Is Liquidity Beneficial to Banks?
The Heterogeneous Effects of Quantitative Easing on European Banks’ Valuation

Sara Longo
Faculty of Economics and Management
Free University of Bolzano

Antonio Parbonetti
Department of Economics and Management
University of Padova

Amedeo Pugliese
Department of Economics and Management
University of Padova

April 2020

ABSTRACT
European banks benefited from a generous liquidity injection following the launch of the Quantitative Easing programme by the ECB in 2015-16. Prior evidence offers contrasting findings on the role played by liquidity in banks: whilst it ensures systemic financial stability, at the same time it raises agency costs. We leverage on the release of the QE and investigate whether investors’ reactions to the announcements of new liquidity injections vary according to bank-level characteristics of the European banks: namely, their financial soundness, the asset portfolio’s quality and the level of transparency. Therefore, we exploit the interplay between an exogenous liquidity injection and bank characteristics to further refine the relationship between liquidity and bank valuation. The results document a negative market reaction to the QE announcements; at a more fine-grained level of analysis we highlight that banks falling short of the regulatory requirements are not expected to benefit from additional liquidity. In fact, investors anticipate that – due to their capital shortfall – banks will not be able to restore their lending activity. This study contributes to the literature on the role of liquidity in banks by showing an important boundary conditions to the beneficial role of liquidity in banks, that is – because of the regulatory capital requirements – liquidity is only valuable to investors if it can be re-invested once constraints are overcome.

Keywords: Capital markets, liquidity injection, Quantitative Easing, European banks, bank characteristics
1. Introduction

There is little doubt that liquidity plays a crucial role in ensuring a bank’s financial stability (Calomiris and Khan, 2015): the two recent waves of financial crisis (2007-2008 and 2014-2015) revealed the systemic importance of liquidity to ensuring an orderly working of the financial system. In addition, according to Basel III framework, banks are bounded to specific parameters to maintain buffers of liquidity. Liquidity has been put under the spotlight by regulators, shareholders and depositors, mainly because low levels of liquidity in banks may result in market frictions and breakdown on the entire banking system (Acharya and Ryan, 2016), regardless of their nature: be them commercial or investment banks (Chahine, 2007, Hilb 2011). The soundness and stability of the banking system is critical for its economy-wide effects: banks may be subject to runs when their perceived risk taking is high and bank failures have significant external costs (Chen and Hasan, 2011; Diamond and Dybvig, 1983; Ippolito et al., 2016).

Liquidity is also a potential source of managerial discretion, thus increasing agency costs (Jensen and Meckling, 1976; Flannery, 1994; Nyers and Rajan, 1998). This is highlighted by ‘free cash flow’ dilemma, liquidity may trigger bankers’ pursuit of personal benefits like excessive compensations and potentially damaging public trust (Bushman et al., 2018). Whether banks’ liquidity is perceived as beneficial or detrimental is still subject to debate. This study aims to contributing to this ongoing discussion.

Following the Sovereign Financial Crisis in 2014-2015 the European Central Bank (ECB)
launched an extraordinary programme - known as Quantitative Easing (QE) - aiming at replenishing banks’ financial statements and instil a recovery plan so that European banks would restore the supply of liquidity to firms/households. The QE consists of an injection of new liquidity in the European banking system (January 2015). The exogenous and extraordinary nature of the ECB intervention allows us to contribute to the current debate surrounding the role of liquidity in banks. Specifically, we sought to address two research questions: (i) how do investors react to (the announcements of) liquidity injections due to the Quantitative Easing (QE) in the Euro zone? and, (ii) does the strength of investors’ reaction to liquidity injections vary according to bank-level characteristics?

To us, a series of QE announcements are a valuable instrument to explore how investors value banks’ enhanced liquidity in light of a series of bank attributes, such as 1) the capital adequacy, 2) the asset quality, 3) the risk exposure. First, we ascertained whether investors reacted to the ECB’ announcements; next, we sought to fill a gap in the literature by taking into account bank characteristics to assess whether the unexpected sources of liquidity are beneficial for banks conditional on their prior financial conditions. Therefore, we explored whether banks’ heterogeneity in terms of asset composition (vis-à-vis the homogeneity on the side of the liabilities in the form of deposits) (Kashyap et al., 2002) affected the magnitude of changes to banks’ valuations. This allows identifying which banks benefit more in a context of strong regulatory intervention.
The analyses are conducted on a sample of European listed banks in the period surrounding the announcements of the QE (2015-2016). The majority of institutions in the sample are commercial banks whose main feature is the lack of a deposit insurance like in US, thus making them exposed to potential default. Using an event study approach, we estimate cumulative abnormal returns (CAR) to proxy for investors’ assessment of banks’ valuation: we argue that these changes may accrue to banks as a reflection of (un)expected additional liquidity. Next, we exploit the cross-sectional variation in stock market’s response as explained by three key bank-level attributes (e.g. capital adequacy, asset quality, risk exposure). Regarding the optimal level of liquidity affected all banks (Cifuentes et al., 2005), it is worth noting that important aspects of banks are related to size, capital structure and transparency. Large banks benefit from economies of scale (Boyd and Heitz, 2016) in screening and monitoring borrowers and from great diversification. Because of their “too-big-to-fail” position, large banks might hold less capital in excess of regulatory requirements (Grapp and Heider, 2010). Moreover, large banks could create more liquidity than small banks because they have easier access to the lender of last resort and because they would be the first to benefit from safety net (Distinguin et al., 2013). Banking regulation, including liquidity requirements, impacts on banks’ capital structure (Bakkar et al., 2019). Thus the well-capitalised banks are perceived as “less risky” by depositors and investors (Rose, 2007), when the capital inadequacy implies negative consequences like 1) the reduction of bank lending (increase of borrowing costs and decrease of credit availability), 2) the deleveraging through fire sales, 3) the
increase of risk-shifting incentives (Bushman and Williams, 2015).

Our results show a negative reaction to the QE announcement of additional liquidity for the banks involved: this is consistent across all events and seems to suggest that investors do not foresee banks would gain benefits out of the upcoming provisions of liquidity. The results stemming from the cross-sectional analyses at bank-level reveal the expectations of new liquidity affects positively the strongly capitalized banks, whereas those not fulfilling all the requirements and expectations, seem to be unaffected.

This study contributes to the literature in the following way. First, it contributes to appreciating the role of liquidity provision by a central bank. Second, we argue that the effects of liquidity are not uniform albeit conditional on a series of bank-level features. While theory suggests a directional relationship from capital to liquidity, where well-capitalized banks behave differently assuming more risk and able to manage differently their liquidity (Diamond and Rajan, 2000; 2001), our findings suggest that the well capitalised banks would increase their capital adequacy, but not their risk exposure, because the combination of new liquidity provided by ECB and higher levels of regulatory capital allows banks to be stronger and more stable from an investor’s perspective (Distinguin et al., 2017).

The paper proceeds as follow. Section 2 reviews the extant literature on the role of liquidity in banks, and some regulatory considerations together with the most debated bank characteristics and the development of the hypotheses. Section 3 describes the empirical research strategy (sample
and methodology). Section 4 provides the main empirical findings and describes further additional
tests. Finally section 5 discusses some implications and limitations of our study and concludes.

2. Theory and Hypotheses Development

To derive theoretical predictions on the effects of liquidity injections on bank valuations, we build
on two strands of literature: 1) theoretical and empirical evidence on the role of regulatory
requirements on bank’s liquidity and 2) studies focusing on the relation between liquidity
provisions and bank valuation. In addition to meeting regulatory requirements, banks need
liquidity to ensure an ongoing lending channel. Next we hypothesize how investors’ reactions to
various QE announcements are shaped by the main bank characteristics identified in capital
adequacy, asset quality and risk exposure.

2.1 The role of liquidity in Bank Regulatory Framework.

Prior literature documents why liquidity has become of primary importance to banks ensuring a
proper assets allocation, a regular lending activity (Levine, 1991). Indeed, illiquidity triggers
bankruptcies and implies negative externalities (Dewatripont and Tirole, 1994) with a contagion
on the entire banking system (Allen and Carletti, 2008; Khan, 2010). Regulators reacted to
liquidity threats through a different approach to liquidity regulation in the aftermath of the recent
financial crisis (2008-09). In fact, they outlined two new separate liquidity ratios, such as the
liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) (Basel III framework;
Young and Jang, 2016). In this way banks should maintain liquid buffers for managing risks as well as absorbing negative shocks (Khan et al., 2017). From a regulatory perspective, prudent capital proxies for bank’s financial robustness and the combination of liquidity and capital affect bank’s solvency and financing flexibility (Calomiris et al., 2015). The financial crisis in 2007 highlighted that in spite of substantial alignments to regulatory capital ratios, banks faced higher likelihood of default because of a low level of liquid assets (Calomiris et al., 2015).

Bank liquidity is strongly connected with risk management activities and tools, in the way that a proper liquidity management affects positively bank investments and lending activity (Kim and Sohn, 2017). Theoretical conjectures propose a high connection between liquidity risk and credit risk, mainly addressed by funding and lending channels. However, empirical evidences show that there is no reliable relation between the two risks, but both influence the probability of default for a bank (Imbierowicz and Rauch, 2014). While liquidity risk is the output of bank solvency, liquidity ratios required by Basel Committee reflect immediately the access of refinancing in a transparent way (Ratnovski, 2013).

Recent literature emphasizes aspects related to the adjustments given the new liquidity provisions. For instance, Acharya et al. (2012) study liquidity hoarding so called “predatory behaviour” aimed at the exploitation of urgent funding needs of other market participants. They show that banks with surplus liquidity have an incentive to strategically underutilize liquidity and provide it to other banks to be able to benefit from the latter’s forced fire sales of assets against low liquidation prices.
Diamond and Rajan (2009) show that the expectation of distressed banks being forced to sell assets in the future at fire-sale prices drives healthy banks to hoard liquid funds so as to allow them to take advantage of future investment opportunities. Brunnermeier and Perdersen’s (2009) explain that market liquidity and funding liquidity are mutually reinforcing leading to liquidity spirals. The crisis (2007-2009) has shown that financial market turbulence triggers liquidity constraints for banks. De Haan and Von den End (2013) provides empirical evidence on banks’ responses to market funding shocks where Dutch banks reduce lending especially wholesale lending. On the basis of the above reasoning and in consideration of the benefits provided by new liquidity for banks, we develop a first hypothesis exploiting the market reactions around the QE announcements on European banks:

**H1:** The liquidity injection stemming through the ECB’s QE programme exerts a positive effect in terms of stock market reaction for European banks.

2.2 The role of bank attributes on liquidity and valuation

In addition to the regulatory requirements, liquidity is essential to banks in ensuring their lending activities and to robust their capital structure (Gropper and Heider, 2010). Liquidity is the result of a transformation of the underlying loan and deposit contracts balancing illiquid loans with liquid
deposits. Further liquidity transformation is connected with maturity transformation, where banks use short-term liabilities to finance longer-term assets. In other words liquidity represents the engine of banks’ core business to support the real economic growth (Caselli, 2010), but it represents also the primary source of its vulnerability facing the risk of depositors’ claims in short times.

Prior literature has also considered the relation between liquidity and managerial discretion. A well-known risk in banks is that (excess) liquidity may exacerbate managerial discretion, thus giving raise to agency costs (Jensen and Meckling, 1976; Flannery, 1994; Nyers and Rajan, 1998, Attig et al., 2013, Busta et al., 2014). Furthermore, liquidity may enhance or curtail misalignment of interests between managers and shareholders: it depends on the risk exposure of a bank in the way to maximize shareholder wealth (De Angelo and Stulz, 2015; Bushman et al., 2018). Liquid assets give accessible ways to reinvest in other assets when prices are low and reduce same investing risks by ensuring that an investor will be able to quickly react to market moves (Brunnermeier, 2009). Liquidity production is intrinsic to banking is discussed extensively by, among others, Diamond and Dybvig (1983), Diamond and Rajan (2001), Gorton (2010), Gorton and Pennacchi (1990), and Holmstrom and Tirole, 1998, Holmstrom and Tirole, 2011. With regard to the economic and financial structure of each bank (Shleifer and Vishny, 1992; Kiyotaki and Moore, 1997; Zingales, 2009), more capitalized banks are less exposed to monetary policy changes, because they are perceived safer by investors and because they have a smaller leverage
Furthermore, liquidity requirements can compromise banks’ transparency choices and increase refinancing risk. Indeed, banks can choose the level of transparency (the amount of information available to outsiders), albeit higher transparency reduces the owner-manager’s private benefit of control (Ratnovski, 2013).

Anyway, how bank attributes affect bank valuation upon additional exogenous liquidity injections is not fully explored (Ahrens et al., 2011). Banks with a high rate of liquid assets tend to adjust their capital ratio more quickly (Memmel and Raupach, 2010). Banks usually operate above minimum regulatory capital requirements in order to minimise the probability of reaching the regulatory limit of solvency ratios (Maurin and Toivanen, 2012). In relation to asset quality, the bank loan response to QE might differ depending on the liquidity position of a bank (Kashyap and Stein, 2000). Focusing on the risk solvency ratios we know that before the adoption of QE, European banks increased their portfolios purchasing sovereign debt securities and consequently the sovereign default risk, corroborating again the financial stability (Acharya and Steffen, 2015). Liquidity has the power to adjust quickly the capital ratios, while it becomes a new source for reserves every time that a bank should provide further loan loss provisions for impaired loans. Further because liquidity vulnerability makes banks unstable, liquidity plays also a role in the valuation of financial assets that can be affected by different risk factors (Chen et al., 2017). Under the perspective of risks taken by a bank, we know that QE programme pointed out as a liquidity shock aims at purchasing relatively “good assets”, such as those safe and less risky assets with
high ratings, leaving bad assets in banks’ portfolios.

European banks were subject to similar regulatory requirements (Basel and IFRS frameworks) and under the same supervisory rules (European Banking Authority) when the QE programme took off.

To further qualify the drivers of market reactions, we exploit banks’ heterogeneity in terms of financial features of treated banks that are likely to be associated with QE announcements. Indeed European banks offer a degree of heterogeneity due of their financial strength and ability to overcome potential crisis: this is in part due to the degree of discretion banks’ managers have in terms of capital and earnings management decisions (Bushman, 2014).

There is consensus in relation to the idea that more capitalized banks are less exposed to monetary policy changes, because they are perceived safer by investors and because they have a smaller leverage (Madura and Schnusenberg, 2000; Shleifer and Vishny, 1992; Kiyotaki and Moore, 1997; Zingales, 2009). Moreover, well-capitalised banks are perceived as “less risky” by depositors and investors because capital inadequacy implies negative consequences, first of all the reduction of lending activity. Low-risk banks are able to offer a larger amount of credit and can better shield their lending from monetary policy changes, probably due to easier access to uninsured fund raising (Kishan and Opiela, 2000; Altunbas et al., 2010). The tension among capital markets is dictated by banks’ need to be aligned to the regulatory standards at one side and the need to
increase their profitability through the lending activity at the other side. In both cases banks need liquidity.

In regard to exploit investors’ expectations around the announcements of QE, we may predict from a regulatory capital standpoint to find no relevant effects for those banks close to meeting the regulatory parameters: therefore we should find the effects of additional liquidity to be more beneficial for banks who could afford lending but just lacked the required liquid resources. In line with these arguments, we may also predict to find no relevant effects only for those banks in troubles with capital requirements, if we consider that a bank can increase the lending level just in presence of the desired levels of capital and liquidity (Kim and Sohn, 2017). On the basis of the above reasoning and in consideration of the banks’ characteristics identified in capital adequacy, asset quality and risk exposure we develop a second hypothesis exploiting the different levels of capitalization across our sample of European banks:

**H2:** The effects of liquidity injection stemming through the ECB’s QE programme exerts on banks’ valuation is moderated by a series of bank characteristics.
3. Research Design

3. Sample and methodology

3.1 Data, sample and bank characteristics

Our sample is composed by listed European commercial banks affected by the QE programme. ECB purchases (eligible) assets on the secondary market; purchasable assets met specific requirements related to their typology and the duration: mainly governmental bonds held in European commercial banks’ portfolios¹.

Table 1 presents the sample composition of 120 European banks aggregated by country distinguishing if they belong to the QE programme, Euro zone and the EU. Given our interest in assessing investors’ reactions to liquidity injections (e.g. proxied by QE announcements), we consider all listed European banks somehow subject to the QE programme. Data are gathered from Datastream Thomson Reuters Eikon for banks’ stock prices, market value and book equity value, and market indexes. We retain all commercial European banks in the sample.

The main bank level attributes refer to three categories: 1) capital adequacy, 2) asset quality and 3) risk exposure. Capital adequacy includes the regulatory capital proxied by the Tier1 ratio (Tier1). Regulatory capital includes book value of common shares, paid in capital, retained earnings, less goodwill, and any other intangibles plus other instruments subordinated to

¹ https://www.ecb.europa.eu/paym/coll/assets/html/index.en.html This is the list of eligible assets disclosed on ECB website. It reports the ISIN code and the issuer, that is mainly a national government of a Euro zone country.
subordinated debt, have no fixed maturity and no embedded incentive for redemption and for which a bank can cancel dividends or coupons at any time.

The asset quality refers to liquid assets ($LiquidAss\_TA$), loans over total assets ($Loans\_TA$), the loan loss provisions over total loans ($LLP\_Tloans$). In detail the liquid assets ($LiquidASS/TA$) represent the level of liquidity measuring the ability to transform in 30 calendar days the marketable securities in cash. Concerning the asset quality, especially relevant from a supervisor’s perspective (e.g. the stress tests and the transparency exercises by ECB-EBA), we include the ratio of total loans over total assets ($Loans/TA$) and the loan loss provisions over total loans ($LLP\_Tloans$). The ratio of total loans over total assets points out that banks could tend to lend less and to rely more on borrowing through typically short-term repurchase agreements (potentially collateralized by held to maturity securities) in the way to create new liquidity for the same bank. The risk exposure explanatory variable has been identified in the risk weighted assets ratio ($RWAs$) such as that solvency ratio that indicates the proportion of risk weighted assets over the total assets. The risk weighted assets minimum requirement would be increased at the threshold of 1.25%, which regulatory capital and capital buffers would absorb moderately any financial impact: the more the regulatory capital increases, the more the RWAs decreases. All these regulatory requirements have important implications in terms of bank’s solvency and financial stability (Calomiris et al., 2015), as well as they contribute to the assessment of the banks’ financial vulnerability (Klomp and de Haan, 2012). Furthermore risk exposure has gained a prominence in
the accounting studies after the last financial crisis. Sadka (2011) highlights the important role played by accounting information during liquidity events. Indeed Lang and Maffett (2011) show that transparency reduces firm-level liquidity uncertainty, while Ng (2011) shows that increased information quality can reduce a firm's exposure to systematic liquidity risk.

Table 2 reports the descriptive statistics of the dependent variable (CAR), the explanatory variables (bank characteristics and the asset and liability components) and the control variables used for our cross-sectional analyses for the full sample and the two subsamples (well and not well capitalized banks). The variables proxy a bank’s prior conditions in relation to the market assessments of the QE programme. As expected, well- capitalized banks display more robust ratios than not well-capitalized banks before the QE period, in terms of Tier1 (mean 20.253) and liquid assets (mean 30.269). Anyway the proportion of loans over total assets and loan loss provisions over total loans are lower in well-capitalized banks.

The definitions of all the variables are reported in the Appendix II and all the data are based on the 2014 banks’ annual reports.

Table 3 reports the correlation matrix of the all variables employed in our analyses conducted at firm-level. The banks’ financial data come from the database Orbis Bankscope for the time period 2014, 12 months before the QE announcements. The Tier1 is positively correlated (0.347) with liquid assets (LiquidAss_TA) as well as (0.158) with risk weighted assets (RWAs). Moreover, the Tier1 exhibits a significant and positive correlation (0.226) with the dividend pay-out (Dividend
This is consistent with the findings by Grapp and Heider (2010). As expected, liquid assets are negatively correlated (-0.704) with loans ($Loans_{TA}$) and positively (0.406) with RWAs. In addition loans are negatively correlated (-0.290) with deposits ($Deposits_{TL}$). It is worth noticing that the sign of the correlation between loan loss provisions ($LLP_{Tloans}$) and mortgage loans ($Mortgage\ loans\_{TA}$) is the opposite of the sign of the correlation between loan loss provisions and corporate loans ($Corporate\ loans\_{TA}$).

### 3.3 Event study

To test whether investors perceive the QE to be beneficial for European banks, our research design relies on an event study methodology that has been widely employed to assess investors’ reactions around the adoption of conventional and unconventional monetary policies by a central bank (Fiordelisi et al., 2014; Ricci, 2015) as well as other regulatory interventions (Gao et al., 2016). We adopt a Fama-French three factor model and identify six events over the years 2015-2016 in relation to the initial launch of the QE programme for the Euro zone, which are expected to materially affect equity valuations of banks. Information about the announcements are gathered via the ECB website (e.g. “Public Sector Purchase Programme”). Each event corresponds to the day in which the ECB releases official information, features and further implementations about the QE taking effect in March 2015\(^2\). The aim of updates to the QE is due to the original rules

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\(^2\) [https://www.ecb.europa.eu/mopo/implement/omt/html/index.en.html](https://www.ecb.europa.eu/mopo/implement/omt/html/index.en.html)
rapidly constrain the purchases in countries with low levels of public debt and it raises the need to expand the “universe of available debt securities occurring to the supranational agencies” \(^3\). Specifically, Appendix I details the description of all events and a figure summarizing the timeline and the methodology used to conduct the event study (estimation period and event window computation).

Each announcement conveys varying information about QE programme. Hence, we partition the sample events into three categories: 1) “information announcements” related to the process of purchases by ECB; 2) “details announcements”, through which ECB describes the rules and the requirements of the QE programme; 3) “implementations announcements” following which ECB adds new elements related to its purchases of public sector assets, such as new financial instruments issued by supranational agencies (see Appendix I – section b. “Timeline and methodology”). In the meanwhile, ECB adds to the list of the eligible assets corporate bonds explicitly not held by European banks (i.e. bonds issued by big European companies), as well as an increase of the amount for the monthly purchases (from € 60 to 80 billion) and finally an increase of the same duration of the programme (until the end of 2017) to allow still new liquidity injection. The aim of most changes related to the QE ongoing and functioning is because the original rules rapidly constrain the purchases in countries with low levels of public debt and it

\[^3\_url{http://bruegel.org/2016/02/the-european-central-banks-quantitative-easing-programme-limits-and-risks/} \]
raises the need to expand the “universe of available debt securities occurring to the supranational agencies”.

The event study methodology allows estimating the cumulative abnormal returns (CAR) as a proxy for the changes in investors’ assessment of the future expected benefits of the European banks included in our sample around the total six events as well as for each event related to the QE. This represents a change in bank valuation that can be unequivocally attributed to the expected increases in liquid assets as a result of the exogenous QE. Before January 2015 we can see from the figure reported in Appendix II that QE program in the Euro zone has not been “particularly” expected. Thus, the results obtained through the tool of Google trend show that just on the prior days before the first announcement there has been a tremendously increase of news and information about the possible decision to adopt the unconventional macroeconomic policy for the first time of the economic history of the Euro zone. Anyway, we lack data about the exact amount and timing of the purchases of assets by the ECB: the Central Bank did not disclose information about the timing and the amount of bonds relieved from the banks’ portfolios during the QE.

We consider the daily stock price, the market value and the book value of equity for each listed bank and the daily price of the main financial market index (Stoxx Europe 600). We choose as short event windows a range of three days (-1; +1) and five days (-1; +3) or (-2; +2) for the computation of cumulative abnormal returns (CAR). The estimation period is based on a range of twenty-five working days prior to announcement (-30; -5); we excluded using alternative and
longer observation windows (-60; -5). In our case we don’t have any overlapping dates within a given QE announcement and all events. Further we should take into account that a number of concurrent events occurred while ECB was launching the QE programme, making causal relationships difficulties. With non-overlapping events in the whole period and after controlling for the presence of other confounding events, we provide estimators for the parameter of the normal return model that are not influenced by the returns around the event. Including the event window in the estimation of the normal model parameters could lead to the event returns having a large influence on the normal return measure. In this situation both the normal returns and the abnormal returns would capture the event impact.

Specifically, the three factors in 3-factor model are: market return \(R^M_{it}\), size portfolio return \(SMB_t\) and book-to market portfolio return \(HML_t\).

\[
R_{it} = \beta_0 + \beta_1 R^M_{it} + \beta_2 SMB_t + \beta_3 HML_t + \epsilon_{it}
\]

(Eq.1)

To calculate the daily abnormal returns around different event windows we compute the abnormal returns \(AR_{it}\) are the difference between the observed returns and the expected returns.

\[
AR_{it} = R_{it} - E (R_{it})
\]

(Eq.2)
The abnormal returns are a direct measure of an unexpected change in a stock price associated to the event under consideration. An abnormal stock price effect associated with an un-anticipated event should be observed if the event has information content. Indeed information is defined “material” when the abnormal return is statistically significant, because the difference between the returns and the predicted returns is based on economic grounds. QE announcements represent an exogenous shock in an economic context: 1) they can change significantly banks’ behaviour or incentives; 2) the same banks of our sample are not directly chosen to be treated by this shock (Atanasov and Black, 2016). Aggregating the ARs over each event window we calculate the cumulative abnormal returns (CARs) for each bank stock price.

3.4 Empirical models for cross-sectional analyses

We test the cross-sectional variation (hypothesis H2) in banks’ stock price reactions to the key events corresponding to the announcements of QE programme. We investigate whether bank characteristics influence investors’ valuation, namely, if the financial soundness of European banks prior to the QE is somehow reflected into investors’ reactions. Recalling the identified bank characteristics as main independent variables we see that capital adequacy includes the regulatory capital (Tier1), while the asset quality refers to liquid assets (LiquidAss_TA), loans over total assets (Loans_TA), the loan loss provisions over total loans (LLP_Tloans). The asset quality of a bank indicates that assets with a high credit quality become
more liquid compared to low credit quality assets during times of financial market distress (Roesch and Kaserer, 2013).

As control variables we include the %GDP growth rate at country-level, the size and the book leverage (De Angelo and Stulz, 2015) and finally we consider also two agency cost variables (Archer et al., 1998), such as the dividend pay-out and the risk-taking behaviour. The dividend policy can affect the level of regulatory capital with consequences also in term of liquidity (Grapp and Heider, 2010), while the risk-taking behaviour can affect the level of risk exposure of a bank (Bushman et al., 2018).

Given the potential incentives to employ the unexpected external liquidity in different ways other than restoring the lending channel to banks, we deem timely assessing what affects the magnitude of the investors’ reactions upon the announcements. The models to test the hypotheses 1 and 2 include as dependent variable the cumulative abnormal returns (CAR) for all the events and as explanatory variables the banking features that influence the banks’ valuation of investors and other regulatory factors that can mitigate the benefits of the new liquidity injection by ECB. These last regulatory factors reflect a country dimension coming from the past according to the experiences at country level about the supervisory/controlling roles as well as the adoption of more stringent ratios on liquidity before Basel regulation (Bruno et al., 2018). The presence of big banks in these countries as well as of banks that are identified to support a systemic risk with a particular attention to maintain an economic and financial equilibrium has induced to include in our models
bank and country fixed effects. We also include year fixed effects to control for economy-wide shocks and timely trends. We cluster the robust standard errors by banks to control for non-constant error variance and the time dependency of errors for all the banks included in the sample.

Further, all the analyses incorporate aspects at individual-level emphasizing how a bank can appear sound and stable and consequently solvent given several considerations coming from inside and outside the same bank. In this way investors’ expectations might be focused to understand whether the weakest banks would be incentivized to invest again in better asset quality decreasing their leverage and improving their liquidity. At the other side we know how banks’ financial and economic structure may make the difference according to the goals of a central bank given the adoption of unconventional macroeconomic policies (e.g. TARP experience in US). Because of prior mixed evidences the analyses are based on the full sample of European banks and on two subsamples (the well-capitalized banks and the not well-capitalized banks) to verify whether under-capitalized banks are perceived differently from the well capitalized banks. We employ the threshold of 17% of the Common Equity Tier 1 (CET1) for the two categories of the European banks.

In sum, to test the second hypothesis (H2) we adopt the following model:

\[
\text{CARs} = \beta_0 + \beta_1 \text{Bank Characteristics} + \beta_2 \text{Controls} + \\
\text{Time FE} + \text{Country FE} + \epsilon
\]  

(Eq.)
In the above model we include the time and the country fixed effects clustering at bank level. Moreover we include control variables, such as the percentage change in GDP growth rate at country-level (\(\% \Delta GDP\)), the book leverage (Book leverage), the size (Size). Moreover we include two agency cost variables: the dividend pay-out (Dividend payout) and the risk-taking (Risk-taking) measured following Minton et al., 2014.

4. Results

4.1 Investors’ reaction to QE announcements

We first provide an outlook on the results obtained through the development of the event study around the six QE announcements. Table 4 reports the results for the sample of European banks among different event-windows identified in (-1; +1), (-2; +2), (-1; +3). The findings show on average a negative stock market reaction both for each event and overall. Whilst surprising, we interpret this as investors being sceptical about expected benefits of QE for European banks. The liquidity provided by ECB offers banks a tool that may be used differently across banks to serve various purposes and in order to respond to their needs: the next section investigates this further via a series of bank-level analyses.
4.2 Cross-sectional analyses of Cumulative Abnormal Returns (CAR)

Following on the event study we explore what drove investors’ reaction to potential new liquidity injections: first, we look at sector-wide differences and next we focus some specific banks characteristics considering different levels of capitalization.

Table 5 (Panel A and Panel B) presents the results related to the second hypotheses (H2). The results suggest that in cross sectional tests the distribution of stock price reactions is consistent with investors worrying or not being fully appreciative of the ECB intervention.

Taking into account the full sample of banks, we find a positive association between CAR and loan loss provisions (+0.039), while negative with loans (-0.102) and risk weighted assets (-0.013).

We then split the sample between well or not-so-well capitalized banks and we find a positive and significant association between the CAR and Tier1 (0.004) for the well-capitalized banks, but negative between CAR and liquid assets (-0.001), total loans (-0.072) and RWAs (-0.009). For the not so well-capitalized banks, CAR are positively associated with liquid assets (0.0007) and loan loss provisions (0.059).

In other words the results are highlighting that the ex-ante QE conditions will allow to be stronger and more stable for well-capitalized banks, while the not well-capitalized banks run the risk to become weaker and weaker. Banks have surely the opportunity to increase its liquidity ratio, but at the same time it is expected a reduction of risk weighted assets. Indeed the regulator addressed all the efforts to increase the threshold of the RWAs to allow a sort of buffer for banks to attenuate
any kind of financial turbulences generated also by different factors like market risks, liquidity risks, credit risks and operational risks. It is plausible that the new liquidity might be addressed by banks to increase their risk exposure buying new assets, such as other governmental bonds, as well as issuing new credit without having a strong funding side.

4.3 Additional analyses

In this section we perform additional analyses to examine the market reactions around the QE announcements adopting a one factor model, such as the market model (Ricci, 2015). The results reported in Table 7 show again a negative overall market reaction under the three different event windows (-1; +1), (-2;+2) and (-1,+3) with a smaller magnitude according to the results obtained with the Fama-French three factor model. In a second way, we consider different European market indexes reporting the same negative reactions (see Table 8). The different market indexes are described in detail in the Appendix III.

To further qualify the drivers of market reactions, we exploit banks’ heterogeneity considering specific components of banks’ balance sheets according to the level of banks’ capitalization (Laux and Rauter, 2017). Generally, banks may expand through securitization or lending. In the first case we can see a decrease in risk weighted assets or simply a lower perception of risk, while in the second case banks may increase their leverage. The single components can underline the direction following which investors can identify the potential benefits of QE liquidity shock according to
the consistency of the results obtained testing the second hypothesis. Following we decompose the assets and the liabilities of banks’ balance sheets to test the determinants of the market reactions around QE announcements. The theoretical reason under which the asset and liability components analyses can assume interesting connotations is because of the different level of risk reflected on each component. In other words we identify as main drivers of the assets the mortgage loans (Mortgage loans_TA), the consumer loans (Consumer loans_TA), the corporate loans (Corporate loans_TA), the securities assets (Securities_TA), the fixed assets (FixedAss_TA), while for the liabilities the main drivers are the deposits (Deposits_TL), the short term funding and debt securities (ShortTermFund&DebtSec_TL) and finally the subordinated debt (Subordinated debt_TL). Banks may expand via securities or loans. In the first case a decrease of RWAs and an increase of liquid assets correspond in case of a securities’ expansion. In the second case, an expansion of loans impacts strongly on bank business model. At the liability side expansionary macroeconomic conditions may affect also the deposits and other sources of debt financing (Acharya and Ryan, 2016; Laux and Rauter, 2017).

Breaking down the assets and the total liabilities of banks’ balance sheets we investigate which assets and liabilities components are associated with the market reactions around QE announcements always according to the level of banks’ capitalization.

\[ \text{CARs} = \beta_0 + \beta_1 \text{Banks’ balance sheet Components} + \beta_2 \text{Controls} + \]
Table 6 (Panel A and Panel B) reports the results of the asset and liability components’ analyses. In this case for well-capitalized banks we find a positive association between CAR and securities (17.430), while for not well-capitalized banks we find a negative association with mortgage loans (-0.068) and corporate loans (-0.094). Looking at the results of the liability component analyses well-capitalized banks present a positive association between CAR and deposits (0.174) as well as with subordinated debt (2.074), while for not well-capitalized banks we find no significant results. Finally we perform another additional test considering the sample of banks joining the comprehensive assessment, such as the major milestone towards the operational start of the Single Supervisory Mechanism (SSM) in November 2014. The comprehensive assessment is announced on October 23rd 2013 and it would take effect on November 2013\(^4\). One of the goals of this exercise is to enhance transparency by improving the quality of information available on the condition of the banks (Bischof and Daske, 2013). We identify a subsample of banks based on the variable \textit{Basel III Tier1 Shortfall}, such as the difference between a given bank’s Tier1 capital under Basel II and the announced implementation of Basel III. These banks present a specific robustness in terms of capital and given the announcement of QE liquidity shock they will benefit both for

\[ Time\ FE + Country\ FE + \epsilon \]  

\(^4\) https://www.ecb.europa.eu/press/pr/date/2013/html/pr131023.en.html
adjusting capital ratio and liquid asset ratio. These findings confirms that just those banks aligned with regulatory capital can benefit of new liquidity provided by ECB (see Table 9).

5. Conclusions and limitations

This study investigates whether (exogenous) liquidity affects banks’ valuation. Given that liquidity is fundamental to banks’ financial soundness and their ability to ensure a functioning lending channel, we exploit investors’ reactions to the announcements related to Quantitative Easing as a shock of new liquidity provisions on a sample of European banks. Furthermore, we condition the strength of the market reactions on a series of bank-level attributes that may meaningfully affect ways in which according to specific bank characteristics (capital adequacy, asset quality and risk exposure). The QE programme initially attempted to re-ignite the banking sector with liquidity and alleviate financial market distress; next, the ultimate objective was to relaunch credit lending to the private sector by providing banks with stable funding at affordable prices.

In order to address the key questions, we looked at a number of key events leading to the passage of QE among the years 2015-2016 and we exploit at firm-level whether investors envisage any potential benefits due to the liquidity provision of the ECB. Our findings report a negative overall bank stock price reaction among the six QE announcements, thus indicating a slight investors’ concerns about the exogenous liquidity flowing through an extraordinary intervention by the ECB.

Next, we looked at bank-level characteristics as potential drivers of the market reactions:
consistent with our expectations, we find that the pre-existing conditions faced by banks prior to the QE announcements significantly shaped investors’ reactions. Splitting the sample in well or not well-capitalized banks, the findings show that not well-capitalized banks might would get no benefits in terms of economic and financial robustness. Banks experiencing higher financial stability in the period just prior to the launch of the QE programme would allow banks to address the new liquidity for becoming stronger and more aligned to the regulatory ratios.

Our study is subject to a number of caveats and limitations. First, similar to the most part of event studies, we assume the hypothesis of markets’ efficiency, where the market adjusts rapidly to new information (Fama et al., 1969). Second, we lack data about the exact amount and timing of the purchases of assets by ECB: the Central Bank did not disclose information about the timing and the amount of bonds relieved from the banks’ portfolios during the QE programme. Finally, because the results provide an estimate of the investors’ assessments regarding the few trust on European banks given the QE programme, it is also evident that the range of time period about banks’ accounting data are restricted to a short period of two years (2014-2015) not providing a comprehensive evaluation of these outcomes.

The empirical evidences coming out from our tests allow identifying potential implications for the regulator aiming to guarantee financial stability among the banking sector, especially to avoid large and systemic bank failure. In this regard, the on-going consolidation moment in the banking industry is creating an increasing number of large banks. One policy response to the potential for
“too-big-to-fail” dangers is to combine high regime of regulation with intervention of central banks as a safety net.

In conclusion, just combining the level of banks’ capitalization with the expectations of new liquidity injection we obtain new interesting empirical evidences. The analyses conducted at firm-level allow to see that the undercapitalized banks could not benefit of new liquidity provided by ECB to support the real sector (Caselli, 2010). Just only the well-capitalized banks could reactivate effectively the lending activity. In other words, a funding liquidity shock as the Quantitative Easing adopted in the Euro zone can represent a benefit depending on the economic and financial structure of a bank (Zingales, 2009).

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## Appendix I – Event Study

### a. Event description

| Event | Event_number | Description | Source |
|-------|--------------|-------------|--------|
| **Year 2015** | | | |
| January 22nd 2015 | Event_1 | ECB announces the launch of the Quantitative Easing programme in the Euro zone | [https://www.ecb.europa.eu/press/pressconf/2015/html/is150122.en.html](https://www.ecb.europa.eu/press/pressconf/2015/html/is150122.en.html) |
| March 5th 2015 | Event_2 | QE program starts for the first time on March 5th 2015. This program consists in purchasing assets for a monthly amount corresponding to € 60 billion. | [https://www.ecb.europa.eu/press/pressconf/2015/html/is150305.en.html](https://www.ecb.europa.eu/press/pressconf/2015/html/is150305.en.html) |
| April 15th 2015 | Event_3 | ECB approves amendments to the initial list of agencies located in the Euro area issuing securities that are eligible for the PSPP (Public Sector Purchase Programme). | [https://www.ecb.europa.eu/press/pressconf/2015/html/is150415.en.html](https://www.ecb.europa.eu/press/pressconf/2015/html/is150415.en.html) |
| **Year 2016** | | | |
| March 10th 2016 | Event_4 | ECB announces the Corporate Sector Purchase Programme (CSPP) (Not banking corporate bonds); an increase of APP monthly purchases corresponding to € 80 billion. | [https://www.ecb.europa.eu/press/pr/date/2016/html/pr160310.en.html](https://www.ecb.europa.eu/press/pr/date/2016/html/pr160310.en.html) |
| April 21st 2016 | Event_5 | First monthly assets purchase of € 80 billion in APP (Asset Purchase Programme). Furthermore, The Eurosystem starts to buy corporate sector bonds under the corporate sector purchase programme (CSPP) on 8 June 2016. | [https://www.ecb.europa.eu/press/pr/date/2016/html/pr160421.en.html](https://www.ecb.europa.eu/press/pr/date/2016/html/pr160421.en.html) |
| July 22nd 2016 | Event_6 | The APP (or QE) is intended to be carried out until March 2017 | [https://www.ecb.europa.eu/press/pr/date/2016/html/pr160721.en.html](https://www.ecb.europa.eu/press/pr/date/2016/html/pr160721.en.html) |
b. Timeline & Methodology

* Fama and French 3-Factor Model Cumulative Abnormal Returns (CARs)
  
  \[ R_{it} = \beta_0 + \beta_1 R_{Mkt} + \beta_2 SMB_t + \beta_3 HML_t + \epsilon_{it} \]
  
  \[ ARs_{it} = R_{it} - \beta_0 - \beta_1 R_{Mkt} - \beta_2 SMB_t - \beta_3 HML_t + \epsilon_{it} \]
  
  \[ CARs = \sum_{t=1}^{n} ARs_t \]
### Appendix II – Variable Definitions

| Variable | Definition                                                                                                                                                                                                 | Source                                           |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| **Dependent variable**                                                                                                                                                                                  |                                                  |
| CAR      | Cumulative abnormal returns based on *Fama-French 3 factor model* where the *Bank stock price* is the daily stock price of the listed European banks, the *Market value and the Book value of equity* for each listed European bank, the *Market stock price* is the daily market stock price of the following market indexes: Stoxx Europe 600 | Eikon Thomson Reuters - Datastream               |
| **Independent variables**                                                                                                                                                                               |                                                  |
| Tier1    | Tier 1 capital ratio                                                                                                                                                                                       | Bankscope                                       |
| LiquidAss_TA | Liquid assets divided by total assets                                                                                                                                                                   |                                                  |
| Loans_TA | Total loans over total assets                                                                                                                                                                              |                                                  |
| LLP_Tloans | Loan loss provisioning / total loans                                                                                                                                                                     |                                                  |
| RWAs    | Total risk weighted assets / total assets                                                                                                                                                                |                                                  |
| Mortgage loans_TA | Mortgage loans / total assets                                                                                                                                                                            |                                                  |
| Consumer loans_TA | Consumer loans / total assets                                                                                                                                                                           |                                                  |
| Corporate loans_TA | Corporate loans / total assets                                                                                                                                                                         |                                                  |
| Securities_TA | Sum of AfS, HtM and trading securities of bank at the end of the year (Laux and Rauter, 2017)                                                                                                                |                                                  |
| FixedAss_TA | Fixed assets / total assets                                                                                                                                                                               |                                                  |
| Total Assets (€ bn) | Total assets in billions of Euro                                                                                                                                                                         |                                                  |
| Deposits_TL | Total deposits divided by total liabilities                                                                                                                                                              |                                                  |
| ShortTermFund&DebtSec_TL | Short term funding & debt securities divided by total liabilities                                                                                                                                          |                                                  |
| Subordinated debt_TL | Subordinated debt divided by total liabilities                                                                                                                                                          |                                                  |
| Total Liabilities (€ bn) | Total liabilities in billions of Euro                                                                                                                                                                    |                                                  |
| **Control variables**                                                                                                                                                                                  |                                                  |
| Dividend Payout | (common stock dividends + preferred stock dividends)/net income                                                                                                                                          |                                                  |
| Risk-taking | Total risk is the average annual standard deviation of daily stock returns (Minton et al., 2014)                                                                                                           |                                                  |
| %ΔGDP | Percentage change in GDP per capita (Bushman and Williams, 2012)                                                                                                                                              |                                                  |
| Book leverage | Total assets/total equity (Laux and Rauter, 2017)                                                                                                                                                          |                                                  |
| Size | Natural logarithm of total assets (Bushman and Williams, 2012)                                                                                                                                               |                                                  |
### Appendix III – Market Index Definitions

| Variable              | Abb.  | Definition                                                                                                                                                                                                 | Source              |
|-----------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| STOXX Europe 600     | djstoxx | derived from the Stoxx Europe Total Market Index (TMI) and is a subset of the Stoxx Europe 600 index. With a fixed number of 600 components, the STOXX Europe 600 index represents large, mid and small capitalization companies across 18 countries of the European region: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and UK. | Eikon Thomson Reuters - Datastream |
| STOXX Europe 50      | djes50i | Europe’s leading Blue-chip index, provides a representation of super sector leaders in Europe. The index cover 50 stocks from 18 European countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and UK. This index id licensed to financial institutions to serve as underlying for a wide range of investment products such as Exchange traded funds (ETFs), Futures and options and structured products worldwide. |                      |
| S&P euro              | speurop | is a stock index of European stocks. It is part of the S&P Global 1200.                                                                                                                                   |                     |
| Ftse Eurotop 100      | fteu100 | is designed to measure the performance of companies resident and incorporated in Europe. The index can be used for benchmarking purposes and as tools in the creation of index tracking funds, exchange traded funds and derivatives. It represents the performance of the 100 most highly capitalized blue chip companies in Europe. |                     |
| Ftse Eurofirst 100    | ftef1e  | 60 largest companies ranked by market capitalization in the FTSE Developed Europe Index and 40 additional companies selected for their size and sector representation. It provides a range of liquid and transparent pan-European and Eurozone indices, which track equity performance across the region as a whole and across 18 industry sectors. |                     |
| Ftse Eurofirst 80     | ftef80e | the 60 largest companies ranked by market capitalization in the FTSE Eurozone index and 20 additional companies selected for their size and sector representation.                                                                 |                     |
Appendix IV - Results of Google Trend related to Euro Quantitative Easing News

By tracking the number of searches on google trends and using the key word ECB QE the results show that these announcements were not anticipated by investors in days prior to the actual release.
Figure 1. Distribution of the Cumulative Abnormal Returns (CAR)

This figure represents the distribution of the cumulative abnormal returns (CAR) obtained from the conduction of the event study according to the level of the total capital ratio of the European banks included in our sample. The total capital ratio is composed by Tier 1 and Tier 2 capital divided by RWAs.
Table 1. Sample Composition of the European Banks

| Country         | Country Code | Nr. Listed Banks | QE  | Euro zone | EU  |
|-----------------|--------------|------------------|-----|-----------|-----|
| Austria         | AT           | 6                | Yes | Yes       | Yes |
| Belgium         | BE           | 1                | Yes | Yes       | Yes |
| Cyprus          | CY           | 1                | No  | Yes       | Yes |
| Finland         | FI           | 2                | Yes | Yes       | Yes |
| France          | FR           | 4                | Yes | Yes       | Yes |
| Germany         | DE           | 5                | Yes | Yes       | Yes |
| Ireland         | IE           | 1                | Yes | Yes       | Yes |
| Italy           | IT           | 16               | Yes | Yes       | Yes |
| Malta           | MT           | 3                | Yes | Yes       | Yes |
| Netherlands     | NL           | 2                | Yes | Yes       | Yes |
| Portugal        | PT           | 1                | Yes | Yes       | Yes |
| Slovakia        | SK           | 3                | Yes | Yes       | Yes |
| Spain           | ES           | 6                | Yes | Yes       | Yes |
| Denmark         | DK           | 22               | No  | No        | Yes |
| Norway          | NO           | 21               | No  | No        | No  |
| Sweden          | SE           | 4                | No  | No        | Yes |
| Switzerland     | CH           | 17               | No  | No        | No  |
| United Kingdom  | GB           | 5                | No  | No        | Yes |

** Total Banks ** 120

** UK belonged to EU until June 23rd 2016

QE = countries under the programme of Quantitative Easing

Euro zone= countries which have adopted Euro currency

EU = countries member of the European Union

All banks in all countries are subject to the Basel Regulation
Table 2. Descriptive Statistics

| Variables                      | Full Sample                   | Well-capitalized Banks | Not well-capitalized Banks |
|-------------------------------|-------------------------------|------------------------|-----------------------------|
|                               | Nr.obs | Mean     | Median   | SD    | Nr.obs | Mean     | Median   | SD    | Nr.obs | Mean     | Median   | SD    |
| CAR                           | 711    | -0.037   | -0.351   | 0.067 | 144    | -0.041   | -0.325   | 0.047 | 567    | -0.036   | -0.035   | 0.071 |
| Tier1                         | 711    | 14.572   | 14.100   | 3.721 | 144    | 20.253   | 19.550   | 2.931 | 567    | 13.129   | 13.2     | 2.215 |
| LiquidAss_TA                  | 711    | 20.220   | 16.773   | 14.715| 144    | 30.269   | 24.927   | 18.547| 567    | 17.668   | 14.499   | 12.349|
| Loans_TA                      | 711    | 0.619    | 0.659    | 0.189 | 144    | 0.539    | 0.599    | 0.261 | 567    | 0.640    | 0.667    | 0.160 |
| LLP_Tloans                    | 711    | 0.603    | 0.667    | 0.221 | 144    | 0.499    | 0.584    | 0.240 | 567    | 0.629    | 0.691    | 0.208 |
| RWAs                          | 711    | 0.603    | 0.769    | 0.884 | 144    | 1.195    | 0.988    | 1.406 | 567    | 0.891    | 0.742    | 0.680 |
| Mortgage loans_TA             | 711    | 0.128    | 0.000    | 0.231 | 144    | 0.122    | 0.000    | 0.261 | 567    | 0.130    | 0.000    | 0.235 |
| Consumer loans_TA             | 711    | 0.152    | 0.008    | 0.238 | 144    | 0.129    | 0.000    | 0.280 | 567    | 0.158    | 0.0281   | 0.226 |
| Corporate loans_TA            | 711    | 0.085    | 0.000    | 0.158 | 144    | 0.068    | 0.000    | 0.134 | 567    | 0.089    | 0.000    | 0.163 |
| Securities_TA                 | 711    | 0.001    | 0.000    | 0.002 | 144    | 0.001    | 0.000    | 0.002 | 567    | 0.001    | 0.000    | 0.002 |
| FixedAss_TA                   | 711    | 0.008    | 0.008    | 0.006 | 144    | 0.006    | 0.003    | 0.007 | 567    | 0.009    | 0.008    | 0.005 |
| Total Assets (€ bn)           | 711    | 15.3     |          |        | 144    | 10.3     |          |        | 567    | 16.6     |          |        |
| Deposits_TL                   | 711    | 0.078    | 0.057    | 0.084 | 144    | 0.059    | 0.032    | 0.075 | 567    | 0.083    | 0.066    | 0.086 |
| ShortTermFund&DebtSec_TL      | 711    | 0.028    | 5.223    | 0.050 | 144    | 0.050    | 0.000    | 0.081 | 567    | 0.023    | 0.000    | 0.036 |
| Subordinated debt_TL          | 711    | 0.009    | 0.006    | 0.012 | 144    | 0.005    | 0.000    | 0.010 | 567    | 0.011    | 0.007    | 0.012 |
| Total Liabilities(€ bn)        | 711    | 14.5     |          |        | 144    | 9.78     |          |        | 567    | 15.7     |          |        |
| Dividend Payout               | 711    | 0.460    | 0.727    | 0.441 | 144    | 0.722    | 0.890    | 0.377 | 567    | 0.394    | 0.000    | 0.431 |
| Risk-taking                   | 711    | 0.013    | 0.007    | 0.020 | 144    | 0.009    | 0.006    | 0.009 | 567    | 0.014    | 0.007    | 0.022 |
| %AGDP                         | 711    | 1.633    | 1.676    | 1.472 | 144    | 1.738    | 1.992    | 0.769 | 567    | 1.607    | 1.676    | 1.602 |
| Book leverage                 | 711    | 14.182   | 13.087   | 5.804 | 144    | 12.829   | 11.480   | 6.298 | 567    | 14.526   | 13.502   | 5.626 |
| Size                          | 711    | 16.481   | 16.413   | 2.422 | 144    | 16.189   | 16.579   | 2.389 | 567    | 16.555   | 16.346   | 2.427 |

This table reports means, medians and standard deviations of various balance sheet characteristics and regulatory variables for our sample banks. The sample covers European banks (full sample) and following we split them in two sub-samples: the well-capitalized banks and the not well-capitalized banks. All the variables are based on annual reports of the years 2014-2015. See Appendix II for variable definitions.
Table 3. Correlation Matrix

| Variables                  |  1 |  2  |  3  |  4  |  5  |  6  |  7  |  8  |  9  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  |
|----------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 CAR                      | 1.000 |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 2 Tier1                    | -0.087 | 1.000 | | | | | | | | | | | | | | | | |
| 3 LiquidAss_TA             | 0.018 | 0.347* | 1.000 | | | | | | | | | | | | | | | | |
| 4 Loans_TA                 | -0.163* | -0.227* | -0.704* | 1.000 | | | | | | | | | | | | | | | | |
| 5 LLP_Tloans               | 0.223* | -0.211* | 0.068 | -0.265* | 1.000 | | | | | | | | | | | | | | | | |
| 6 RWAs                     | -0.108* | 0.158* | 0.406* | -0.425* | -0.056 | 1.000 | | | | | | | | | | | | | | | | |
| 7 Mortgage loans_TA        | -0.183* | 0.061 | -0.225* | 0.337* | -0.512* | -0.084 | 1.000 | | | | | | | | | | | | | | | | |
| 8 Consumer loans_TA        | -0.144* | 0.012 | -0.084 | 0.310* | 0.008 | 0.019 | -0.226* | 1.000 | | | | | | | | | | | | | | | | |
| 9 Corporate loans_TA       | -0.154* | 0.084 | -0.127* | 0.124* | 0.104* | 0.146* | -0.014 | 0.058 | 1.000 | | | | | | | | | | | | | | | | |
| 10 Securities_TA           | -0.153* | 0.134* | 0.160* | 0.110* | -0.025 | 0.119* | -0.181* | 0.255* | -0.150* | 1.000 | | | | | | | | | | | | | | | | |
| 11 FixedAss_TA             | 0.051 | -0.175* | -0.010 | 0.004 | 0.269* | -0.050 | -0.242* | 0.001 | 0.010 | 0.087 | 1.000 | | | | | | | | | | | | | | | | |
| 12 Deposits_TL             | 0.044 | -0.114* | -0.001 | -0.290* | 0.121* | 0.066 | -0.054 | -0.202* | 0.036 | -0.183* | 0.260* | 1.000 | | | | | | | | | | | | | | | | |
| 13 ShortTermFund&DebtSec_TL| 0.004 | 0.173* | -0.056 | 0.134* | -0.047 | -0.001 | 0.029 | 0.286* | 0.132* | -0.009 | -0.396* | -0.174* | 1.000 | | | | | | | | | | | | | | | | |
| 14 Subordinated debt_TL    | -0.046 | -0.314* | -0.097* | 0.092 | 0.135* | 0.084 | -0.167* | 0.160* | 0.193* | 0.171* | -0.042 | -0.076 | 0.179* | 1.000 | | | | | | | | | | | | | | | | |
| 15 Dividend Payout          | -0.122* | 0.226* | 0.091 | 0.140* | -0.273* | -0.002 | 0.212* | 0.184* | -0.050 | -0.079 | -0.291* | -0.280 | 0.279* | -0.004 | 1.000 | | | | | | | | | | | | | | | | |
| 16 Risk-taking             | -0.187* | -0.098* | -0.111* | -0.023 | 0.156* | 0.015 | 0.025 | -0.072 | 0.261* | -0.068 | 0.061 | 0.170* | -0.072 | -0.049 | -0.204* | 1.000 | | | | | | | | | | | | | | | | |
| 17 %ΔGDP                   | -0.207* | 0.034 | 0.139* | 0.035 | -0.219* | 0.190* | 0.165* | 0.248* | -0.102* | 0.089 | -0.089 | -0.024 | 0.097* | 0.052 | 0.222* | -0.084 | 1.000 | | | | | | | | | | | | | | | | |
| 18 Book leverage           | 0.224* | -0.311* | 0.084 | -0.302* | 0.069 | -0.019 | 0.022 | -0.259* | -0.060 | -0.254* | -0.229* | 0.152* | 0.199* | 0.077 | -0.099* | 0.027 | -0.109* | 1.000 | | | | | | | | | | | | | | | | |
| 19 Size                    | 0.274* | 0.198* | -0.079 | -0.336* | 0.212* | -0.034 | 0.097* | -0.326* | 0.077 | -0.676* | -0.219* | 0.164* | 0.102* | -0.111* | -0.016 | 0.103* | -0.132* | 0.490* | 1.000 | | | | | | | | | | | | | | | | |

Significance is indicated by *p<0.01
See Appendix II for variable definitions
Table 4. Market reactions of the European Banks around QE programme announcements (*FF three factor model*)

| Nr. Event | Date            | Count | CAR (-1:+1) | CAR (-2:+2) | CAR (-1:+3) |
|-----------|-----------------|-------|-------------|-------------|-------------|
|           |                 |       | (-1;+1)     | (-2;+2)     | (-1;+3)     |
|           |                 |       | (-0.013***  | (-0.016***  | (-0.013***  |
|           |                 |       | [0.002]     | [0.003]     | [0.002]     |
|           |                 |       | (-0.030***  | (-0.053***  | (-0.059***  |
|           |                 |       | [0.003]     | [0.005]     | [0.005]     |
|           |                 |       | (-0.035***  | (-0.078***  | (-0.091**   |
|           |                 |       | [0.005]     | [0.011]     | [0.012]     |
|           |                 |       | (-0.055***  | (-0.123***  | (-0.118***  |
|           |                 |       | [0.006]     | [0.011]     | [0.012]     |
|           |                 |       | (-0.044***  | (-0.124***  | (-0.122***  |
|           |                 |       | [0.007]     | [0.011]     | [0.012]     |
|           |                 |       | (-0.043***  | (-0.139***  | (-0.140***  |
|           |                 |       | [0.007]     | [0.011]     | [0.012]     |
| All_events|                 | 711   | **-0.037*** | **-0.089*** | **-0.091*** |
|           |                 |       | [0.002]     | [0.004]     | [0.004]     |

This table reports the results of the event study following the methodology of *Fama-French three factor model* described in the Appendix I. The data source of the daily stock prices, the market index prices (Stoxx Europe 600) the market values and the book values of equity for the sample of European banks is Eikon Thomson Reuters – Datastream. The results are for each event and for all the events under three event windows composed by three or five days including the day of the announcement. Significance is indicated by: ***<0.001, **<0.05, *<0.10. Clustered standard errors are given in parentheses.
Table 5. Cross-sectional Analyses related to *Hypothesis 2*

*Panel A. OLS regression model*

|                         | Full Sample | Well-capitalized Banks | Not well-capitalized Banks |
|-------------------------|-------------|------------------------|---------------------------|
| **Tier1**               | -0.001      | 0.0003                 | 0.004**                   | -0.003**                 | -0.002 |
|                         | (-1.85)     | (0.25)                 | (0.03)                    | (2.71)                   | (-2.15) | (-1.59) |
| **LiquidAss_TA**        | -0.004      | 0.0004                 | -0.0007*                 | -0.001***                | -0.001  | 0.0007** |
|                         | (-1.77)     | (0.20)                 | (-1.96)                  | (-3.83)                  | (-0.37) | (2.14)   |
| **Loans_TA**            | -0.102***   | -0.018                 | -0.084**                 | -0.072**                | -0.095** | 0.030   |
|                         | (-5.95)     | (-0.97)                | (-3.21)                  | (-2.25)                  | (-3.62) | (0.99)   |
| **LLP_Tloans**          | 0.039**     | 0.044***               | -0.004                   | -0.009                  | 0.056*** | 0.059*** |
|                         | (3.06)      | (3.99)                 | (-0.31)                  | (-0.60)                 | (3.20)  | (4.13)   |
| **RWAs**                | -0.013***   | -0.007**               | -0.138***                | -0.009*                 | -0.014** | -0.008  |
|                         | (-4.70)     | (-2.34)                | (-4.65)                  | (-1.77)                 | (-3.17) | (-1.92)  |
| **Dividend Payout**     | -0.013**    | 0.050                  |                          |                         | -0.015** |
|                         | (-2.43)     | (1.69)                 |                          |                         | (-2.53) |
| **Risk-taking**         | -0.848***   | 0.407                  |                          |                         | -0.909*** |
|                         | (-3.87)     | (0.75)                 |                          |                         | (-4.12) |
| **%AGDP**               | -0.005**    | -0.005                 |                          |                         | -0.005** |
|                         | (-2.59)     | (-0.39)                |                          |                         | (-2.63) |
| **Book leverage**       | 0.001       | 0.077***               |                          |                         | 0.0007   |
|                         | (1.94)      | (4.73)                 |                          |                         | (1.29) |
| **Size**                | 0.005***    | -0.012***              |                          |                         | 0.007*** |
|                         | (4.22)      | (-3.47)                |                          |                         | (-5.04) |
| **Constant**            | 0.040       | -0.124***              | 0.044                    | 0.048                   | 0.047   | -0.180*** |
|                         | (1.88)      | (-4.20)                | (0.92)                   | (0.69)                  | (1.76)  | (-3.83) |
| **Observations**        | 711         | 711                    | 144                      | 144                     | 567     | 567     |
| **R-squared**           | 0.098       | 0.209                  | 0.177                    | 0.4257                  | 0.110   | 0.241   |
| **Prob>F**              | 0.000       | 0.000                  | 0.000                    | 0.000                   | 0.000   | 0.000   |

This table reports the estimation results for regression model (3). The dependent variable is CAR (-1;+1) obtained through the conduction of the event study. The key explanatory variables are Tier1 (for *Capital Adequacy*), liquid assets, loans/total assets, LLP/total loans (for the *Asset Quality*), RWAs (for *Bank Solvency*). The control variables include two agency cost variables, such as the dividend payout and risk-taking, and other variables like %GDP, book leverage and size. St. errors adjusted for clusters; t-statistics in parentheses; *p<0.10; **p<0.05; ***p< 0.01; see Appendix II for variable definitions.
Table 5. (continued)
Panel B. Fixed Effects and Clustering

|                     | Full Sample | Well-capitalized Banks | Not well-capitalized Banks |
|---------------------|-------------|------------------------|---------------------------|
| **Tier1**           | -0.002***   | -0.009                 | 0.001                     | 0.004**                   | -0.001                   |
|                     | (-3.79)     | (-1.08)                | (0.84)                    | (3.81)                    | (-3.33)                  | (-1.44)                 |
| **LiquidAss_TA**    | -0.006**    | -0.0004                | -0.0005                   | -0.002***                 | -0.0002                  | **0.0008**              |
|                     | (-2.35)     | (-0.28)                | (-1.28)                   | (-3.80)                   | (-0.53)                  | (2.49)                  |
| **Loans_TA**        | -0.114***   | -0.026                 | -0.093*                   | -0.087***                 | -0.110***                | 0.021                   |
|                     | (-4.78)     | (-1.31)                | (-2.78)                   | (-3.59)                   | (-4.07)                  | (0.92)                  |
| **LLP_Tloans**      | 0.018       | 0.0200                 | -0.028                    | 0.012                     | 0.027                    | **0.026**              |
|                     | (1.31)      | (1.92)                 | (-1.37)                   | (0.87)                    | (1.63)                   | (2.59)                  |
| **RWAs**            | -0.007**    | -0.003                 | **-0.013**                | -0.006                    | -0.006                   | -0.006                  |
|                     | (-3.05)     | (-1.80)                | (-2.11)                   | (-1.07)                   | (-1.21)                  | (-1.37)                 |
| **Dividend Payout** | -0.014**    |                        | -0.018                    |                            | **-0.017**               |
|                     | (-3.01)     |                        | (-0.83)                   |                            | (-2.36)                  |
| **Risk-taking**     | -0.063**    |                        | 0.108                     |                            | **-0.715**               |
|                     | (-2.18)     |                        | (0.15)                    |                            | (-2.24)                  |
| **%AGDP**           | -0.015**    |                        | 0.026                     |                            | **-0.015**               |
|                     | (-2.79)     |                        | (0.017)                   |                            | (-2.40)                  |
| **Book leverage**   | 0.0006      |                        | **0.009**                 |                            | 0.0006                   |
|                     | (1.04)      |                        | (4.57)                    |                            | (1.02)                   |
| **Size**            | **0.003**   |                        | -0.016***                 |                            | **0.006**                |
|                     | (2.71)      |                        | (-4.62)                   |                            | (4.14)                   |
| **Constant**        | **0.083***  | **-0.043**             | 0.028                     | 0.105                     | **0.084**                | **-0.118**             |
|                     | (3.48)      | (-1.26)                | (0.53)                    | (1.77)                    | (2.64)                   | (-3.52)                |

Country Fixed: Yes
Time Fixed Effects: Yes
Clustering Level: Bank
Observations: 711
R-squared: 0.071
Prob>F: 0.0002

This table reports the estimation results for regression model (3) including the clustering at bank level and the fixed effects for country and time. St. errors adjusted for clusters; t-statistics in parentheses; *p<0.10; **p<0.05; ***p< 0.01; see Appendix II for variable definitions.
Table 6. Component Analyses related to Additional Analyses

Panel A. Asset-Component Analysis

|                      | Full Sample | Well-capitalized Banks | Not well-capitalized Banks |
|----------------------|-------------|------------------------|---------------------------|
| **Mortgage loans_TA**| -0.051***   | -0.042***              | -0.068***                 |
|                      | (-3.58)     | (-3.60)                | (-3.77)                   |
| **Consumer loans_TA**| 0.009       | 0.020                  | -0.027                    |
|                      | (-0.55)     | (-1.74)                | (-1.43)                   |
| **Corporate loans_TA**| -0.774**    | -0.062**               | -0.094**                  |
|                      | (-2.40)     | (-2.75)                | (-2.40)                   |
| **Securities_TA**    | -0.261      | -0.798                 | 17.43***                  |
|                      | (-0.09)     | (-0.52)                | (5.27)                    |
| **FixedAss_TA**      | 0.762       | 0.723**                | -1.357                    |
|                      | (1.10)      | (2.89)                 | (-1.16)                   |
| **%AGDP**            | -0.006**    | -0.013**               | -0.032***                 |
|                      | (-2.04)     | (-2.07)                | (-3.31)                   |
| **Book leverage**    | 0.001       | 0.0009                 | 0.0008                    |
|                      | (1.42)      | (1.57)                 | (0.08)                    |
| **Size**             | 0.006**     | 0.004**                | 0.174***                  |
|                      | (2.69)      | (2.16)                 | (2.66)                    |
| **Constant**         | -0.146***   | -0.093**               | -0.289***                 |
|                      | (-3.35)     | (-3.32)                | (-3.37)                   |
| Country Fixed        | No          | Yes                    | No                        |
| Time Fixed Effects   | No          | Yes                    | No                        |
| Clustering Level     | Bank        | Bank                   | Bank                      |
| Observations         | 711         | 711                    | 144                       |
| R-squared            | 0.311       | 0.290                  | 0.557                     |

This table reports the estimation results for regression model (4). The dependent variable is CAR (-1;+1). The key explanatory variables are Mortgage loans, Consumer loans, Corporate loans, Securities and Fixed Assets, while the control variables are %GDP, book leverage and size. St. errors adjusted for clusters; t-statistics in parentheses; *p<0.10; **p<0.05; ***p<0.01; see Appendix II for variable definitions.
Table 6. (continued)
Panel B. Liability-Component Analysis

|                      | Full Sample | Well-capitalized Banks | Not well-capitalized Banks |
|----------------------|-------------|------------------------|---------------------------|
| Deposits_TL          | -0.015      | 0.002                  | 0.138 **                  | 0.174***                  | -0.625                  | -0.038                  |
|                      | (-0.22)     | (0.07)                 | (1.71)                    | (5.69)                    | (-0.70)                 | (-1.00)                 |
| ShortTermFund&DebtSec_TL | -0.028 | 0.170                  | 0.011                     | -0.120                    | -0.163                  | -0.063                  |
|                      | (-0.43)     | (0.33)                 | (0.09)                    | (-1.79)                   | (-1.52)                 | (-0.71)                 |
| Subordinated debt_TL | -0.099      | -0.023                 | 1.187 **                  | 2.074**                   | -0.268                  | -0.220                  |
|                      | (-0.25)     | (-0.14)                | (1.22)                    | (3.12)                    | (-0.58)                 | (-1.14)                 |
| %ΔGDP                | -0.007      | -0.187**               | -0.006                    | -0.016                    | -0.006                  | -0.017                  |
|                      | (-1.82)     | (-2.63)                | (-0.48)                   | (-1.57)                   | (-1.51)                 | (-2.23)                 |
| Book leverage        | 0.001       | 0.001                  | 0.001 **                  | 0.002**                   | 0.001                   | 0.001*                  |
|                      | (1.59)      | (1.87)                 | (1.44)                    | (3.27)                    | (1.52)                  | (1.96)                  |
| Size                 | **0.005**   | **0.004***             | 0.0004                    | **0.008**                 | **0.006***              | **0.005***              |
|                      | (3.01)      | (3.08)                 | (0.07)                    | (-2.25)                   | (3.46)                  | (4.07)                  |
| Constant             | -0.134      | **0.095***             | -0.075                    | 0.082                     | **0.146***              | **0.110***              |
|                      | (-5.04)     | (-5.21)                | (-1.22)                   | (1.64)                    | (-4.91)                 | (-5.92)                 |
| Country Fixed        | No          | Yes                    | No                        | Yes                       | No                      | Yes                      |
| Time Fixed Effects   | No          | Yes                    | No                        | Yes                       | No                      | Yes                      |
| Clustering Level     | Bank        | Bank                   | Bank                      | Bank                      | Bank                    | Bank                    |
| Observations         | 711         | 711                    | 144                       | 144                       | 567                     | 567                     |
| R-squared            | 0.198       | 0.230                  | 0.370                     | 0.131                     | 0.224                   | 0.235                   |
| Prob>F               | 0.000       | 0.000                  | 0.000                     | 0.000                     | 0.000                   | 0.000                   |

This table reports the estimation results for regression model (4). The dependent variable is CAR (-1;+1). The key explanatory variables are deposits, short term funding & debt securities, subordinated debt, while the control variables are %GDP, book leverage and size. St. errors adjusted for clusters; t-statistics in parentheses; *p<0.10; **p<0.05; ***p< 0.01; see Appendix II for variable definitions.
Table 7. Additional tests of the market reactions around QE programme announcements (one factor model)

| Nr. Event | Date               | Count | CAR (-1;+1) | CAR (-2;+2) | CAR (-1;+3) |
|-----------|--------------------|-------|-------------|-------------|-------------|
| Event_1   | January 22nd 2015  | 117   | 0.002       | 0.006       | 0.002       |
|           |                    |       | (0.002)     | (0.003)     | (0.002)     |
| Event_2   | March 3rd 2015     | 117   | 0.0001      | -0.007      | -0.017**    |
|           |                    |       | (0.003)     | (0.005)     | (0.006)     |
| Event_3   | April 15th 2015    | 117   | -0.011*     | -0.037***   | -0.049***   |
|           |                    |       | (0.005)     | (0.011)     | (0.013)     |
| Event_4   | March 10th 2016    | 120   | -0.028***   | -0.078***   | -0.080***   |
|           |                    |       | (0.006)     | (0.011)     | (0.013)     |
| Event_5   | April 21st 2016    | 120   | -0.009      | -0.066***   | -0.073***   |
|           |                    |       | (0.007)     | (0.012)     | (0.012)     |
| Event_6   | July 22nd 2016     | 120   | -0.013      | -0.086***   | -0.094***   |
|           |                    |       | (0.008)     | (0.011)     | (0.013)     |
| All_events|                    | 711   | -0.010***   | -0.045***   | -0.052***   |
|           |                    |       | (0.002)     | (0.004)     | (0.004)     |

This table reports the results of the event study following the methodology of one factor model (market model). The data source of the daily stock prices and the market index prices for the sample of European banks is Eikon Thomson Reuters – Datastream. The results are for each event and for all the events under three event windows composed by three or five days including the day of the announcement. Significance is indicated by: ***<0.001, **<0.05, *<0.10. Clustered standard errors are given in parentheses.
Table 8. Results of the overall market reaction around QE programme announcements (*FF three factor model & European market indexes*)

| Market Index | CAR  
|             | (-1:+1) | CAR  
|             | (-2:+2) | CAR  
|             | (-1:+3) |
| All-events  | speurop | -0.036***  
|             |         | (-0.002)  
| All-events  | ftef80e | -0.036***  
|             |         | (-0.002)  
| All-events  | ftefc1e | -0.037***  
|             |         | (-0.002)  
| All-events  | fteu100 | -0.038***  
|             |         | (-0.002)  
| All-events  | djes50i | -0.036***  
|             |         | (-0.002)  

This table reports the results of the event study following the methodology of Fama-French three factor model described in the Appendix I. The results of the overall market reactions (including all the events) around the QE programme announcements are computed with different European market indexes: 1) speurop, 2) ftef80e, 3) ftefc1e, 4) fteu100, 5) djes50i. The definition of each market index is reported in the Appendix III. The results are computed considering three event windows (-1:+1), (-2:+2) and (-1:+3). Significance is indicated by: ***<0.001, **<0.05, *<0.10. Clustered standard errors are given in parentheses.
### Table 9. Additional test – Subsample Basel III Tier 1 Shortfall

| Variable          | MES < 5% Banks | MES > 5% Banks |
|-------------------|----------------|---------------|
| **Tier1**         | 0.003***       | -0.003**      |
|                   | (3.28)         | (-2.80)       |
| **LiquidAss_TA**  | -0.0005        | -0.0002       |
|                   | (-1.29)        | (-0.48)       |
| **Loans_TA**      | -0.1005***     | -0.101***     |
|                   | (-3.55)        | (-3.72)       |
| **LLP_Tloans**    | -0.012         | -0.006        |
|                   | (-1.65)        | (-1.19)       |
| **RWAs**          |                | -0.006**      |
|                   |                | (-0.49)       |
| **Dividend Payout** |             | -0.015**     |
|                   |                | (-1.04)       |
| **Risk-taking**   | -0.348         | -0.680**      |
|                   | (-0.56)        | (-2.15)       |
| **%AGDP**         | 0.016          | -0.017***     |
|                   | (0.72)         | (-2.63)       |
| **Book leverage** | 0.007***       | 0.0007        |
|                   | (3.83)         | (1.20)        |
| **Size**          | -0.014***      | 0.005***      |
|                   | (-3.47)        | (3.54)        |
| **Constant**      | -0.006         | 0.119***      |
|                   | (-0.18)        | (-3.46)       |
| **Observations**  | 120            | 591           |
| **R-squared**     | 0.195          | 0.172         |
| **Prob>F**        | 0.0011         | 0.0001        |

This table reports the estimation results for regression model (3). The dependent variable is CAR (-1;+1) obtained through the conduction of the event study. The key explanatory variables are Tier1 (for Capital Adequacy), liquid assets, loans/total assets, LLP/total loans (for the Asset Quality), RWAs (for Bank Solvency). The control variables include two agency cost variables, such as the dividend payout and risk-taking, and other variables like %GDP, book leverage and size. St. errors adjusted for clusters; t-statistics in parentheses; *p<0.10; **p<0.05; ***p< 0.01. In this case the sample is split according to the parameter of the Marginal Expected Shortfall around a threshold of 5%. MES is the difference between a given bank’s TIER 1 capital under Basel II and the announced implementation of Basel III.