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Abstract

We examine the informative value of the 2016 and 2018 supervisory EU stress tests on the basis of the bank stock and CDS abnormal returns they have caused. Our conclusions are based on results from event study analysis and from regressions on the determinants of bank stocks' abnormal returns. We conclude that the 2018 stress test has been comparatively more informative for investors but only for a sub-group of banks based on sovereign debt-ridden and non-Eurozone countries. The robustness of our results is tested by applying an exhaustive set of event study test statistics on abnormal returns generated from both single and Fama-French factor models. The equity Tier I, leverage and profitability ratios are important determinants of abnormal bank stock returns for the same group of countries as in the event study analysis. Non-linear reactions highlight the fact that investors assign varying degrees of importance on the information they get from the stress tested financial ratios. Overall, our results substantiate the claim that the recent EU stress tests have been calibrated towards revealing the weaknesses of the banking sectors of peripheral Eurozone and non-Eurozone countries.

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JEL classification: G21, G28.

1. Introduction

In the aftermath of the recent Global Financial Crisis, the banking sector supervisory authorities have started employing stress tests more consistently than in the past in their pursuit of uncovering the fragilities in their banking sectors. Since then, stress tests are being conducted regularly, both in the European Union (EU) and the U.S., whereas details of these exercises are often being disclosed to the public. The main argument for conducting those stress tests is that the complexity of modern banking institutions is so high that it is impossible for outsiders to form an accurate idea of the true value of those companies (Petrella and Resti, 2013, Kapinos *et al.* 2018). Therefore, the implementation of well-structured stress tests will either appease the ungrounded fears of investors or by disclosing previously unidentified risks will oblige the banking institutions to repair their capital ratios and therefore to contribute to the overall financial stability.[1] The usefulness of stress tests is also manifested through a market discipline mechanism for banks which do not fail the stress tests but are still considered to be financially fragile. This market discipline mechanism can also function in an ex-ante way when bank managers, in expectation of forthcoming stress tests and knowing the type of the regulator, act pre-emptively by adapting their policies accordingly (Bookstaber *et al.*, 2014).

The market reaction to stress tests hinges crucially however on the targets regulators have set about to fulfill. A "soft" regulator might prioritize the fast recovery of the economy and the benefit of avoiding the hassle of a series of costly defaults, at the risk of experiencing future financial stability problems. On the other hand a "tough" regulator prioritizes financial stability, which leads to a situation of having more banks being recapitalized, at the risk of causing a recession. Therefore,

[1] Fixing the capital ratios can be done by either increasing the numerator (capital) or reducing the denominator (assets), with the latter option considered to be detrimental to financial stability (due to fire-sale effects) or to hopes for an economic recovery (due to credit crunch effects). Hanson *et al.* (2011) report that banks reduce their lending when they experience a negative shock to their capital. Also, Acharya *et al.* (2018) and Calem *et al.* (2016), among others, have found that banks which underwent the U.S. stress tests reduced their loan activity.

each regulator has built his own reputation and the information value of each stress test exercise will depend on the market participants' perception for the regulatory reaction.[2]

A relative obvious way to judge the informative value of the implemented stress tests is to examine empirically the reaction of bank stock prices at the time the results are disclosed to the public. However, even if a significant reaction is not being detected it can still be claimed that markets have already reacted when the details of the stress tests were first announced. In this case, investors had been given the opportunity to figure out the implications of the stress tests for banks' balance sheets, with the banks' stock prices adjusting at the time of the announcement. Although a significant reaction can always be interpreted as providing a justification for the choice to implement stress test analyses, in the sense that the degree of opaqueness in the banking sector is reduced, it is the case of an insignificant reaction that raises more questions. The absence of a market reaction can be attributed on a number of reasons like the leniency of the macroeconomic scenarios, the amount of information on stress-testing results that is being disclosed, the knowledge of the type of the regulator or banks' balance sheets being already tuned to the predictable requirements of future stress tests.[3]

The empirical investigation of the significance of market reaction bears the risk therefore of being inconclusive since it relies on the vague idea of expected returns. It is these returns which are then compared to the realized ones to generate the abnormal returns that are the object of the statistical analysis. The first aim of our paper is to explore the sensitivity of the obtained statistical results, concerning the relevance of the pan-European 2016 and 2018 supervisory stress tests, on the abnormal returns generated by different methodologies. To that end we apply the same set of tests

[2] Various papers have investigated the regulator' s choice concerning his type; i.e. being soft or tough. In some of them the choice hinges on the reputation he wants to build (e.g. Morrison and White, 2013, Shapiro and Zeng, 2019) while in others on his ability to provide a fiscal backstop (Faria-e-Castro et al. 2016). It is possible also that the regulator might be "tough" to a certain segment of the banking industry when the structure of the stress test intends to reveal weaknesses pertaining only to banks sharing some common characteristics.

[3] Goldstein and Supra, 2014 suggest that banks choose their investments so that they perform well in repeated, and predictable, supervisory stress tests. Glasserman and Gowtham, 2015, have empirically shown a declining informative value of the most recent U.S. supervisory stress tests since their requirements have become more predictable.

on abnormal returns generated by two distinct models; a single factor model and a five-factor model suggested by Fama-French (2015). Furthermore, since the event study tests rely on average abnormal returns, which mingle together positive and negative stock price reactions of different banks, we have also used non-directional measures of abnormal returns where the absolute value of the reaction only matters (Flannery *et al.,* 2016). The second question we address is concerned with the determinants of abnormal bank stock price return reactions. First, we examine whether these reactions, in absolute values, are statistically related, possibly in a no-linear way, to certain bank characteristics exemplified by the book / market values of critical financial indicators at the time the stress tests were executed (see, Hirtle *et al.,* 2017). The purpose of this exercise is to identify the type of banks, for instance high or low leveraged ones, which are more susceptible to the disclosure of the stress tests' results. Through this analysis we also derive an indirect evidence on the specific banking institutions regulators had in mind when constructing each stress test. Second, we attempt at identifying the financial indicators which explain statistically the abnormal stock price return, be it positive or negative. Here, we regress abnormal returns on the difference of each financial indicator's value at the end of the stress test period, under the adverse scenario, from its corresponding value at the end of the year preceding the start of the stress test. If stress tests bring any new information to the market then stock price reactions should be statistically related, in a linear or a non-linear way, to how critical financial ratios behaved under those tests. Therefore, this is a supplementary test to the event study analysis of the first part which however has the additional value of indicating the financial ratios investors are responsive to when the stress test results are disclosed to the public.

The analysis is conducted on samples of the financial institutions that underwent the EU 2016 and 2018 stress tests, and have their stock traded in stock markets, as well as on sub-samples that focus on banks sharing some common characteristics, i.e. originating from core / peripheral euro countries or countries which are not members of Eurozone. We concentrate our attention on the two most recent EU stress tests where a capital threshold has not been used and the results have been used by the competent authorities as an assessment for banks' forward looking capital planning. Our obtained evidence from an event study analysis indicates that the 2018 stress test had a greater impact than the 2016 one. On the other hand, the 2016 stress test emerges as being more informative when our judgement is based on the average abnormal reaction of Credit Default Swap spreads. However, in both cases the impact of the stress tests is observed on a sub-sample of the banks which either belongs to no-Eurozone countries (2018 stress test) or to countries especially hit by the recent Eurozone sovereign risk crisis (2016 stress test). This piece of evidence is further substantiated when we look at the determinants of the stock price return reactions. Financial ratios like the common Tier I and leverage ratios consistently explain a larger proportion of either the absolute value or the actual changes of bank stock abnormal returns, but again for the same group of countries which were identified as more responsive in the event study analysis.

The second section of the paper offers a brief review of the accumulated evidence of the relevance of the stress tests implemented up to now in both the EE and the USA since 2009. In the third section we present the models we used in order to generate the expected returns, the event study tests we apply and the equations we estimate in order to identify the crucial abnormal stock price returns determinants. In the fourth section we report and analyze the empirical results. We conclude in a final section with the main lessons we have learnt for the relevance of the 2016 and 2018 stress tests.

2. Overview of supervisory stress testing

As a result of the argument developed in the Introduction, a supervisory stress test is considered to have been successful if it brings new information to the market concerning the risk-taking "attitude" of each bank. In that case, we could observe an abnormal reaction of each bank's asset prices that would either reward or punish it for its risk-taking policy. A great number of recent studies therefore have embarked on empirically examining the significance of banks' security prices reaction when stress tests are either announced or their results are released. For instance, Hirtle et al. (2009) examined the 2009 Supervisory Capital Assessment Program (SCAP) in the USA and concluded that it did not add any information to the established market's perception on the "quality" of the institutions that underwent the stress test exercise. On the other hand, Peristiani *et al.* (2014) assessed, with an event study analysis, the same program and concluded that stock prices reacted only to the unanticipated component, if any, of the extra capital banks had to raise as a result of the stress test. Neretina *et al.* (2014) examined the evidence from the Comprehensive Capital Analysis and Review (CCAR) and the Dodd-Frank Act Stress Testing (DFAST) programs conducted in the U.S. over the period 2009-2013 and concluded that they had marginal effects on stock prices, especially through their negative impact on the systemic risk. However, they were able to establish a strong negative reaction of CDS prices to the disclosure of the stress test results. Flannery *et al.* (2016) and Hirtle *et al.* (2017) attribute the recorded weak impact of the stress tests on the choice of the average abnormal returns when testing for their relevance. Since average abnormal returns merge together positive and negative stock price reactions they suggest the use of the absolute values of abnormal returns which, in their case, offer more promising results for the reaction of stock prices. Other researchers have detected a decreasing impact of the most recent stress tests which they attribute either to the reduction of economic uncertainty after its peak during the global financial crisis or to the greater predictability of the Federal Reserve's bank stress tests. Glasserman and Gowtham (2015) argue that banks optimize their behavior for a specific supervisory hurdle and therefore they can generate other risks, which are more difficult to detect. Hirtle *et al.* (2017) find evidence supportive to the significance of the stress tests by looking not only at the abnormal stock and CDS returns, in absolute values, but also on the abnormal trading activity and implied volatility indices. They also establish a contagion effect to banks which were not covered by the stress test exercises and that private information producers, such as stock analysts, are not driven out due to the recurrence of these exercises.

Similar studies have been conducted on the experience from the supervisory stress tests in the European Union (2009, 2010, 2011, 2014, 2016, 2018). Blundell-Wignll and Slovik (2010) blame the favorable treatment of government bonds, in the sense that only those in the trading portfolio were subject to credit-related losses in the 2010 EU stress test, for its small credibility. Cardinali and Nordmark (2011) applied an event study analysis in order to study the stock market reaction to the 2010 and 2011 EU stress tests. They also concluded that the 2010 stress test had been rather uninformative while the announcement of the 2011 stress test triggered negative stock price reactions. Also, they discern no different reaction for the countries in the south of Europe. Candelon and Sy (2015) rely on event study methodologies to evaluate the market impact of the stress test exercises in the U.S. and the EU over the period 2009-2013. They conclude that only the EU 2011 stress test produced a negative impact on stock prices although the governance of the stress test might have been more informative to market participants than the release of quantitative results. Petrella and Resti (2013) relied also on event study methodologies to examine the 2010 and 2011 stress tests and concluded that the market was not able to anticipate the test results. Therefore, the tests mitigated bank opacity. In contrast Sahin and de Haan (2015) failed to show, through an event study analysis, that bank stocks and CDS reacted to the assessment exercises. Finally, Ellahie (2013), by relying on option implied volatilities and equity and bond bid-asked spreads, finds that the disclosure of the 2011 European stress test results reduced information asymmetries among investors but increased uncertainty more broadly.

As is evident from above there is an inconclusive verdict on the relevance of the supervisory stress tests exercises and there have been various arguments substantiating this view. All these tests differ among themselves on the basis of the authority that conducted them, the severity of the underlying macroeconomic scenarios, the methodology of the test (e.g., the simulation window, the models linking variables at the bank level to the macro factors defined in the scenarios, the application or not of caps and floors in order to promote comparability, the degree of common definitions on balance sheet items), the differences in the resolution mechanisms in the aftermath of the disclosure of results, the presence or not of fiscal backstops and the amount of information that is released to the market (on the last issues see Morrison and White, 2013, and Shapiro and Skeie, 2015).[4]

Among the most severe critics to the methodologies employed in the stress tests exercises are those that criticize the adopted bottom-up strategy that relies on risk-weighted assets, where these risk weights are conditional on internal models employed by banks, and the privileged treatment of most EU sovereign bonds that carry a zero risk- weight coefficient (see e.g. Acharya and Steffen, 2014, Acharya, *et al.*, 2016, Pierret and Steffen, 2018). They claim that the regulatory assessments of capital shortfalls of European banks severely underestimate them, when compared to those from partly market-based models, and this might be an explanation for the poor informative value of the stress tests found in many studies. In order to address this problem they opt for a top-down approach which relies on simulated bank equity returns on the event of experiencing a systemic financial crisis exemplified by a dramatic decline to a global stock market index. For instance, Acharya *et al.* (2016) and Pierret and Steffen, (2018) show that their stressed capital shortfall measure, SRISK, shows a severe under-capitalization of the European Banking system when compared to the regulatory assessments of the 2016 and 2018 stress tests.

3. Data Sources and Testing Methodology

Our data consist of daily observations for stock prices and CDS spreads of banks, from 15 European Union (EU) and European Economic Area (EEA) countries, that participated in the EU-wide 2016 and 2018 stress tests. Since a number of the banking institutions are not public listed companies we use data on 35 banks for both the 2016 and 2018 stress tests (out of 51 and 48 banks

[4] Gross and Población (2019) analyze the implications of model uncertainty, concerning the link between macro stressors and bank variables, for the capital estimates produced by the stress tests.

respectively that were involved in the two tests).[5] The data regarding the EU-wide 2016 and 2018 stress tests cover the period 4/2/2016- 9/8/2016 and 10/5/2018- 13/11/2018 respectively and have been extracted from Datastream. We also make use of the published results of the 2016 and 2018 stress tests, for each bank, for their fully loaded Common Equity Tier 1, fully loaded Leverage, Coverage and profitability ratios over two different dates, for each test, i.e., 31/12/2015, 31/12/2018 and 31/12/2017, 31/12/2020.[6]

For each stress test we concentrate on the release of the results date (i.e. 29/7/2016 and 2/11/2018). Around each event day we calculate cumulative abnormal returns for various periods ranging from a 3-day, [-1, +1], to a 15-day, [-7, +7], event windows.[7] The abnormal stock price returns have been generated by subtracting the realized return on a particular date from the expected one that has been calculated from either a single factor or a five-factor Fama-French (2015) model.

The single factor model is expressed by:

$$R_{i,t} = a_i + \beta_i R_{m,t} + \varepsilon_{i,t} \qquad (1),$$

where $R_{i,t}$ is the daily stock return on bank i at time t and $R_{m,t}$ the corresponding return of a market index which in our case is represented by the MSCI Europe Index (see also Sahin and de Haan, 2015).[8] In the case of the CDS prices we have also relied on their daily returns and abnormal returns have been generated in a similar fashion as before whereas the *i-Traxx Europe* index has been used

[5] When tests on CDS spreads are involved our sample size reduces to 32 and 28 observations for the 2016 and 2018 stress tests respectively.

[6] The data on 31/12/2018 and 31/12/2020 refer to the values of the financial ratios at the end of the third stressed year under the adverse scenario case, while the data on 31/12/2015 and 31/12/2017 to the corresponding values at the end of the year preceding the implementation year of each stress test. The source for these data is the European Banking Association's publications "2016 & 2018 EU-Wide Stress Test- results".

[7] Since the test results were published at 22:00 CET (2016) and at 18:00 CET (2018), the first trading date in the event windows is day (+1) and not day (0). However, we choose to abide by the announcement date and therefore this should be borne in mind in the interpretation of the results.

[8] We believe that the MSCI Europe Index better represents the market portfolio due to the size and the breadth of activities of most of the banks in our sample. Moreover, the use of domestic general stock indices would most probably generate biased estimates due to endogeneity issues. The domestic general stock indices are substantially dependent, directly or not, on the valuation of the participating in these indices domestic banks. Acharya and Steffen (2014), Acharya et al. (2016), among others, are using the MSCI World index in their studies for the measures of the systemic risk of banks.

as the market index. Equation (1) is estimated with OLS over an estimation window of 60 days for the EU-wide 2016 and 120 days for the EU-wide 2018 stress tests. Each estimation window ends at the beginning of the longest event window [-7, +7].[9]

On the other hand the Fama-French (2015) model is expressed by equation (2) where a sixth factor, the daily exchange rate return of the domestic currency to the USD, has been added since the returns of the other five factors are in USD terms. Also, the 1-month offered Euribor rate has been used as the risk-free rate since the stock prices, of even the non-Eurozone banks in our sample, are expressed in euros. Specifically, we estimate the following equation:

$$R_{it} - r_{ft} = a_i + b_1\left(R_{Mt} - r_{ft}^{\$}\right) + b_2(SMB_t) + b_3(HML_t) + b_4(RMW_t) + b_5(CMA_t) + b_6(RFX_t) + e_t \qquad (2)$$

In this equation R_i is the daily return of security i, r_f the 1-month Euribor rate, $(R_M - r_f^{\$})$ the difference between the return of a market weighted portfolio from sixteen European countries and the US 1-month treasury bill yield, *SMB* the return on a diversified portfolio of European small stocks minus the corresponding return of big stocks, *HML* is the difference between the returns of European value portfolios minus the return of growth portfolios, *RMW* is the difference between the returns of diversified European portfolios with strong and weak profitability, *CMA* the difference of returns from portfolios of stocks from conservative minus aggressive European companies and *RFX* the daily return of the exchange rate[10].

After having estimated model (1) or (2) we generate abnormal returns, which are defined as:

$$AR_{i,t} = R_{i,t} - \widehat{R_{i,t}} \ , \qquad (3)$$

[9] In comparison to other event studies we have a short estimation period. Although this is necessitated from the presence of two events, the announcement and the release of the test results, within the same calendar year, the fact that the estimation period is short, and closer to the event window, makes the null hypothesis of event indifference less likely to reject.

[10] The data for the Fama-French (2015) factors and their description can be found at: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#International

where $\widehat{R_{i,t}}$ represents the predicted return over each day in the "event window" from models (1) or (2). Then, the Cumulative Abnormal returns (*CAR*) over the "event-window" [-T, +T] are defined by:

$$CAR_{i,T} = \sum_{t=-T}^{T} AR_{i,t}. \qquad (4)$$

We are interested in testing whether the average of the *CARs* over all N banks, i.e. *CAAR*, equals zero. Under the assumption that individual bank's abnormal returns are independently normally distributed, the *Cross Sectional Standard Deviation* test statistic for the null hypothesis H_0: *CAAR=0* is given by:

$$t_{CAAR} = \sqrt{N}\frac{CAAR}{SD_{CAR}}, \qquad (5)$$

where *SD* is the standard deviation of the *CARs* in the event window and the *t-statistic* follows a *t-distribution* with (N-1) d.o.f.[11]

Although most papers base their evidence on this test, its rather restrictive assumptions like the normality of the abnormal returns, the absence of event-induced volatility and cross-sectional independence, necessitate the use of other less restrictive tests in order to safeguard the soundness of our evidence. Therefore, we also implement the Patell (1976) test procedure which by standardizing the residuals with the estimation interval's dispersion of ARs accounts for the event-induced volatility. Boehmer *et al.* (1991) have shown that the Patell test is still prone to event-induced volatility changes and have developed a more robust test, indicated as the BMP test statistic. Kolari and Pynnönen (2010) have shown that the afore mentioned test statistics over-reject the null hypothesis that *CAAR=0* in the presence of cross-sectional correlation and therefore have developed adjusted versions of those tests, denoted as adjusted-Patell and KP respectively. Finally, if we relax the assumption that abnormal returns are normally distributed we can still test for the impact of the

[11] This is actually a joint test that abnormal returns are zero and that the adopted model for the generation of expected returns is correct.

disclosure of the stress test results on abnormal returns by resorting to non-parametric tests. Specifically, we report results for the Wilcoxon signed rank test and the Generalized Rank (GRANK) test, which accounts for event-induced volatility and cross-correlation of returns (Kolari and Pynnönen, 2011).

Flannery et al. (2016) and Hirtle *et al.* (2017) have convincingly argued that the above procedures, when applied to event studies, tend to over-accept the null hypothesis that the event is not significant. The argument they put forward states that the event might generate positive and negative Cumulative Abnormal Returns, *CARs,* which are netted out when we form the *CAAR*. In order to address this issue we again resort to the non-parametric Wilcoxon signed rank test. To that end we obtain the absolute values of the *CARs* over the event window for each financial institution in our sample and compare it to the corresponding average absolute values calculated from rolling samples over the last 120 days in the estimation period. Then, the Wilcoxon signed rank test will reject the null that the difference between the pairs, from 35 banks, follows a symmetric distribution around zero if the release of the results has caused a substantial reaction of the abnormal returns, being either positive or negative (see, Flannery *et al.* 2016, Hirtle *et al.* 2017).[12]

In the second part of our empirical investigation we try to identify factors that explain the behavior of the estimated cumulative abnormal returns. To that end we run regressions where the dependent variable is either $|CAR_{i,T}|$ or $CAR_{i,T}$, *i=1,….N,* and as independent variables we use various financial ratios. In the first case, we examine whether the size of the stock price reaction, represented by $|CAR_{i,T}|$, can be explained by certain bank characteristics expressed from the values of four financial ratios at the end of the financial year preceding the stress test period, i.e. 31/12/2015 and 31/12/2017 for the 2016 and 2018 stress tests respectively. Those ratios comprise of the common equity Tier I capital and the leverage ratios, the profitability of each bank, defined by the ratio of

[12] The same procedure has been applied on the absolute values of CDS spread changes.

annual profits over the common equity Tier I capital, and the coverage ratio, defined as reserves over non-performing exposures, as a measure each bank's policy towards managing its credit risk.[13] We have also tested whether the observed stock price abnormal reactions in absolute values, $\left|CAR_{i,T}\right|$, can be explained by market based measures of risk expressed by the last available observation, before the start of each event window, of banks' CDS spreads or their corresponding SRISK measure of capital shortfalls (Acharya *et al.* 2012) .

In the second case, when we examine the stock price abnormal reactions themselves, i.e. *CARs*, we use as regressors the differences between the reported values of the afore-mentioned financial ratios under the adverse scenarios on 31/12/2018 and 31/12/2020, and their values at the end of the year preceding the year of the announcement of the stress tests, on 31/12/2015 and 31/12/2017.[14] Finally, we have also tested whether the abnormal reaction of *CDS* spreads, over the same event window, can be a significant determinant of the observed stock price abnormal returns. If market participants interpret the released results as implying a deterioration in riskiness then a significantly negative relationship between the stock price and *CDS* abnormal returns should be expected.

The first hypothesis therefore we test is whether bank characteristics have any relevance to the absolute value of the abnormal returns. Since however the nature of this relationship can be a non-linear one and more specifically quantile dependent, we run quantile regressions which are better suited to reveal any possible significance. Therefore, one would expect that stock price abnormal returns, under an adverse macroeconomic scenario, are moderate for, better capitalized, more profitable and more covered against possible losses from non-performing loans banks. This

[13] The fully loaded common equity Tier I and leverage ratios has been used for the 2018 stress test case. The profitability index is available only for the 2018 stress test.

[14] The choice of these financial ratios is dictated by the policy of EBA to report their values in the stress tests summary reports and by the recent literature on the relevance of balance sheet items for the behavior of banks' stock and CDS returns, in the aftermath of the global financial and European sovereign debt crises (e.g. Chiaramonte and Casu, 2012, Demirguc let al. , 2013, Drago *et al.* 2017).

reflects the perception that the unexpected outcome, better or worse, of a stress test exercise little matters for the future of this type of banks. On the other end of the spectrum, abnormal returns would react dramatically on the unexpected outcome , better or worse, of a stress test when critical financial ratios indicate a financially unhealthy situation. Since all the above-mentioned financial ratios are not indicative of the market's perception on each bank's riskiness, we have also considered the case where the dependent variable is either the CDS spread of each bank at the last date of the estimation period or the SRISK measure of systemic risk at the same date (Acharya *et al.* 2016, Pierret and Steffen, 2018). Again, a positive relationship would be expected between the level of the CDS spread / the SRISK measure and each bank's stock price absolute abnormal return. Finally, in the case when the stress test outcome is expected and has already been incorporated in the prices before the release of the information date, no statistical relationship is expected to be revealed between the absolute value of abnormal returns and financial ratios reflecting the financial condition of banks.

The equations we estimate are of the form:

$$|CAR_i|/q_\tau = \alpha_\tau + \beta_{1,\tau}X_{j,i} + \varepsilon_{i,\tau}, \quad (6)$$

where q_τ indicates the quantile τ of the dependent variable $|CAR|$ of bank i and $X_{j.i}$ refers to the j financial ratio. Since it can always be claimed that the relationship between banks' characteristics and their *CARs* varies with the home country of each bank, we have also considered the following specification:

$$|CAR_{i|}|q_t = a_t + \beta_1 X_{j,i} + \beta_2 Z_K + \beta_3 X_{j,i} Z_K + \varepsilon_{i,\tau}, \qquad (7)$$

where Z is a dummy variable that takes the value of one, interchangeably, if a bank is one of the EU core, peripheral or non-eurozone K group of countries. The rationale behind making our results conditional on the home country of each bank is that, for most of them, their asset and liability sides are heavily home-biased and the European Banking Union "project" is still far from being completed.[15] This last issue generates risks from the presence of the sovereign – bank doom loop (see, Acharya *et al.*, 2014).

The second hypothesis we test is whether the calculated *CARs,* under both the single index and the Fama-French models, are statistically related to the difference of financial ratios' values at the end of the stress test period under the adverse scenarios, on 31/12/2018 and 31/12/2020, from their values at the end of the year preceding the year of the announcement of the stress tests, i.e. on 31/12/2015 and 31/12/2017. The specifications we estimate are identical to equations (6) and (7) shown above whereas now $X_{j,i}$ refers to the difference of the financial ratios and *CAR is* the dependent variable, be it positive or negative. Since three of the financial ratios considered, i.e. the common equity Tier I, the leverage ratio and the profitability index, deteriorate under the adverse scenario, their values in the sample are always negative. If the outcome of the stress test exercise is anticipated then the revealed change in the financial ratios under the adverse scenario would be irrelevant for investors and therefore the coefficients β_1 and β_3 wouldn't be statistically significant. On the other hand if the released results are worse than expected, significantly positive estimates of β_1 and β_3 would be obtained. Finally, negative estimated values for the two coefficients cannot be excluded in the case when the market has already gone through some correction in anticipation of bad results which were proved however to be better than expected. As concerns the coverage ratio data they take values in the last year of the stressed period, in some cases, which are larger than the corresponding values at the beginning of this period. Therefore, the observations in our sample of the coverage ratio variable are both positive and negative and consequently it is harder to interpret the sign of the estimated coefficients β_1 and β_3.

[15] In the empirical section for the non-directional measures of reaction we have transformed regressors to *(1- X)* so that higher values are always implying a worse state of the financial ratios. Therefore, if financial ratios matter β_1 and β_3 should be positive.

4. Empirical Evidence

4.1 Event study – Single factor model

In Tables 1 and 2 we present the evidence from the event study analysis on the significance of the *CAARs*, for the stock prices and CDS spreads respectively, which have been generated from the single factor regressions shown in eq. (1). Then, Table 3 shows the corresponding evidence for the direction neutral measures of reaction, $|CARs|$.

Although there appears to be no consistent evidence in favor or against the null hypothesis that the *CAAR* are insignificant, a certain pattern in the results can still be detected. The release of the 2016 stress test results seems to have had a very limited impact on stock prices as this is verified by the small number of cases where the null hypothesis H_0: $CAAR=0$ is rejected. Among the various tests that have been implemented the most favorable to the rejection of the null case is the Wilcoxon non-parametric test whereas the choice of the event window makes no difference. The evidence for the 2018 exercise is slightly more favorable to the impact of the stress test since a substantially higher percentage of rejections of the null has been obtained. A more careful however inspection of the results reveals that it is the group of non-Eurozone countries that "drives" this evidence. Among the various event windows the poorest evidence for the impact of the stress tests is obtained for the [-7,+7] case which might imply the presence of an initial reaction in the opposite direction from the one the [-7, 0] event window produces. Finally, it is worth noting that all the reported *CAARs* are positive which leads us to conclude that the revealed stress test results had been on average better than those expected by the market.

[insert Tables 1 and 2 around here]

In Table 2 the evidence is reported for the abnormal reaction of the CDS spreads in the period around the release dates of the 2016 and 2018 stress tests. In comparison with the Table 1 we observe that we have obtained a higher percentage of cases for the 2016 stress test where the null hypothesis, that the test had no impact, is rejected. The number of rejections are equally distributed among the three groups of countries with a higher percentage of them appearing in the [-7,+7] event window. Finally, all the reported results on the *CAAR*s are negative which implies that the market expected that banks carried a larger degree of credit risk than what the stress test revealed. The corresponding evidence for the 2018 stress test, shown in the same Table, points to the opposite direction, that the release of the data had no impact on the perceived credit risk of the banks undergone the stress exercise. [16]

In Table 3 we turn our attention to the Absolute values of the Cumulative Abnormal Returns (*ACAR*). We apply the non-parametric Wilcoxon test under which we compare the calculated value of the *ACAR* during the event window, for each bank, to the average value from rolling samples over the last 120 days in the estimation period (see also, Hirtle et al. 2017).[17] The reported evidence indicates that we have strong rejection of the null hypothesis, that the revealed results had no impact, only in the case of the CDS spreads for the 2016 stress test and for the [0,+1] event window. Also, in half of the reported cases for the behavior of stock prices, under the [0,+7] event window, a rejection of the null has been obtained for both the 2016 and 2018 stress tests. These results cannot be compared directly to those reported in Tables 1 and 2 since the series under comparison are different. However, we can conclude that netting out positive and negative return reactions, that the *CAAR* index implies, seems not to be the crucial factor, as other researcher cite for the U.S.

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[16] All the tests reported above have also been applied on the *CAARs* generated around the announcement of the stress tests dates (24/2/2016 and 31/1/2018). The evidence is similar, qualitatively, to the one presented for the release dates, in the sense that a small number of rejections of the null hypothesis is recorded (2016- peripheral countries, 2018-non-eurozone and peripheral countries). Similarly, the *CAAR*s of CDS spreads have been found, in many tests, to be significantly different from zero, and positive, for the groups of "core" EE countries (2016 and 2018) and "non-Eurozone" countries (2018). These results are available upon request.

[17] The announcement and release of the results dates were very close to each other for the 2016 stress test and therefore we had to adopt a smaller sample of 60 days. For the 2018 stress test the results are not sensitive to the choice of a 60 or 120 days period for the calculation of average |CAR|s and therefore we report the evidence derived from the 120 days period.

stress tests, that leads to having a small number of rejections of the null hypothesis in Tables 1 and 2 (see, Flannery *et al.*, 2016 and Hirtle *et al*., 2017).

[insert Table 3 around here]

4.2 Event study –Fama/ French model

The next step of our analysis sets to examine the sensitivity of the evidence we have already obtained from the single factor model to a different specification for the "expected" returns generating process. To that end we have used the 5-factor model of Fama and French (2015) and then we applied the same testing methodology for the significance of the *CAARs* as in the single factor model case. In Table 4 we report the marginal significance levels obtained from the various test statistics and groups of countries.[18] The evidence is overall more favorable to rejecting the no impact hypothesis and this is more clearly seen in the 2018 stress test case. The evidence is overwhelmingly in favor of the rejection of the no-impact hypothesis for the non-Eurozone group of countries and to a considerable degree for the peripheral group of countries as well (compare with Table 1). The results for the 2016 stress test are again more favorable, than those in Table 1, to the relevance of the stress test exercise although they are not so strong as those referring to the 2018 test. Overall, we can conclude that the choice of the "expected" returns generating model does matter for the evidence we derive. [19]

[insert Tables 4 and 5 around here]

In the last part of this section we report in Table 5 the evidence for the significance of the Absolute Cumulative Abnormal Returns. We follow the same testing methodology as above, in Table 3, and the evidence is overwhelmingly in favor of the null hypothesis that the stress tests had

[18] We report results for the release of the stress results dates only as well as for the [0,1] and [0,+7] event windows. Results for the other cases are available upon request.

[19] The relevance of the Fama-French model can also be judged by the fact that the calculated *CAARs* carry, in the great majority of cases, the same sign and they are similar in size to those obtained from the single factor model.

no impact. This is again an evidence that turns the verdict not in the direction of accepting the relevance of the stress tests, as mentioned by other researcher, but in the opposite direction of not being relevant.

4.3. The determinants of the Cumulative Abnormal Returns

In this section of our empirical investigation we focus on uncovering the deterministic factors of the Cumulative Abnormal Returns, *CARs*. We first examine whether the no-directional measures of reaction, i.e. the *Absolute Cumulative Abnormal Returns*, are related to the values of the common equity Tier I ratio, the leverage and coverage ratios, the CDS spread and the profitability ratio (available only for the 2018 case).[20] If the released data, for the adverse case scenario, bring new information in the market then we would expect that investors would have been less nervous about the financial viability of the banks concerned, the higher the values of the above mentioned ratios were at the beginning of the stress test period, i.e. on 31/12/2015 and 31/12/2017. For instance, in the case when these financial ratios are low, if the released data are worse (better) than expected we would observe a larger negative (positive) reaction of stock prices in comparison to the case of banks with high values on these financial ratios.

The results are presented in Tables 6 and 7 for the 2016 and 2018 stress tests respectively and for the [0,+1] event window only. In the first three columns we present the evidence from the estimation of eq. (6) for the full sample. The first column refers to the OLS case and the other two to the corresponding evidence for two different quantiles, 25% and 75%, of the dependent variable. As

[20] The common equity Tier I ratio is directly related to the needs for recapitalization in the case of a bad performance of a bank in the stress test exercise. On the other hand, many authors claim that this ratio is irrelevant for the market participants due to the unrealistic, regulatory imposed, risk weights or due to the "manipulation" these weights undergo when they are internally calculated. As a result many believe that the financial resilience of a bank is better expressed by the value of the leverage ratio (see Acharya *et al.,* 2014, Pierret and Steffen, 2018). The coverage ratio is directly related to the credit risk a financial institution carries. On the other hand however this a backward looking measure of credit risk since it is applied only on the exposures which have been already spotted as non-performing. Therefore, we also use the CDS spread of each bank as a market based measure of the credit risk and the SRISK measure of systemic risk as a quasi-market based measure. Finally, the profitability index can also be seen as an indirect measure of the state of liquidity.

we observe the explanatory power of the chosen ratios is very low towards explaining the behavior of the |*CARs*|, on both stress tests and irrespectively of the abnormal returns generating model.

[insert Tables 6 and 7 around here]

Then, we turn to interactive models, shown in eq. (7), where we allow the chosen financial ratios to have an impact that varies with three distinct group of countries, i.e. the core and peripheral ones in the Euro area as well as the non-Eurozone ones. The results appear in the remaining nine columns in Tables (6) and (7). The overall picture is better than before since the explanatory power of the models have increased substantially. For instance, when the common equity Tier I ratio appears as the dependent variable the coefficient of determination takes the value of 22% for the peripheral countries in the 2016 test and 37% for the non-Eurozone countries in the 2018 stress test. Similarly, the coefficient of determination is larger for the other financial ratios as well. The explanatory power of each financial ratio is captured by the significance of the coefficients β_1 and β_3, where for the interpretation of their sign it is useful to recall that the dependent variables, *X,* are inserted in the estimated equations as *(1-X);* therefore an increase of the their value signifies a deteriorating situation. Consequently, and according to the arguments outlined above, we would expect that they are positively related to the dependent variable when the released information has not been already discounted. The reported estimates in the first there columns of Table 6, for the entire sample, indicate that in the majority of cases the estimated coefficient β_1 is insignificant. These results tie well with the evidence in Table 1, and the column on [0,+1], where the *CAAR* estimate was found to be insignificantly different from zero. However, when we look at specific group of countries a more encouraging picture emerges. For instance, the Tier I (coverage) ratio appears to be significant for the EU core (peripheral) group of countries, for the 2016 test, with its impact varying with the quantiles of the dependent variable.[21] Moreover, the sum of the statistically significant β_1 and β_3 coefficients, in the Tier I case mentioned above, indicates a positive reaction

[21] This evidence in some cases is produced from the single factor model while in others from the Fama-French model.

whereupon a deterioration of the ratio is compatible with a larger, in absolute values, abnormal reaction. Similarly, in Table 7 we present the evidence for the 2018 stress test. Again the significance of the various financial ratios becomes evident when we focus on specific group of countries. For instance, all financial ratios appear to be statistically significant, and positive, in the *OLS* estimations for the non-Eurozone group of countries while the profitability index is a significant contributor to the |*CARs*| behavior for the Eurozone core countries as well. Overall, the evidence we provide is compatible with those given in Table 1 (column on [0,+1]) on the significance of the *CAARs* for the 2018 test (especially for the non-Eurozone countries). Also, the estimates of β_3 are always correctly signed but not those of β_1 ; although the last ones are significant only in the case where the leverage ratio is the dependent variable.[22]

[insert Tables 8 and 9 around here]

In Tables 8 and 9 we present the evidence from estimating equations 6 and 7 whereas now the dependent variable expresses the actual value of *CAR* while the independent variables refer to the financial ratios defined as the difference of their values on the last year of the stress tested period, under the adverse scenario, from their values at the beginning of this period. Therefore, these values are always negative for the equity Tier I, the leverage and profitability ratios and we would expect them to be related to the dependent variable in a positive way. However, negatively estimated values cannot be excluded if the released stress test result is considered better than expected, in which case a positive reaction of the stock price would be observed as well.[23] The overall picture tells us that the coefficient of determination increases drastically in the interactive models where we allow for a different reaction for the Eurozone core, peripheral and the non-Eurozone countries. Also, among the

[22] The perceived market risk, exemplified by the CDS spreads (Tables 6 and 7) and the SRISK measure of risk (available upon request) at the beginning of each stress test period, do not appear to be significant determinants of the Absolute Cumulative Abnormal Returns.

[23] The difference of coverage ratio values takes both positive and negative values in the sample which makes the estimated values of β_1 and β_3 more difficult to interpret. The *CDS* variable is calculated as the difference between its value on the day the stress test data were released and its value on the last day of the estimation period. Therefore, endogeneity bias issues cannot be excluded in this case.

various financial ratios, the common equity Tier I, the leverage and profitability (for 2018 only) ratios produce the highest coefficients of determination. With respect to the estimates of coefficients β_1 and β_3, at the 2016 test, we observe that they appear to be statistically significant for the common equity Tier I and the leverage ratio models only (Table 8). The β_1 coefficient takes everywhere negative values while the β_3 is positive in one half of the cases. The results look very similar when we examine the 2018 stress test case in Table 9. The estimates of β_1 and β_3 are statistically significant in a great number of cases but negatively signed in almost all of them. For the other two models, the coverage ratio does never appear to be an important contributor to the stock price reactions while the profitability ratio is statistically significant with the β_1 and β_3 coefficients coming with the expected positive sign. With respect to the comparison between the single factor and the Fama-French models we notice that the results they produce are very close qualitatively. Finally, the estimated values, and the significance, of the various coefficients vary among the different quantiles.[24]

[insert Diagrams 8 and 9 around here]

In Diagrams 1 and 2 we offer a visual presentation of the impact of various financial ratios, on different group of countries, in order to highlight the differences a) between the single and the Fama-French models and b) among the different quantiles of the dependent variable. In each case we have calculated the impact of a 100 basis points reduction of the respective financial ratio on bank stocks' CARs. The calculations are based only on the statistically significant coefficients β_1 and β_3 of Tables 8 and 9. The diagrams indicate that looking at the full sample of banks masks differences in the pattern of the response of market participants which varies with the group of countries and the

[24] We have re-produced Tables 6 to 9 for the event windows [-1,+1] and [0,+7]. The main pattern of the results remains the same. The coefficients of determination are larger for the [-1,+1] window and somewhat smaller for the [0,+7] one. Also, the percentage of the cases with statistically significant β_1 and β_3 coefficients fluctuates around the same levels as in Tables 6 to 9 and the best performing models are again the interactive ones with the Eurozone peripheral and no-Eurozone group of countries. Finally, the estimates on other, more refined, quantiles are qualitatively the same to the ones shown here. These results are available upon request.

quantiles of the CAR. Moreover, differences are also recorded between the two “expected returns” generating models where a more uniform picture appears for the 2018 stress test.

Finally, we have addressed the question on whether a common pattern among the banks between the two stress test exercises exists in terms of the sign and size of their abnormal stock price reactions. The reason for this investigation is to exclude the possibility that the results of 2018 test are dependent on the outcome of the 2016 test. A high correlation index might imply, among others, that the banks most affected by the 2016 results haven’t implemented corrective actions and therefore find themselves also among the worst performers in the 2018 tests, that the scenarios of the 2016 and 2018 stress tests were very similar so that the same banks are sensitive to them or that there is an irrational behavior among investors concerning their stance against banks with certain characteristics e.g. being located in the peripheral group of countries or having acquired a “bad” reputation from previous test results. The evidence is provided in Table 10 and it is clear that the correlation indices are very low. Therefore, we can reasonably reject all the reasons given above that would justify a dependent pattern of the 2018 bank stock reactions on those of 2016.

[insert Table 10 around here]

5. Concluding remarks

This paper aspires to provide an answer on the relevance for markets participants of the EU 2016 and 2018 supervisory stress test. If their relevance is confirmed then a justification would exist for their existence and the purposes they are meant to fulfill. Our obtained evidence from an event study analysis indicates that the 2018 stress test had a greater impact than the 2016 one, when the criterion for this judgement is the Cumulative Average Abnormal Return, *CAAR*, of bank stock prices. However, the impact of the stress tests is observed on a sub-sample of the banks which either belong to no-Eurozone countries or to countries especially hit by the recent Eurozone sovereign risk crisis. A further analysis on the determinants of the *CARs* shows that financial ratios like the Tier I and the profitability ratios are able to explain a substantial percentage of their variation, but only for certain groups of countries and not for the entire sample of them.

Methodologically, we depart from previous studies on the same topic on a number of issues. First, we supply evidence from a large number of event study test statistics, based on different assumptions, which however tend to confirm the evidence derived from more conventional tests. Second, we have produced abnormal stock price returns from two different models; a single factor model employed by most researchers in this area and a 5-factor Fama-French type model that is used for the first time on EU stress tests studies. Again, the evidence from those two models is qualitatively very similar and this fact reinforces the conclusions we have reached at. Third, we have tested for the significance of non-directional measures of abnormal returns but we have failed to provide more favorable results, to the stress tests' relevance case, as other studies on U.S. stress tests occasions have. Finally, we have tested for a varying impact of financial ratios on specific quantiles of the dependent variable, i.e. the cumulative abnormal stock price returns. Indeed, there are many cases where the quantile estimates differ and this is evidence for the existence of a non-linear pattern of reaction of abnormal returns to their determinants, that is to say the same stress test results for a number of banks are not interpreted always in the same way.

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Table 1: Testing the significance of Abnormal returns around the release date – Stocks –Marginal significance levels are reported.

	29th July 2016 All N=35 countries				2nd November 2018 All N=35 countries			
Event Window	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**
CAAR	-1.62%	0.48%	-1.11%	-0.77%	2.55%	1.73%	1.41%	2.27%
Normality	**0.03**	0.79	0.07	0.54	**0.00**	0.12	**0.00**	**0.00**
Patell	**0.00**	0.25	**0.02**	0.92	**0.00**	0.26	**0.00**	**0.00**
Adjusted Patell	0.41	0.72	0.47	0.97	**0.02**	0.64	0.11	0.23
BMP	**0.00**	0.13	**0.00**	0.90	**0.00**	0.29	**0.00**	**0.00**
KP	0.30	0.70	0.36	0.97	0.05	0.69	0.15	0.08
Wilcoxon	0.09	**0.00**	0.21	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Grank	0.24	0.67	0.30	0.92	**0.04**	0.61	0.15	0.11
	Core countries N=10				**Core countries N=11**			
Event Window	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**
CAAR	-2.21%	1.95%	-1.52%	0.31%	2.28%	0.15%	0.82%	1.37%
Normality	0.07	0.51	0.12	0.88	**0.00**	0.93	0.17	0.27
Patell	0.07	0.45	0.10	0.82	**0.0**	0.89	0.17	0.22
Adjusted Patell	0.40	0.72	0.45	0.91	0.14	0.94	0.49	0.54
BMP	0.07	0.27	0.09	0.76	**0.01**	0.89	0.06	0.14
KP	0.52	0.68	0.54	0.91	0.31	0.95	0.44	0.54
Wilcoxon	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Grank	0.39	0.51	0.50	0.69	0.26	0.96	0.35	0.59
	Peripheral countries N=11				**Peripheral countries N=8**			
Event Window	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**
CAAR	-1.53%	-4.38%	-0.98%	-3.87%	2.79%	4.06%	1.28%	1.86%
Normality	0.42	0.33	0.52	0.22	**0.01**	0.13	0.17	0.33
Patell	0.25	0.31	0.34	0.26	**0.02**	0.11	0.21	0.34
Adjusted Patell	0.63	0.67	0.69	0.64	0.20	0.38	0.49	0.60
BMP	0.05	**0.04**	0.07	**0.02**	**0.00**	**0.00**	0.11	**0.04**
KP	0.57	0.55	0.59	0.50	0.16	0.23	0.46	0.36
Wilcoxon	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Grank	0.50	0.41	0.52	0.34	0.08	0.22	0.26	0.34
	Non-eurozone coutries N=14				**Non-eurozone coutries N=16**			
Event Window	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**
CAAR	-1.28%	3.25%	-0.90%	0.90%	2.42%	1.61%	1.65%	3.07%
Normality	0.111	0.095	0.162	0.499	**0.00**	0.30	**0.00**	**0.00**
Patell	0.105	**0.037**	0.139	0.338	**0.00**	0.44	**0.00**	**0.01**
Adjusted Patell	0.421	0.312	0.462	0.634	**0.01**	0.62	**0.04**	0.11
BMP	**0.000**	**0.010**	**0.008**	0.357	**0.00**	0.52	**0.02**	**0.00**
KP	0.093	0.277	0.248	0.688	0.08	0.70	0.16	**0.00**
Wilcoxon	0.510	**0.000**	**0.000**	**0.000**	**0.00**	**0.00**	**0.00**	**0.00**
Grank	0.064	0.229	0.145	0.800	0.07	0.59	0.19	**0.02**

Table 2: Testing the significance of Abnormal returns around the release date – CDS –Marginal significance levels are reported.

	29th July 2016 All N=32 countries				2nd November 2018 All N=28 countries			
Event Window	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**
CAAR	-0.53%	-10.2%	-3.18%	-6.31%	0.64%	0.92%	0.68%	0.90%
Normality	0.63	**0.00**	**0.00**	**0.00**	0.59	0.76	0.48	0.65
Patell	0.71	**0.00**	**0.00**	**0.00**	0.70	0.94	0.63	0.71
Adjusted Patell	0.90	0.14	0.21	0.18	0.83	0.97	0.79	0.83
BMP	0.49	**0.00**	**0.00**	**0.00**	0.65	0.93	0.59	0.69
KP	0.85	0.18	0.44	0.37	0.81	0.96	0.77	0.83
Wilcoxon	**0.00**	**0.00**	**0.01**	0.39	**0.00**	**0.00**	**0.00**	**0.00**
Grank	0.99	**0.04**	0.22	0.18	0.83	0.89	0.71	0.92
	Core countries N=13				**Core countries N=11**			
Event Window	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**
CAAR	0.23%	-11.8%	-1.64%	-5.33%	-0.16%	3.47%	-0.02%	1.43%
Normality	0.894	**0.004**	0.245	0.066	0.91	0.34	0.98	0.57
Patell	0.842	**0.000**	0.243	**0.006**	0.75	0.51	0.65	0.60
Adjusted Patell	0.934	0.109	0.630	0.258	0.81	0.63	0.74	0.70
BMP	0.639	**0.004**	**0.039**	0.081	0.66	0.30	0.50	0.05
KP	0.880	0.367	0.513	0.580	0.76	0.48	0.64	0.18
Wilcoxon	**0.000**	**0.001**	**0.000**	**0.000**	**0.00**	**0.00**	**0.00**	**0.00**
Grank	0.599	0.174	0.285	0.354	0.72	0.37	0.31	0.21
	Peripheral countries N=11				**Peripheral countries N=7**			
Event Window	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**
CAAR	-1.32%	-10.5%	-3.07%	-6.76%	4.67%	1.50%	3.24%	1.21%
Normality	0.51	**0.02**	0.05	**0.04**	0.09	0.83	0.15	0.79
Patell	0.54	**0.02**	0.05	**0.03**	0.19	0.61	0.39	0.69
Adjusted Patell	0.74	0.21	0.29	0.25	0.28	0.70	0.49	0.74
BMP	0.35	**0.00**	**0.00**	**0.00**	0.23	0.56	0.51	0.71
KP	0.66	**0.00**	0.10	0.09	0.35	0.68	0.61	0.77
Wilcoxon	**0.00**	**0.00**	**0.00**	0.72	**0.00**	**0.00**	**0.00**	**0.00**
Grank	0.66	**0.00**	0.06	**0.05**	0.31	0.37	0.75	0.65
	Non-eurozone countries N=8				**Non-eurozone countries N=10**			
Event Window	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**	**[-1,+1]**	**[-7,+7]**	**[0,+1]**	**[0,+7]**
CAAR	-0.70%	-7.35%	-5.83%	-7.29%	-0.47%	-0.99%	0.04%	0.36%
Normality	0.75	0.15	**0.00**	**0.04**	0.80	0.82	0.97	0.90
Patell	0.79	0.09	**0.00**	**0.01**	0.88	0.94	0.95	0.63
Adjusted Patell	0.85	0.25	**0.00**	0.08	0.91	0.96	0.97	0.73
BMP	0.62	**0.00**	0.10	0.08	0.86	0.94	0.94	0.69
KP	0.75	**0.01**	0.31	0.29	0.90	0.96	0.96	0.79
Wilcoxon	**0.00**	**0.02**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Grank	0.85	**0.01**	0.19	0.20	0.99	0.91	0.86	0.92

Table 3: Testing for significance direction-neutral measures of reaction to the disclosure of the stress test results (absolute values of *CARs*)

A: Stock Returns

		[0,+1]		[0, +7]	
		ΣR+	*ΣR-*	*ΣR+*	*ΣR-*
2016 stress test (29/7/2016)	All countries	222	408	134	442
		H_0: Accepted		***H_0: Rejected***	
	Core countries	17	38	4	51
		H_0: Accepted		***H_0: Rejected***	
	Peripheral countries	31	35	12	54
		H_0: Accepted		*H_0: Accepted*	
	Non-eurozone	28	77	63	41
		H_0: Accepted		*H_0: Accepted*	
2018 stress test (2/11/2018)	All countries	362	267	187	442
		H_0: Accepted		***H_0: Rejected***	
	Core countries	24	42	15	51
		H_0: Accepted		*H_0: Accepted*	
	Peripheral countries	9	27	2	34
		H_0: Accepted		***H_0: Rejected***	
	Non-eurozone	112	23	63	72
		H_0: Rejected		*H_0: Accepted*	

B: CDS Returns

		[0,+1]		[0, +7]	
		ΣR+	*ΣR-*	*ΣR+*	*ΣR-*
2016 stress test (29/7/2016)	All countries	51	477	122	406
		H_0: Rejected		***H_0: Rejected***	
	Core countries	8	83	21	70
		H_0: Rejected		*H_0: Accepted*	
	Peripheral countries	9	57	15	51
		H_0: Rejected		*H_0: Accepted*	
	Non-eurozone	0	36	9	27
		H_0: Rejected		*H_0: Accepted*	
2018 stress test (2/11/2018)	All countries	144	262	179	227
		H_0: Accepted		*H_0: Accepted*	
	Core countries	33	33	2	60
		H_0: Accepted		***H_0: Rejected***	
	Peripheral countries	9	19	12	16
		H_0: Accepted		*H_0: Accepted*	
	Non-eurozone	16	39	42	13
		H_0: Accepted		*H_0: Accepted*	

Notes: *ΣR+ (ΣR-)* is the sum of the ranks with a positive (negative) sign. The verdict (*Accept/ Reject)* is based on two-tailed critical values for Wilcoxon's signed ranks tests at the 5%. Under the null hypothesis *H_0: ΣR+ =ΣR-*.

Table 4: Testing for the significance of Abnormal returns around the release date – Stocks – Fama/ French model - Marginal significance levels are reported

	29th July 2016		2nd November 2018	
	All countries (N=35)		All countries (N=35)	
Event Window	**[0,+1]**	**[0,+7]**	**[0,+1]**	**[0,+7]**
CAAR	0.53%	0.03%	1.49%	3.07%
Normality	0.290	0.977	**0.000**	**0.000**
Patell	0.356	0.162	**0.000**	**0.000**
Adjusted Patell	0.656	0.500	**0.034**	**0.042**
BMP	0.326	0.161	**0.000**	**0.000**
KP	0.652	0.520	**0.052**	**0.002**
Wilcoxon	**0.000**	**0.000**	**0.000**	**0.000**
Grank	0.524	0.450	**0.053**	**0.005**
Core countries (N=10)			**Core countries (N=11)**	
Event Window	**[0,+1]**	**[0,+7]**	**[0,+1]**	**[0,+7]**
CAAR	-0.07%	1.40%	0.80%	2.24%
Normality	0.930	0.374	0.154	**0.045**
Patell	0.921	0.280	0.134	**0.042**
Adjusted Patell	0.949	0.487	0.393	0.246
BMP	0.908	0.046	0.110	0.003
KP	0.946	0.237	0.434	0.149
Wilcoxon	0.000	**0.000**	**0.000**	**0.000**
Grank	0.829	0.232	0.329	0.121
Peripheral countries (N= 11)			**Peripheral countries (N= 8)**	
Event Window	**[0,+1]**	**[0,+7]**	**[0,+1]**	**[0,+7]**
CAAR	1.46%	-5.41%	1.82%	2.73%
Normality	0.227	**0.026**	**0.064**	0.162
Patell	0.316	**0.031**	**0.060**	0.189
Adjusted Patell	0.568	0.218	0.240	0.412
BMP	0.271	**0.016**	**0.000**	**0.035**
KP	0.577	0.223	**0.018**	0.258
Wilcoxon	**0.000**	**0.000**	**0.000**	**0.000**
Grank	0.724	0.172	**0.025**	0.191
Non-Eurozone countries (N=14)			**Non-Eurozone countries (N=16)**	
Event Window	**[0,+1]**	**[0,+7]**	**[0,+1]**	**[0,+7]**
CAAR	0.38%	2.89%	1.39%	3.01%
Normality	0.550	**0.023**	**0.009**	**0.005**
Patell	0.492	**0.009**	**0.003**	**0.007**
Adjusted Patell	0.711	0.161	**0.057**	**0.086**
BMP	0.487	**0.001**	**0.028**	**0.000**
KP	0.740	0.100	0.187	**0.008**
Wilcoxon	**0.000**	**0.000**	**0.000**	**0.000**
Grank	0.413	**0.049**	0.241	**0.016**

Table 5: Testing for significance direction-neutral measures of reaction to the disclosure of the stress test results (absolute values of *CARs*) – Fama/French model

Stock Returns

		[0,+1]		[0, +7]	
		ΣR+	*ΣR-*	*ΣR+*	*ΣR-*
2016 stress test (29/7/2016)	All countries	231	398	239	391
		H_0: Accepted		*H_0: Accepted*	
	Core countries	23	32	2	53
		H_0: Accepted		***H_0: Rejected***	
	Peripheral countries	25	41	25	41
		H_0: Accepted		*H_0: Accepted*	
	Non-eurozone	49	55	60	45
		H_0: Accepted		*H_0: Accepted*	
2018 stress test (2/11/2018)	All countries	347	282	280	289
		H_0: Accepted		*H_0: Accepted*	
	Core countries	35	31	29	37
		H_0: Accepted		*H_0: Accepted*	
	Peripheral countries	9	27	10	26
		H_0: Accepted		*H_0: Accepted*	
	Non-eurozone	93	42	77	58
		H_0: Accepted		*H_0: Accepted*	

Notes: *ΣR+ (ΣR-)* is the sum of the ranks with a positive (negative) sign. The verdict (*Accept/ Reject)* is based on two-tailed critical values for Wilcoxon's signed ranks tests at the 5%. Under the null hypothesis *H_0: ΣR+ =ΣR-.*

Table 6: Determinants of |*CAR*| – release of the 2016 stress test results – single index model case (upper cell) / Fama-French model case (lower cell) (eq.6 & 7)

	OLS	*q25*	*q75*	*OLS*	*q25*	*q75*	*OLS*	*q25*	*q75*	*OLS*	*q25*	*q75*
	All sample			*Core*			*Peripheral countries*			*Non-eurozone*		
Common equity Tier I - |CAR[0,+1]|												
α	-0.12	-0.02	-0.07	-0.10	0.02	-0.06	-0.14	0.02	-0.11	-0.23	-0.05	-0.00
	0.01	0.05	-0.02	-0.02**	-0.03**	-0.01*	0.05	-0.02	0.04	0.19	0.07	0.08
β_1	0.16	0.03	0.10	0.13	-0.01	0.09	0.18	-0.01	0.16	0.29	0.06	0.02
	0.01	-0.05	0.06	-0.32*	-0.34	-0.33*	-0.04	0.03	-0.03	-0.19	-0.07	-0.05
β_2				-0.15	-0.07	-0.91	-0.41	-0.39	-0.12	0.16	-0.02	-0.05
				0.09**	0.10	0.15***	1.07**	0.13	1.95**	-0.10	-0.01	-0.03
β_3				0.18	0.08	1.08	0.46	0.44	0.12	-0.19	0.03	0.06
				2.80**	3.51*	3.61***	-1.19**	-0.15	-2.16**	0.10	0.01	0.01
R^2	0.08	0.08	0.08	0.11	0.11	0.11	0.11	0.11	0.11	0.09	0.09	0.09
	0.00	0.00	0.00	0.21	0.21	0.21	0.22	0.22	0.22	0.05	0.05	0.05
Leverage Ratio- |CAR[0,+1]|												
α	-0.37	-0.06	-0.07	-0.15	-0.07	-0.07	-0.27	-0.27**	-0.03	-0.52*	-0.03	-0.23
	0.61**	-0.08	0.95**	-0.02**	-0.02	-0.01	0.44	-0.07	0.28	0.64*	-0.07	1.36
β_1	0.41	0.07	0.09	0.18	0.07	0.04	0.30	0.29**	0.05	0.57*	0.03	0.27
	-0.62**	0.09	-0.97**	-0.60*	-0.47	-0.72**	-0.45	0.08	-0.28	-0.65*	0.08	-1.40
β_2				-0.82	-0.36	-2.22	-0.64	0.21	-0.94	0.61	-0.25	0.52
				0.01	0.04	0.01	0.56	0.28	1.41	-0.09	-0.04	0.25
β_3				0.87	0.38	2.35	0.68	-0.22	1.00	-0.65	0.26	-0.56
				1.86	7.12*	0.95	-0.58	-0.29	-1.46	0.09	0.04	-0.28
R^2	0.07	0.07	0.07	0.12	0.12	0.12	0.10	0.10	0.10	0.15	0.15	0.15
	0.12	0.12	0.12	0.11	0.11	0.11	0.21	0.21	0.21	0.16	0.16	0.16
Coverage Ratio- |CAR[0,+1]|												
α	0.04*	0.00	0.03	0.05*	0.05***	0.04	0.02	0.00	0.03	0.04	0.00	0.05
	0.04*	0.02	0.05	-0.01*	-0.02	0.00	0.03	0.02*	0.06	0.03	0.01	0.04
β_1	-0.03	0.01	-0.02	-0.06	-0.07***	-0.03	-0.01	0.01	-0.02	-0.03	0.00	-0.04
	-0.03	-0.02	-0.04	-0.01	-0.01	0.02	-0.03	-0.03	-0.07	-0.01	-0.02	-0.02
β_2				-0.05	-0.07***	-0.16	0.16**	0.09***	0.13	-0.02	0.00	-0.01
				-0.01	-0.01	-0.03	0.00	-0.13**	-0.01	0.00	0.01	-0.02
β_3				0.12	0.13***	0.39*	-0.28**	-0.15***	-0.23	0.01	-0.00	0.01
				-0.06	-0.26	-0.26	0.02	0.23**	0.05	-0.02	-0.02	0.02
R^2	0.03	0.03	0.03	0.12	0.12	0.12	0.17	0.17	0.17	0.06	0.06	0.06
	0.02	0.02	0.02	0.02	0.02	0.02	0.12	0.12	0.12	0.04	0.04	0.04
CDS-|CAR[0,+1]|												
α	0.02***	0.00*	0.02	0.01*	0.00	0.01	0.02**	0.00*	0.02	0.02***	0.00	0.02
	0.02***	0.01***	0.03	0.03***	0.01***	0.03*	0.01**	0.01**	0.02*	0.03***	0.01**	0.02
β_1	-0.03	-0.03	-0.05	-0.05	-0.03	-0.07	-0.05	-0.02	-0.05	0.04	-0.01	-0.29
	0.06	0.08*	0.07	0.08	0.08**	0.08	0.03	0.04	0.05	0.08	0.10	-0.29
β_2				0.01	-0.00	0.00	0.00	-0.00	-0.00	-0.01	0.00	-0.01
				-0.01	-0.00	-0.01	0.02	-0.00	0.01	-0.01	-0.00	-0.01
β_3				-0.03	0.00	-1.01	0.12	0.05	-0.30	-0.13	-0.09	0.19
				-0.06	-0.06	-0.08	0.17	0.02	0.22	-0.05	-0.02	0.19
R^2	0.01	0.01	0.01	0.05	0.05	0.05	0.01	0.01	0.01	0.06	0.06	0.06
	0.02	0.02	0.02	0.06	0.06	0.06	0.15	0.15	0.15	0.08	0.08	0.08

Notes: Shaded cells indicate significance at the 1% (***), 5%(**) and 10%(*) levels. The shaded cells in the coefficient of determination lines indicate the models with the best explanatory power. Peripheral countries : Ireland, Italy, Portugal, Spain. SQREG results have been obtained by using the relevant STATA routine. Pseudo R^2 *are reported for the quantile regressions. Standard errors in the quantile regressions have been produced by bootstrapping techniques under 1000 repetitions.*

Table 7: Determinants of |*CAR*| – release of the 2018 stress test results – single index model case (upper cell) / Fama-French model case (lower cell) (eq.6 & 7)

	OLS	*q25*	*q75*	*OLS*	*q25*	*q75*	*OLS*	*q25*	*q75*	*OLS*	*q25*	*q75*
	All Sample			*Core*			*Peripheral countries*			*Non-eurozone*		
Common equity Tier I - |CAR[0,+1]|												
α	-0.03	-0.05	0.02	-0.05	-0.07	-0.07	-0.07	-0.05	-0.20	0.06	-0.06	0.13
	-0.05	-0.07	-0.09	-0.08	-0.07	-0.21	-0.09	-0.00	-0.21	0.12	-0.08	0.30
β_1	0.05	0.07	0.01	0.09	0.10	0.12	0.11	0.07	0.28	-0.04	0.07	-0.12
	0.08	0.10	0.14	0.12	0.09	0.29	0.13	0.02	0.29	-0.12	0.10	-0.31
β_2				0.03	0.02	0.11	-0.55	-1.56***	-0.69	-0.36**	-0.14	-0.49
				-0.04	-0.01	0.14	-0.65	-2.04***	-0.29	-0.40**	-0.07	-0.56*
β_3				-0.05	-0.03	-0.15	0.61	1.75***	0.77	0.44**	0.18	0.60
				0.03	0.00	-0.19	0.72	2.30***	0.30	0.48**	0.10	0.66*
R^2	0.01	0.01	0.01	0.17	0.17	0.17	0.07	0.07	0.07	0.37	0.37	0.37
	0.03	0.03	0.03	0.16	0.16	0.16	0.10	0.10	0.10	0.29	0.29	0.29
Leverage Ratio- |CAR[0,+1]|												
α	0.22	0.41**	0.25	0.19	0.39*	0.21	0.24	0.41***	0.24	0.35*	0.41*	0.37
	0.17	0.08	0.28	0.17	0.26	0.17	0.17	0.09	0.17	0.38*	0.52**	0.34
β_1	-0.21	-0.42**	-0.23	-0.17	-0.40*	-0.19	-0.23	-0.42***	-0.23	-0.35	-0.42*	-0.37
	-0.16	-0.08	-0.27	-0.16	-0.26	-0.15	-0.16	-0.08	-0.15	-0.38*	-0.54**	-0.34
β_2				-0.48	-0.61	-0.47	-0.80	-1.63**	-0.56	-0.46	-0.02	-0.74
				-0.51	-0.26	-0.20	-0.14	-0.13	0.18	-0.66*	-0.44	-0.88
β_3				0.49	0.64	0.48	0.85	1.71**	0.59	0.50	0.02	0.80
				0.53	0.27	0.20	0.15	0.14	-0.19	0.70*	0.46	0.94
R^2	0.04	0.04	0.04	0.17	0.17	0.17	0.07	0.07	0.07	0.17	0.17	0.17
	0.03	0.03	0.03	0.12	0.12	0.12	0.03	0.03	0.03	0.16	0.16	0.16
Coverage Ratio- |CAR[0,+1]|												
α	0.01	0.00	0.02	0.02	0.02	0.04**	0.01	0.00	0.02	0.03**	0.02	0.05*
	0.01	0.01	0.01	0.02	0.01	0.05*	0.01	0.01	0.05*	0.04**	0.02	0.07**
β_1	0.02	0.01	0.00	0.02	-0.01	-0.02	0.02	0.01	0.00	-0.03	-0.02	-0.04
	0.02	0.00	0.03	0.01	-0.00	-0.03	0.01	0.00	-0.04	-0.04	-0.02	-0.08
β_2				-0.01	-0.02	-0.04	0.01	0.03	-0.02	-0.05	-0.03	-0.05
				-0.01	-0.00	-0.08	-0.02	-0.00	-0.06	-0.06*	-0.01	-0.09
β_3				0.00	0.02	0.04	-0.02	-0.07	0.05	0.09*	0.05	0.11
				0.01	-0.00	0.14	0.04	0.02	0.09	0.11**	0.02	0.18*
R^2	0.04	0.04	0.04	0.16	0.16	0.16	0.04	0.04	0.04	0.19	0.19	0.19
	0.02	0.02	0.02	0.10	0.10	0.10	0.03	0.03	0.03	0.16	0.16	0.16
Profitability Index- |CAR[0,+1]|												
α	-0.01	0.02	-0.03	-0.09*	-0.15***	-0.05	-0.00	0.02	-0.01	0.02	0.02	0.00
	-0.04	-0.06*	-0.04	-0.10**	-0.14***	-0.05	-0.04	-0.05	-0.08	0.00	-0.01	0.00
β_1	0.04	-0.01	0.06	0.13**	0.19***	0.10	0.03	-0.01	0.05	-0.00	-0.01	0.02
	0.06	0.08**	0.08	0.14***	0.18***	0.09	0.06	0.07*	0.11	0.02	0.02	0.03
β_2				0.09	0.15*	0.04	-0.01	-0.17**	-0.00	-0.15*	-0.19**	-0.06
				0.06	0.13***	-0.01	-0.00	-0.07	0.05	-0.14*	-0.12**	-0.11
β_3				-0.11	-0.18**	-0.07	0.01	0.20**	-0.00	0.18**	0.22***	0.08
				-0.08	-0.15***	-0.01	0.00	0.08	-0.05	0.17**	0.15**	0.13
R^2	0.02	0.02	0.02	0.29	0.29	0.29	0.03	0.03	0.03	0.24	0.24	0.24
	0.08	0.08	0.08	0.33	0.33	0.33	0.08	0.08	0.08	0.24	0.24	0.24
CDS-|CAR[0,+1]|												
α	0.02***	0.01***	0.03***	0.02***	0.01***	0.04***	0.02***		0.02***	0.02***	0.01***	0.02***
	0.02***	0.01**	0.03***	0.02***	0.01***	0.04***	0.02***	0.01***	0.02***	0.02***	0.01***	0.02***
β_1	0.05	0.02	-0.02	0.02	-0.08	0.42*	0.05	-0.01	0.01	0.08	0.12	0.06
	0.07	-0.07	0.22	0.03	-0.12	0.53**	0.06	-0.07	0.17	0.13	0.13	0.17
β_2				-0.01	-0.00	-0.02**	-0.00	0.01	-0.00	0.01	-0.00	0.03***
				-0.01	-0.00	-0.01	-0.00	0.00	0.00	0.01	-0.01*	0.03**
β_3				0.07	0.13	-0.25	-0.04	0.57**	-0.15	-0.07	-0.18	0.84**
				0.09	0.12	-0.31	0.13	0.53**	0.04	-0.14	-0.20*	0.82**
R^2	0.01	0.01	0.01	0.13	0.13	0.13	0.01	0.01	0.01	0.11	0.11	0.11
	0.02	0.02	0.02	0.08	0.08	0.08	0.03	0.03	0.03	0.11	0.11	0.11

Notes: see Table 6

Table 8: Determinants of *CAR* – release of the 2016 stress test results – single index model case (upper cell) / Fama-French model case (lower cell) (eq.6 & 7)

	OLS	*q25*	*q75*	*OLS*	*q25*	*q75*	*OLS*	*q25*	*q75*	*OLS*	*q25*	*q75*
	All sample			*Core*			*Peripheral countries*			*Non-eurozone*		
Common equity Tier I -CAR[0,+1]												
α	-0.02***	-0.03	-0.01*	-0.02***	-0.03**	-0.01*	-0.01	-0.01	-0.01	-0.02**	-0.03	-0.01
	-0.02**	-0.02	-0.00	-0.02*	-0.01	-0.00	0.01	-0.00	0.01	-0.03***	-0.05***	-0.02
β_1	-0.27	-0.34	-0.33*	-0.32*	-0.34	-0.33*	0.15	0.10	-0.21	-0.31	-0.34	-0.32*
	-0.63***	-0.25	-0.66***	-0.67***	-0.14	-0.72***	0.28	0.14	-0.12	-0.87***	-1.00***	-1.05***
β_2				0.09**	0.10	0.15***	-0.02	-0.01	-0.00	0.01	0.01	0.00
				0.07	0.09	0.04	-0.03**	-0.06*	-0.03*	0.04**	0.05*	0.03
β_3				2.80**	3.51*	3.61***	-0.56	-0.44	-0.12	0.14	0.44	0.09
				2.17	2.99	1.49	-1.16***	-1.20	-1.08**	1.13**	0.92	0.91
R^2	0.08	0.08	0.08	0.21	0.21	0.21	0.13	0.13	0.13	0.08	0.08	0.08
	0.27	0.27	0.27	0.34	0.34	0.34	0.44	0.44	0.44	0.41	0.41	0.41
Leverage Ratio- CAR[0,+1]												
α	-0.02***	-0.02	-0.01	-0.02**	-0.02	-0.02	-0.01	-0.01	-0.01	-0.02***	-0.02	-0.01
	-0.01	-0.00	0.01	-0.01	-0.00	0.01*	0.01	0.00	0.02*	-0.02**	-0.00	-0.00
β_1	-0.56	-0.58	-0.72**	-0.60*	-0.47	-0.72**	0.03	0.59	-0.65	-0.74*	-0.58	-0.70
	-1.19***	0.99**	-1.44***	-1.34***	-0.01	-1.43***	1.11	2.38	-0.12	-1.68***	1.29	-1.85***
β_2				0.01	0.04	0.01	-0.02	-0.01	-0.01	0.01	0.01	-0.00
				0.04*	0.03	0.02	-0.03**	-0.07**	-0.02*	0.03**	0.00	0.02
β_3				1.86	7.12*	0.95	-0.92	-1.16	-0.17	0.67	1.16	0.01
				4.25**	3.96	3.15**	-3.08***	-5.10***	-1.92**	2.04*	-1.31	1.73
R^2	0.08	0.08	0.08	0.11	0.11	0.11	0.12	0.12	0.12	0.10	0.10	0.10
	0.23	0.23	0.23	0.35	0.35	0.35	0.47	0.47	0.47	0.34	0.34	0.34
Coverage Ratio- CAR[0,+1]												
α	-0.01**	-0.02	-0.00	-0.01*	-0.02	0.00	-0.01**	-0.02	-0.00	-0.01*	-0.02	0.00
	0.01	-0.01	0.02*	0.01	-0.00	0.02*	0.00	0.00	0.02*	0.01	-0.02**	0.02
β_1	-0.01	-0.00	-0.01	-0.01	-0.01	0.02	-0.03	-0.04	-0.03	0.01	0.06	-0.03
	0.10	0.02	0.07	0.12	0.00	0.09	0.08	0.08	0.02	0.09	-0.14	0.07
β_2				-0.01	-0.01	-0.03	0.00	0.01	0.00	-0.00	-0.00	-0.01
				-0.01	-0.02	-0.01	0.01	-0.02	0.01	-0.00	0.03*	-0.00
β_3				-0.06	-0.26	-0.26	0.19	0.15	0.28	-0.03	-0.07	0.00
				-0.12	-0.12	-0.04	-0.02	-0.47	-0.14	0.01	0.10	-0.00
R^2	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00
	0.06	0.06	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.06	0.06	0.06
CDS- CAR[0,+1]												
α	-0.01*	-0.02	0.00	-0.01	-0.01	0.00	-0.01	-0.02	-0.00	-0.02*	-0.02	0.00
	0.01	-0.01	0.02	0.01	-0.00	0.01	0.00	-0.01	0.02	0.00	-0.03***	0.02
β_1	0.02	0.06	0.05	0.04	0.08	-0.03	0.05	0.05	0.03	-0.19	-0.23	-0.04
	-0.00	-0.07	0.04	0.01	-0.05	0.02	0.00	-0.07	0.04	-0.04	-0.36	0.03
β_2				-0.01	-0.01	-0.01	-0.01	-0.01	0.01	0.01	0.02	-0.01
				-0.01	0.01	0.00	0.01	-0.02	0.01	0.01	0.04***	-0.00
β_3				0.06	1.00	0.06	-0.32	-0.28	-0.07	0.27	0.33	0.15
				0.04	0.44	-0.04	-0.09	-0.29	0.21	0.06	0.44*	-0.02
R^2	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.03	0.03	0.01	0.01	0.01

Notes: see Table 6

Table 9: Determinants of *CAR* – release of the 2018 stress test results – single index model case (upper cell) / Fama-French model case (lower cell) (eq.6 & 7)

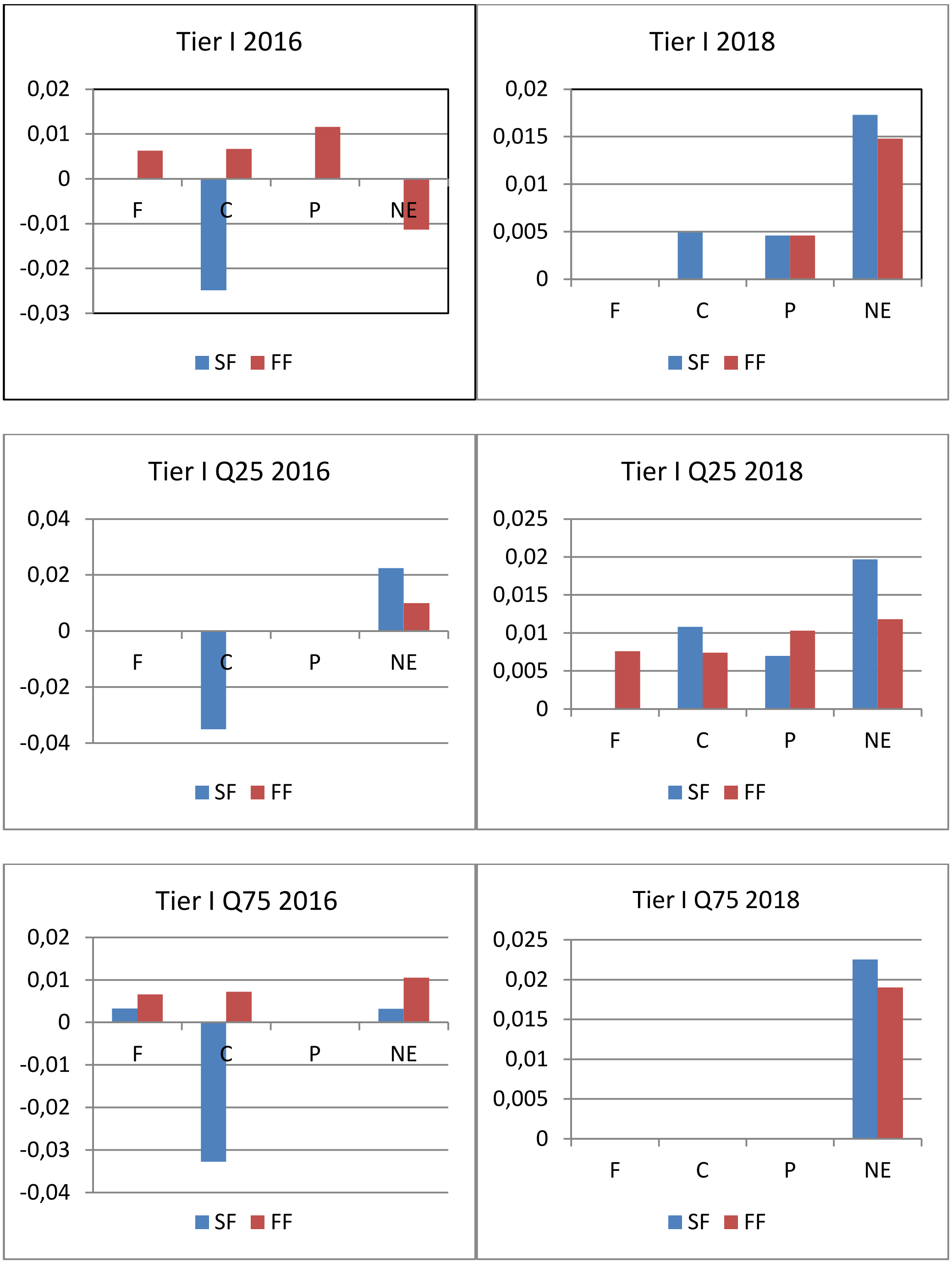
	Common equity Tier I -CAR[0,+1]											
	OLS	*q25*	*q75*	*OLS*	*q25*	*q75*	*OLS*	*q25*	*q75*	*OLS*	*q25*	*q75*
	All sample			*Core*			*Peripheral countries*			*Non-eurozone*		
α	0.00	-0.02	0.01	0.00	-0.03*	0.01	-0.00	-0.02	0.00	0.03***	0.02	0.05***
	0.00	-0.02*	0.01	0.01	-0.02	0.02	-0.00	-0.04***	0.01	0.03***	0.01	0.04**
$β_1$	-0.37	-0.51	-0.56	-0.49*	-1.08**	-0.50	-0.46*	-0.70*	-0.63	0.47	0.53	0.68*
	-0.36	-0.76**	-0.44	-0.37	-0.74**	-0.26	-0.46*	-1.03***	-0.44	0.41	0.09	0.47
$β_2$				0.01	0.06	-0.01	0.02	-0.00	0.01	-0.07***	-0.07**	-0.09***
				-0.01	0.00	-0.03	0.03	0.04	0.03	-0.06***	-0.05*	-0.07***
$β_3$				0.53	1.61	0.13	0.40	-0.54	0.39	-1.73***	-1.97***	-2.25***
				-0.05	0.15	-0.43	0.63	0.82	0.89	-1.48***	-1.18*	-1.90***
R^2	0.07	0.07	0.07	0.15	0.15	0.15	0.10	0.10	0.10	0.45	0.45	0.45
	0.08	0.08	0.08	0.15	0.15	0.15	0.12	0.12	0.12	0.39	0.39	0.39
	Leverage Ratio- CAR[0,+1]											
α	0.01	-0.00	0.01	0.01	-0.01	0.01	0.01	-0.01	0.01	0.02**	0.02	0.04***
	0.01	-0.01	0.01	0.01	-0.01	0.01	0.01	-0.01	0.01	0.02**	0.01	0.04**
$β_1$	-0.71	-0.46	-1.85	-1.42*	-1.77	-2.29**	-0.76	0.07	-2.28**	0.92	1.65	1.17
	-0.77	-1.28	-1.70	-1.27*	-1.47	-2.04**	-0.94	-1.28	-1.86**	0.92	-0.02	1.31
$β_2$				0.01	0.03	0.01	0.01	-0.01	0.03	-0.02*	-0.03	-0.03**
				0.01	0.02	-0.02	0.01	0.02	0.02	-0.02	-0.02	-0.02
$β_3$				2.54*	3.42	2.92	0.53	-2.40	3.81	-3.02**	-0.59	-4.45***
				2.16	3.23	-1.29	1.21	1.21	2.60	-2.86**	0.35	-4.35**
R^2	0.04	0.04	0.04	0.18	0.18	0.18	0.04	0.04	0.04	0.19	0.19	0.19
	0.05	0.05	0.05	0.18	0.18	0.18	0.06	0.06	0.06	0.20	0.20	0.20
	Coverage Ratio- CAR[0,+1]											
α	0.02***	-0.00	0.03***	0.02***	0.01	0.04***	0.02***	-0.01	0.03***	0.02**	-0.00	0.02**
	0.02***	-0.00	0.03***	0.02***	0.01	0.03***	0.02***	-0.00	0.04***	0.02**	0.01	0.02**
$β_1$	0.11**	-0.04	0.14*	0.13**	0.24**	0.21***	0.11*	-0.05	0.17**	0.01	-0.08	0.02
	0.09*	-0.05	0.13	0.09	0.15**	0.14	0.08	-0.06	0.17**	0.02	-0.02	0.05
$β_2$				-0.02	-0.02	-0.02	0.00	0.02	-0.00	-0.00	-0.01	0.02*
				-0.02	-0.02	-0.02	0.00	0.02*	-0.02	-0.00	-0.01	0.02
$β_3$				-0.23	-0.43	-0.14	0.05	0.28	0.08	0.15	0.21	0.19
				-0.24	-0.36	-0.19	0.11	0.23	-0.06	0.10	0.04	0.13
R^2	0.13	0.13	0.13	0.18	0.18	0.18	0.13	0.13	0.13	0.17	0.17	0.17
	0.09	0.09	0.09	0.16	0.16	0.16	0.10	0.10	0.10	0.12	0.12	0.12
	Profitability Index- CAR[0,+1]											
α	0.02***	0.01	0.04***	0.03***	0.02	0.04***	0.03***	0.01	0.04***	0.02**	0.01	0.03*
	0.03***	0.02***	0.04***	0.03***	0.02**	0.04***	0.03***	0.02***	0.04**	0.02***	0.01*	0.03**
$β_1$	0.11**	0.11**	0.06	0.14**	0.18**	0.09	0.16**	0.15**	0.10	0.03	0.04	0.02
	0.12**	0.16***	0.09	0.14**	0.15**	0.08	0.16***	0.18***	0.09	0.07	0.07	0.05
$β_2$				-0.02	-0.01	-0.03	-0.01	-0.01	-0.01	0.02	0.02	0.03
				-0.02	-0.01	-0.02	0.00	0.03*	-0.00	0.01	0.01	0.03
$β_3$				-0.06	-0.07	-0.06	-0.13	-0.23*	-0.05	0.22**	0.37***	0.23
				0.01	-0.01	0.05	-0.09	0.05	-0.04	0.14	0.25**	0.19
R^2	0.13	0.13	0.13	0.21	0.21	0.21	0.19	0.19	0.19	0.25	0.25	0.25
	0.18	0.18	0.18	0.31	0.31	0.31	0.25	0.25	0.25	0.24	0.24	0.24
	CDS- CAR[0,+1]											
α	0.02***	0.00	0.03***	0.02***	0.00	0.04***	0.02***	0.00	0.02***	0.01**	0.01	0.02***
	0.02***	0.00	0.03***	0.02***	0.01	0.04***	0.01***	0.00	0.02***	0.01**	0.01	0.02***
$β_1$	-0.01	-0.09	-0.02	-0.02	-0.09	0.42*	-0.01	-0.09	0.01	-0.02	-0.01	0.06
	0.01	-0.06	0.22	0.03	-0.10	0.53**	-0.00	-0.06	0.17	0.01	-0.02	0.17
$β_2$				-0.01	-0.01	-0.02**	0.01	0.01	-0.00	0.01	-0.00	0.03***
				-0.01	-0.01	-0.01	0.00	0.01	0.00	0.01	-0.00	0.03**
$β_3$				0.00	-0.09	-0.25	0.05	0.69	-0.15	-0.01	-0.08	0.84**
				-0.05	-0.11	-0.31	0.21	0.56	0.04	-0.01	-0.08	0.82**
R^2	0.00	0.00	0.00	0.09	0.09	0.09	0.01	0.01	0.01	0.04	0.04	0.04
	0.00	0.00	0.00	0.07	0.07	0.07	0.01	0.01	0.01	0.04	0.04	0.04

Notes: see Table 6

Table 10: Pearson and Spearman rank correlations between the *CARs* of the banks in the 2016 and 2018 stress tests.

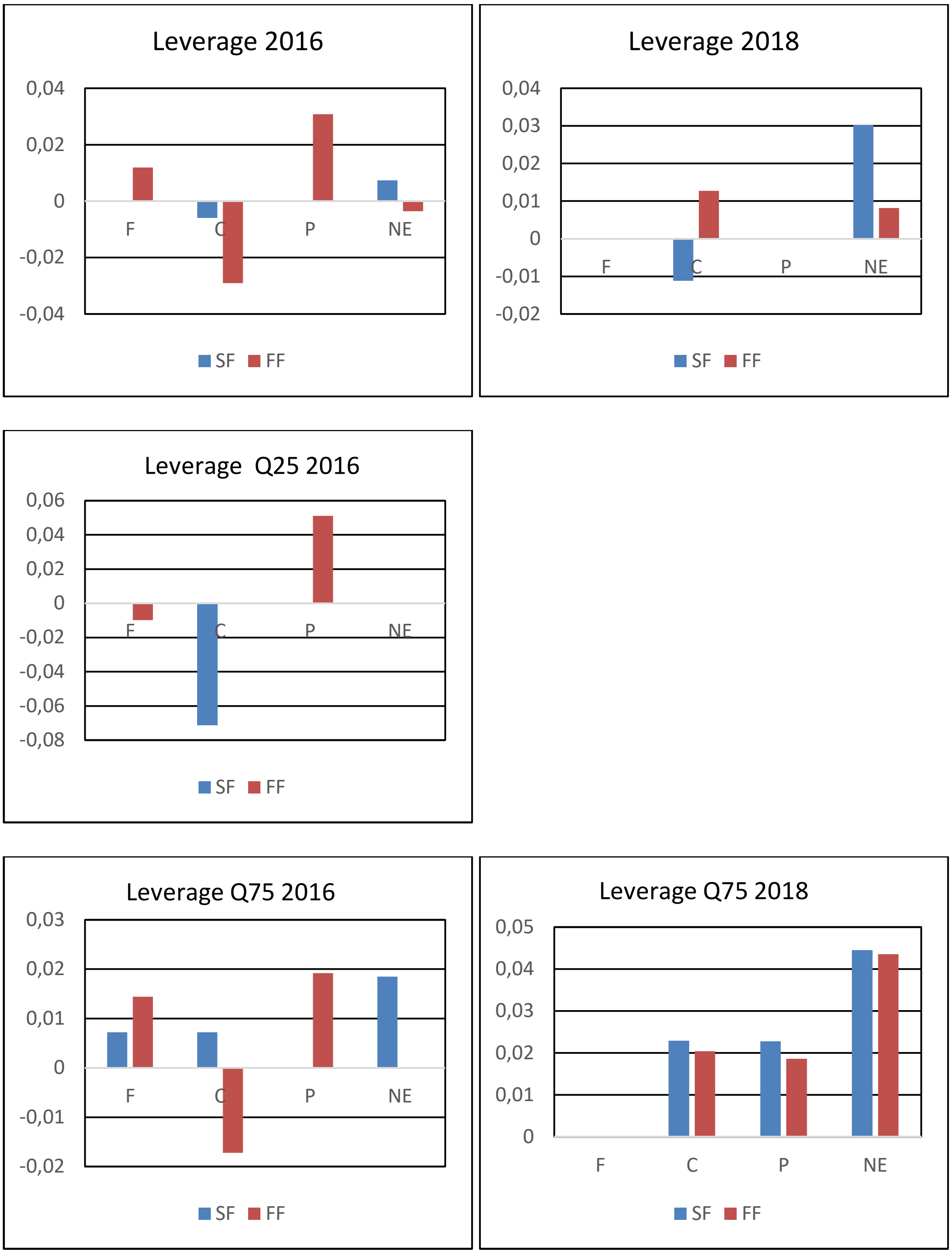
	***CARs*- single factor case**		***|CAR|s* - single factor case**	
	Pearson	**Spearman rank**	**Pearson**	**Spearman rank**
[0,+1]	-0.01	0.03	0.01	0.00
[0,+7]	0.31	0.25	0.05	-0.03
[-1,+1]	-0.17	-0.22	0.07	0.02

Diagram 1: The impact of a 100 basis points reduction of Tier I on the Abnormal bank stock price return .



Notes: The calculations are based on the estimates appearing in Tables 8 and 9 (only statistically significant estimates, at least at the 10% level, of β_1 and β_3 are considered). SF= Single Factor, FF=Fama-French, F= Full Sample, C= Core countries, P = Peripheral countries, NE= Non-Eurozone.

Diagram 2: The impact of a 100 basis points reduction of Leverage on the Abnormal bank stock price return .



Notes: see Notes in Diagram 1. The graph for the case “Q25 2018” does not appear since the coefficients β_1 and β_3 are insignificant in all cases.