Bachelor's Thesis in Economics and Business Economics

Financial Economics

Effects of Unconventional Monetary Policy on European Banks' Stock Returns

Abstract

This paper aims to evaluate the impact of Unconventional Monetary Policies (UMP) on the stock returns of top European banks. In the period of 2010-2015, four unconventional policies have been implemented, named the Securities Markets Programme (SMP), Long-Term Refinancing Operations (LTRO) program, Outright Monetary Transactions (OMT) program and the Asset Purchase Programme (APP). By using a time series event-study analysis, clear evidence is found that European banks' stock returns positively reacted to SMP news; mainly in distressed countries. These positive effects are interpreted as proof that the European Central Bank (ECB) helped in restoring the critical debt crisis, by purchasing government debt of distressed countries. When evaluating the other three policies LTRO, OMT and APP separately, no significant effects are found. Additionally, when analyzing all four programs combined, no significant effects are found either.

Key words: *Stock returns, Unconventional Monetary Policy, Banks, Event study, Cumulative Abnormal Return (CAR).*

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Date: July 8th, 2019

Acknowledgements

I would like to sincerely thank my supervisor Dr. T. (Tim) Eisert of the department of Business Economics at the University of Rotterdam.

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1 Introduction

Since the year 2000, banks in the United States had been taking too many risks in mortgage lending. Therefore, clients were not able to pay back their lendings, and thus banks faced disastrous consequences. There was serious threat that the global payment traffic would to come to a halt. In the meantime, while the bank recovery in the beginning of 2010 was still in full progress, the crisis subject in Europe changed. The population became progressively concerned about the governments' financial positions in Greece, Ireland, Italy, Portugal and Spain (GIIPS). As a result, a debt crisis occurred in Greece and the other GIIPS countries were facing a direct threat to slip into a similar debt crisis. Jean-Claude Trichet, European Central Banks' President of that time, described the critical situation as follows: "We have in front of us a global crisis of sovereign risk and we – the Eurozone – are the epicenter of this global crisis". By the spring of 2010, the European Central Bank (ECB) decided to roll-out the first Unconventional Monetary Policy (further referred to as UMP), which is the Securities Markets Programme (SMP). In the consecutive six years (2010 – 2015), the ECB introduced three other programs, called the Long-Term Refinancing Operations (LTRO) program, Outright Monetary Transactions (OMT) program and the Asset Purchase Programme (APP). Mario Draghi, the successor of Trichet in June 2011, reconfirmed that it was of great importance that the serenity must be restored within the Eurozone.

The UMPs where introduced by the ECB, aimed to lower the government bond yields, stimulating bank lendings to the real economy and addressing risks of a prolonged period of low inflation over the medium term, provided that the programs would have beneficial spillovers. In most of the papers available on this subject, macro-economic effects of the policies are measured. For example, Krishnamurty, Nagel, and Vissing-Jorgensen (2017) find evidence that OMT and SMP announcements lead to a considerable decrease in the bond yields of the Spanish and Italian government. Moreover, they conclude that not only the stock prices of GIIPS countries increase, but also the stock price of non-distressed countries. In this way, one could argue that these policies have positive macro-economic effects. Szczerbowicz (2015) reach the conclusion that the APP is the most adequate in lowering refinancing costs for banks and governments, that are involved with high sovereign risk.

Besides the above macro-economic effects on certain countries, one should consider other possible side-effects. Adjustments in the health and stabilization of European banks is an acute effect of the announcement of an UMP. Acharya, Eisert, Eunger and Hirsch (2018) state that after the establishment of the OMT programme, the stabilization of the European banking

sector has improved. Additionally, Chodorow-Reich (2014) examines the effects of UMPs on financial institutions in the United States. This paper shows beneficial effects on American banks' stock returns. Therefore, the introduction of UMPs appears to be directly related to financial institutions and this effect can, amongst others, be measured in analyzing the stock returns. Although the effect on stock returns of financial institutions in the United States has been measured repeatedly, only limited research has been carried out in Europe. Therefore, this paper takes the effect of four programs into account, whereas most papers studied only focus on a single program. Summarized, the main goal of this research is to study the effect of UMPs on the stock returns of top European banks.

The sample used in this study is based on stock return, market index –and bank specific data from Bloomberg Terminal over a period of six years, from 2010 including 2015. Stock return data is derived for 22 banks, as well as bank-specific data, which represents the geographical location, earnings per share –and size per bank. As mentioned, it is not only relevant to examine macroeconomic effects, but also to research possible other side effects on European banks.

As a first step, the effect for European banks is analyzed per individual program, by conducting a time series event study along the lines of the comment from Vissing-Jorgensen (2014) in the paper of Chodorow-Reich (2014). This implies a bank-specific time series regression, containing nine dummies for all nine announcement dates. Hence, to assess the effects of an UMP, the stock returns of a certain European bank are regressed on the market index and nine event dummies. This allows measuring of the cumulative abnormal effect (CAR) of an UMP for a certain bank, by summing the coefficients of the event dummies of that UMP. Clear evidence is found that the SMP caused significant positive abnormal stock returns for fourteen banks. However, with regards to the LTRO program, OMT program and APP, it cannot be concluded that European banks experienced side effects through UMPs.

As a next step, the overall effect of the UMPs combined is measured by conducting the same regression as above. The difference is that all four CARs are jointly tested for a certain bank. By summing the CARs and then taking the average, the overall effect is examined. Although eleven banks show significant effects, no real evidence is found. This can be explained by the lack of explanatory power in the conducted t-test.

Finally, to enhance relevance of this paper, the effects between GIIPS –and non-GIIPS banks is distinguished, using cross-sectional regressions. With this study, evidence is found that the SMP had a more positive impact on GIIPS-banks during the announcements. With regards to the other UMPs, no conclusions can be drawn because there were no significant effects found

in examining the first hypotheses. Furthermore, again due to a lack of explanatory power, no evidence is found for the overall effect of the UMPs combined.

In the next section, this paper provides a theoretical framework, encompassing theoretical support including current scientific knowledge and a short description of the programs used. Subsequently, a selection of the data and some descriptive statistics are given, followed by an elaboration on how the research objective ought to be investigated. Finally, based on the obtained results, conclusions are drawn about the effects of UMPs on the stock returns of top European banks.

2 Theoretical framework

This chapter covers the literature and insights within the landscape of event studies and stock returns. Additionally, description of every UMP is given along with an explanation in choosing certain announcements dates. All things considered, hypotheses can be formulated.

2.1 Efficient market hypotheses

Before conducting an event study on stock returns of top European banks, the ability of the stock market in signaling new information should be considered. Fama (1970) argues that the efficient market price reflects all information that is known by the market. According to Fama (1970), there are three conditions for the presence of capital market efficiency. First, trading securities lacks transactional cost. Second, market participants do not have to pay for any available information, provided by the market. Finally, every market participant agrees on the implication of current information in the current price.

However, the conditions mentioned above do not reflect the real world, because there is no substantial proof that information influences prices. Nevertheless, Fama (1970) investigates this matter by conducting three different hypotheses: a strong, semi-strong and weak hypothesis, which encompasses the efficient market hypotheses (EMH). Although there is minimal evidence found for the strong hypothesis, the results of the semi-strong –and weak form provides support for the phenomena that stock markets are aggregators of information.

Unfortunately, the EMH does not provide one with solid proof of the real impact of information. Nonetheless, it can be used as support in this paper, because of the widely acceptances within the world of economic literature. Hence, in this paper it is considered that the stock market does incorporate all public information into the stock price, and therefore in the stock returns of European banks.

2.2 Description of ECB's monetary policy

2.2.1 Securities Markets Programme (SMP)

Because of the Greece sovereign debt crisis in 2010 and the real threats that Ireland, Italy, Portugal and Spain were facing at that time, the ECB reacted with the SMP. On May 10, 2010, the announcement regarding the introduction of the SMP was made by the ECB. This program allowed the ECB to purchase government debt of GIIPS countries. The main goals in

designing the SMP were to address some severe tensions in malfunctioning market segments and to restore an applicable functioning of the monetary policy transmission mechanism. This mechanism is the process through which monetary policy decisions affect the economy in general and the price level. Therefore, along the lines of the SMP, it would be possible that the price in the Eurozone returned to its steady state (ECB, 2010).

Judging the announcement of May 10, 2010, there was uncertainty in when the purchases were going to occur. After the first announcement up to July 2011, the ECB bought for EUR 75 billion of securities. Remarkably, only bonds of Ireland, Portugal and Greece were purchased, and not from Italy and Spain. The purchases should unofficially have been stopped in January 2011. However, Spain and Italy were still facing a considerably high risk during the summer in 2011, which led to the reactivation of the SMP on August 7, 2011. Now the bonds were bought from all GIIPS countries. The number of holdings from the ECB rose to EUR 219,5 billion, with last purchases mainly from Italy and Spain (ECB, 2010).

In summary, this study uses May 10, 2010 and August 8, 2011 as event dates for the SMP. Although the official announcement date was August 7, 2011, the next day is chosen for this study. This can be explained by the fact that exchanges are closed on Sundays and no effect can be measured concerning stock returns on August 7, 2011.

2.2.2 Long-Term Refinancing Operations (LTRO)

In September 2011, Josef Ackermann (then CEO of Deutsche Bank) said: “It is an open secret that numerous European banks would not survive having to revalue sovereign debt held on the banking book at market levels”. There is no discussion that the sovereign debt crisis directly caused uncertainty about the balance sheets of banks across Europe. Tensions heavily increased over the years on the interbank-market, because banks held high amounts of risky sovereign debt.

As of 2007, the ECB implemented the Main Refinancing Operation (MRO), which meant that the ECB provided lendings to European banks with a maturity of one year. This MRO program seemed a normal reaction and standard measure at that time. However, approximately four years later the ECB implemented an unconventional program. On December 8, 2011, the LTRO program was introduced. An important improvement of the LTROs relative to the MROs, was the extension of two years in maturity of the lendings. The first goal of the LTROs was to provide the banks with liquidity. The second goal was to decrease the tensions on the interbank-market which was of great importance, because if European banks

returned to a steady state, they would be able to extend credit to firms and households. As a result, European banks lend over more than EUR 1 trillion. (Linzert, Nautz, & Blindseil, 2004).

Although the official announcement date was December 8, 2011, the market already indicated that the ECB would undertake some action, prior to the official announcement. Mario Draghi held a speech a week before, in which he stated that the ECB was aware of the scarcity of eligible collateral to banks. Moreover, Draghi suggested that it was of tremendous importance to repair the credit channel. Lastly, the Financial Times reported that the speech Draghi gave, hinted at introducing a more aggressive UMP; whether this was in the form of an extension of the SMP or the introduction of a new program was unclear.

Concluding, for this research, December 1, 2011, and December 8, 2011 are used as announcement dates for the LTRO program.

2.2.3 Outright Monetary Transactions (OMT)

During the year of 2012, the sovereign debt crisis revived again. Some distressed countries (i.e. Spain and Italy) were in a genuine critical position. The presence of anxiousness amongst Europe's population, led to even less trust in the governments of Spain and Italy. Consequently, the risk factor increased on the concerning governments bonds of Spain and Italy and therefore so did the yield on these bonds. Italian –and Spanish yields on government bonds were at that time 4 percent higher, as compared to the yield on German government bonds.

As a response, Draghi mentioned in his famous speech on July 26, 2012 that the ECB would do "whatever it takes to preserve the Euro". Draghi reinforced his statement even more by saying: "and believe me, it will be enough". After his speech, the market expected that there was going to be a rapid arrival of a new unprecedented policy.

On August 2, 2012, Draghi officially announced that the ECB was going to undertake action in the form of OMT. This implies that the ECB was going to purchase sovereign bonds in secondary markets. Lastly, the technical details of the OMT program on September 6, 2012, were given. At the same time, the SMP came to an end. Although SMP aspired to reach the same goal, it differed with the OMT program. Maturity was maximized to 3 years instead of the issuance of long-term bonds and the OMT program had a condition: a country had to comply with several fiscal adjustments. Otherwise the ECB was not going to purchase bonds of the concerning country. Furthermore, there were no limits for the ECB in the degree of intervening, while during the SMP, the ECB only had the right on a limited number of interventions.

In summary, this study uses July 26, 2012, August 2, 2012, and September 6, 2012, as event dates for the OMT program.

2.2.4 Asset Purchase Programme (APP)

On January 22, 2015, the Governing Council of the ECB announced an expanded Asset Purchase Programme (APP). In the previous years to this announcement, the inflation had drifted towards an historical low level. As consequence of a too prolonged period of low inflation, this situation required a forceful response in the form of an expanded APP. Main goal was to bring the inflation back to a level close to 2%, which was in line with the objectives from the ECB.

By this program, the ECB expanded their existing private sector asset purchase program with purchases of sovereign bonds, which led to an easing of financial conditions. As a result, access to finance would be cheaper for firms and households, which in turn also stimulated the investments, consumption and ultimately contributes to an increase in inflation rate. Along the APP, the ECB initial objective was to purchase EUR 60 billion of bonds as of the 9th of March 2015 (ECB, 2016).

Concluding, this paper uses January 22, 2015 and March 9, 2015 regarding the APP.

2.3 Hypotheses development

As shown in previous studies, UMPs lead to essential effects in sovereign bond yields. For example, according to Krishnamurthy et al. (2017), the SMP and OMT announcements lead to a decrease in the sovereign bond yields in Spain and Italy in 2011. Altavilla, Giannone and Lenza (2014) find the same results regarding the OMT announcement.

At first glance, these kinds of results seem to be most relevant. However, as Chodorow-Reich (2014) mentions, it is of great interest to question whether UMPs can generate undesirable side effects, which is an important aspect in current policymaking. Plausible side effects can be found on stock markets. For instance, Bekeart, Ehrmann, Fratschzer and Mehl (2014) and Rogers, Scotti and Wright (2014) report the similar finding that announcements of UMPs, causes a positive reaction in the stock market during the financial crisis.

Moreover, the results of Haitsma, Unalmis and de Haan (2015) show an increase in the Euro STOXX 50 index after the announcement of UMPs. In contrast, Hosono and Isobe (2014) argue that such announcements contain a negative effect on stock markets in the Eurozone. In short, effects are found on stock markets. However, more importantly for this research is how

the stock returns in the banking sector reacted to UMP announcements and whether there is a clear relationship between them.

Kholodilin, Siliverstovs, Napolitano and Montagnoli (2009) consider different sectors (including financial firms) and their reaction to monetary policy. They find that financial firms appear to be most sensitive to policies. However, Bredin, Hyde, Nitzsche and O'reilly (2007) in turn find that certain sectors like financial institutions do not respond significantly, due to UMPs. More recently, Acharya et al. (2018) find that after ECB's OMT announcement, the stabilization (based on CDS spreads) of the European banking industry has improved.

In the United States, Lambert en Ueda (2014) analyze the reaction of American banks to UMPs of the Federal Reserve. They report that there was no positive effect on bank returns during the announcements. However, according to Chodorow-Reich (2014), UMPs by the Federal Reserve have significant effects on American bank holdings and life insurance companies. He uses an event study with a cross-sectional approach, which lead to excessive T-values. Vissing-Jorgensen (2014) puts this result in perspective with her comment. As support, Vissing-Jorgensen (2014) provides the reader with a time series approach. For some announcements the significant effect remains, but most announcements become insignificant.

Therefore, consistent with the theoretical background and the evidence that UMPs do have effects on stock markets and financial institutions, the hypotheses are formulated as follows:

Hypothesis 1: The announcement of an individual unconventional monetary policy has a positive impact on the stock returns of top European banks.

The hypothesis above (1), is measured by analyzing four different UMPs separate. In addition, see below the hypothesis (2) which examines the overall effect of the UMPs combined.

Hypothesis 2: The announcements of unconventional monetary policies have a positive combined effect on the stock returns of top European banks.

Existing literature within UMP shows that a distinction is made between GIIPS and non-GIIPS countries. For instance, in the study of Acharya et al. (2018), GIIPS countries react more heavily on CDS return, as consequence of the OMT announcement. Gambacorta, Hofmann and Peersman (2014) in turn argue that there are no major differences in effects between distressed and non-distressed countries. Furthermore, Krishnamurthy et al. (2017) and Acharya, Pierret,

& Steffen (2015) reach the same conclusion that the OMT news lead to a considerable increase in stock prices for GIIPS banks. Based on the existent literature a third hypothesis is formulated:

Hypothesis 3: The effect of unconventional monetary policies on top European banks differs between GIIPS and non-GIIPS banks.

3 Data

This section covers the process of data collection and which criteria is used to arrive at a sufficient data sample. The compiled dataset contains market –and bank-specific related information, which respectively includes the daily market returns of the Euro STOXX 50 index and the daily stock returns, market capitalizations (market caps), geographical location and earnings per share of 22 banks. All market –and bank-specific data is collected through the database of Bloomberg Terminal. After downloading the stock prices of the banks and the market prices of the Euro STOXX 50 index (using "Equity screening"), returns are measured in Excel. The data is obtained over the period of 2010-2015, because this timeframe encompasses all announcement dates. To enhance relevance, the timeframe is extended with five months before and after the respectively first –and last announcement.

First, a selection of 29 European banks is made based on a peer group provided by Bloomberg, named "Large Cap European Bank Top Competitive Peer". Unfortunately, seven banks are excluded due to missing data during the period of 2010-2015 or the fact that a bank is merely listed on exchanges with non-euro currencies. For instance, ABN Amro Group N.V., AIB Group PLC, Barclays PLC, Danske Bank A/S and Lloyds Banking Group are removed because of missing data. Moreover, policy in the United Kingdom is determined by the Bank of England. Hence, data of Royal Bank of Scotland Group PLC and Standard Chartered PLC is irrelevant. Table 1 lists the events with the corresponding announcement dates, including a concise description of each announcement[1]. Moreover, Table 2 and 3 respectively provide the market cap and earnings per share (EPS) during all announcement dates for every bank. Whether a country is distressed (GIIPS) or not (non-GIIPS) is shown in Table 4.

As seen in the descriptive statistics regarding the stock returns of the banks (Table 5), the sample sizes slightly differ in the number of observations across the 22 banks, which can be reasonably explained by the fact that some dates are missing for some banks. However, the differences in the number of observations are very small and therefore negligible. Missing data of certain banks are therefore deleted from the Euro STOXX 50 index as well, so that the time series remains correct. Finally, all stock returns' means and medians are given in Table 4, which shows that the stock returns circles around a level of 0%. In addition, given that the sample size is 1500+ observations, it is concluded that the sample is approximately normally distributed.

[1] See chapter 2.2 "Description of ECB's monetary policy", for the selection of the announcements dates per UMP.

4 Methodology

The methodology section provides the mathematical specifications of the used regressions and statistical tests. In addition, variables and Models that are used to measure the effects are discussed.

4.1 Time series regression UMPs

To examine the effect of UMPs on stock returns of European banks, an event study is used. Fama (1991) argues that in assessing the effect of released information, an event study ought to be the most relevant method. However, the event study used in this paper is not the typical cross-sectional approach. In previous studies, it is shown that the study becomes more relevant along the lines of a time series approach with dummies. As mentioned before, Vissing-Jorgensen (2014) conducts this certain time series approach with dummies for stock returns in the United States. Moreover, Altavilla et al. (2014) assess the effect of UMPs on bond yields alongside this approach. Hence, in answering the first two hypotheses, a time series event study with dummies is conducted. The main idea is to run an independent Ordinary Least Square (OLS) time series regression for every bank in the sample. By regressing the stock returns of a single bank on (1) the market return of Euro STOXX 50 and (2) nine event dummies (because of the nine announcements dates), the effect of UMPs on the stock returns of that concerning bank is assessed. In this regression, the dummies take the value of 'one' for an event date and 'zero' for all other days.

In determining the impact of UMPs on stock returns, endogeneity can be a problem, because monetary policy can obviously react to stock return developments as well. Still, it is not likely that monetary policy will be affected, by adjustments in stock returns on the same day. In addition, Gregoriou, Kontonikas, MacDonald and Montagnoli (2013) also discuss that endogeneity is not a major complication when daily data are used. Therefore, the time series approach can be applied. See below the mathematical specification of the estimated time series regression of bank i and day t:

$$R_{i,t} = \beta_0 + \beta_1 * R_{Mit} + \beta_2 * SMP_1 + \beta_3 * SMP_2 + \beta_4 * LTRO_1 + \beta_5 * LTRO_2 + \beta_6 * OMT_1$$
$$+ \beta_7 * OMT_2 + \beta_8 * OMT_3 + \beta_9 * APP_1 + \beta_{10} * APP_2 + \varepsilon_{i,t}$$

Daily stock returns of bank i are calculated using the formula below. P_t and P_{t-1} are respectively denoted as the adjusted closing stock price on day t and the adjusted closing stock price the day before[2]:

$$R_{it} = \frac{(P_t - P_{t-1})}{P_{t-1}}$$

Furthermore, the regression includes R_{Mit} and ε_{it}, which respectively are the Euro STOXX 50 index and the error term. Lastly, SMP_1 is the dummy for the first announcement and SMP_2 the dummy for the second announcement. This further applies for all programs, so $LTRO_1$ is the dummy for the first announcement of the LTRO program, etcetera. The estimated beta coefficients of the dummies represent the abnormal returns (ARs). Hence, the ARs of all banks can be analysed. This can be described using the following formula, where T is an event date of bank i[3]:

$$AR_{i,T} = \beta_T$$

To measure the overall effect of a specific program, the sum of beta coefficients regarding that program, namely the CAR, is taken. Consequently, the total effect of the programs is considered separately when calculating four CARs for each bank. See below the formula for the CAR of bank i and program j. $AR_{i,j,T}$ is the AR on event date T of bank i and program j:

$$CAR_{i,j} = AR_{i,j,T} + \ldots + AR_{i,j,T}$$

After determining the CARs of the policies for each bank, the significance of the CARs is tested. By means of the t-test, it is possible to examine if the found CARs are significantly different from zero. In other words, if a UMP has a significant effect on the stock returns of a European bank. The mathematical specification of the performed t-test is as follows:

$$t_{CAR} = \frac{CAR_{i,j}}{S_{CAR,i,j}/\sqrt{N}}$$

[2] Note: "i" refers to a random bank in the sample.

[3] Event dates starting from T = 2, so T = 2 is the effect of SMP1, T = 3 is the effect of SMP2, T = 4 is the effect of LTRO1 … T = 10 is the effect of APP2

N is the number of CARs, which in this hypothesis (1) is always equal to one (because we examine the effect of an individual program per bank) and so N is negligible. The standard deviation ($S_{CAR,i,j}$) is calculated for each CAR. Since it seems reasonable that the ARs within a program are interdependent, it is essential to consider the covariance between these coefficients. First, (1) the covariance of the ARs within a UMP is calculated, where N is the number of data points in the whole sample and $\overline{R_{it}}$ is the average stock return. Then (2), the correlation coefficient (ρ) is computed. $S_{i,j,T}$ denoting the standard deviation of an AR on event date T, consistent with program j and bank i. Finally (3), it is possible to determine the standard deviation of the CAR, by means of the prior calculations and the third formula.

(1)

$$Cov\left(AR_{i,j,T},\ AR_{i,j,T}\right) = \frac{(AR_{i,j,T} - \overline{R_{it}}) * (AR_{i,j,T} - \overline{R_{it}})}{N}$$

(2)

$$\rho = \frac{Cov\left(AR_{i,j,T},\ AR_{i,j,T}\right)}{S_{i,j,T} * S_{i,j,T}}$$

(3)

$$S_{CAR,i,j} = \sqrt{{S_{i,j,T}}^2 + {S_{i,j,T}}^2 + 2\rho S_{i,j,T} S_{i,j,T}}$$

As aforementioned, the CAR of the OMT contains three ARs. In this respect, the methods (1, 2, 3) above only apply to the SMP, LTRO program and OMT program, because these programs have two ARs and so two event dates. By conducting a covariance matrix for the OMT program, the standard deviations for every bank are assessed. The underlying understanding of the covariance matrix, is considering the covariance between $AR_{i,OMT,6}$ & $AR_{i,OMT,7}$, $AR_{i,OMT,6}$ & $AR_{i,OMT,8}$ and $AR_{i,OMT,7}$ & $AR_{i,OMT,8}$. Subsequently, the three corresponding correlation coefficients (See (2) above) are calculated. Therefore, the standard deviation of the OMT program can be measured in the following way:

$$S_{CAR,i,OMT} =$$

$$\sqrt{{S_{i,j,6}}^2 + {S_{i,j,7}}^2 + {S_{i,j,8}}^2 + 2\rho S_{i,OMT,6} S_{i,OMT,7} + 2\rho S_{i,OMT,6} S_{i,OMT,8} + 2\rho S_{i,OMT,7} S_{i,OMT,8}}$$

Concluding, it is possible to draw conclusions about Hypothesis 1 by conducting t-tests per program for all European banks.

4.2 Measurement UMPs combined

In answering the second hypothesis, the same time series regression with dummies is used, as mentioned before.[4] Every banks' Cumulative Abnormal Average Return (CAAR) is determined. Thus, the overall effect of the UMPs combined on bank i is assessed by employing the following specification:

$$CAAR_i = \frac{(CAR_{i,SMP} + CAR_{i,LTRO} + CAR_{i,OMT} + CAR_{i,APP})}{4}$$

Next, the standard deviation of the CAAR for bank i, with N = 4 (number of CARs) is defined as:[5]

$$S_{CAAR,i} = \sqrt{\frac{1}{N-1}\sum_{j=1}^{N}(CAR_{i,j} - CAAR_i)^2}$$

To investigate whether the output is credible for bank i, the obtained CAAR values are tested for significance, again by using standard t-tests expressed as follows:

$$t_{CAAR,i} = \sqrt{N}\frac{CAAR_i}{S_{CAAR,i}}$$

4.3 Cross-sectional approach

Cross-sectional regressions are applied to test Hypothesis 3. The first regression (Model 1) is used to investigate the difference in effects of an individual UMP, between distressed and non-distressed countries. In the second regression (Model 2), the combined UMP effect is analyzed by again distinguishing distressed and non-distressed counties.[6] To further explain,

[4] See page 14 for the estimated time series regression with dummies
[5] Note: "j" refers again to one of the four UMPs.
[6] See page 18 for Model 1 and 2

both regressions yield another dependent variable, namely the CAR per UMP of all banks and the CAAR of all banks. Logically, the first regression is used four times for the four UMPs. The dummy variable of interest is identical for Model 1 and 2, which hold 'one' if a bank is situated in a GIIPS country and 'zero' if a bank is situated in a non-GIIPS country. These studies are controlled for a few confounding factors that possibly influence the association between the effect of an UMP (or effect UMPs combined) and the country of origin of a European bank.

Currently, many research has been done to which extent company size correlates with its return on stock. Banz (1981) and Brown and Warner (1985) find the existence of the relationship between company size and stock returns. More relevant, van Dijk (2011) assesses the same findings. As a result, it is expected that the size of a European bank positively correlates with the CA(A)Rs. Hence, it is used as a control variable. To put the relevance of the size variable more in perspective, the natural logarithm is taken.

Furthermore, the regression is controlled by the EPS of every bank during all announcements. In the process of predicting stock returns, the EPS ratio is a fundamental determinant (Holthausen & Larcker, 1992). Hence, it seems that the EPS influences stock returns and therefore it could have a possible effect on the CA(A)Rs. Overall, the following two regressions are estimated:

(Model 1)

$$CAR_{i,j} = \beta_0 + \beta_1 * GIIPS_{bank} + \beta_2 * SIZE_{i,j} + \beta_3 * EPS_{i,j} + \varepsilon_{i,j}$$

(Model 2)

$$CAAR_i = \beta_0 + \beta_1 * GIIPS_{bank} + \beta_2 * SIZE_i + \beta_3 * EPS_i + \varepsilon_i$$

The control variables slightly differ in value per program, due to changes over time. This is explained by the fact that there is almost a year difference between the first three UMPs and even a 3-year difference between the OMT –and APP program. Regarding the control variables of the first regression, the average value of the concerning event dates is taken for a specific program. For example, the size variable of the SMP program is measured by first summing market caps of both announcement dates and then taking the average of that sum. This methodology also applies for the EPS variable and moreover for all other individual programs. The only difference in estimating the variables is that for the size variable, the natural logarithm is taken afterwards. With respect to the control variables of the CAAR, the average value of all announcements dates is taken. In Table 6 the descriptive statistics of the independent variables

are shown. One should observe that the average size of a bank remains approximately constant over the estimated period. However, because of the natural logarithm one could have expected such an outcome. Finally, it is remarkable that the average EPS halves after the second program.

5 Results

The results section discusses in chronological order the outcomes of the (Hypothesis 1) individual effect of an UMP, (Hypothesis 2) combined effect of the UMPs and (Hypothesis 3) whether the UMPs have different amount of impact between GIIPS and non-GIIPS banks. Regarding H1 and H2, the hypotheses below is tested for every bank and per program. Under the null hypothesis, the CA(A)R is zero, which means that the CA(A)R does not significantly differs from zero. In contrast, the research hypothesis states that the CA(A)R significantly differs from zero.

$$H_0: CA(A)R = 0$$

$$H_a: CA(A)R \neq 0$$

5.1 Effects of individual UMPs

This chapter examines the question whether an individual UMP influences European banks' stock returns. As aforementioned, the corresponding Hypothesis 1 is: "The announcement of an individual unconventional monetary policy has a positive impact on the stock returns of top European banks". The results of the individual time series regressions for the 22 banks can be seen in Table 7. CARs are given in this table, with its corresponding t-value below the CAR-value. By means of the given overview in Table 7, conclusions are drawn about the effect of an individual UMP on European banks' stock returns.

The results of the SMP includes significant CARs for fourteen European banks in the sample. To illustrate, see Figure 1. In addition, thirteen banks are significant at a one percent level and the other bank at a five percent level. For example, to gain a better understanding of these significant effects, Banco Santander SA and Bank of Ireland Group PLC have a substantial CAR of twenty percent. Intesa Sanpaolo SpA, a bank in Italy, even have a CAR of 23% during 2010 - 2011. Furthermore, only two banks in the sample have a negligible negative CAR of two percent during the announcements of this policy. To put these results more in perspective, the effects are reflected to the content of the program stated in the theoretical framework.

This program announced that the ECB was going to purchase government debt of GIIPS countries. The main goal was to address severe tensions and restore the malfunctioning of the

monetary policy transmission mechanism. Seemingly, these announcements were positively received by the market, because confidence was gained under the population as to economic revival. To summarize, even though relative small and non-GIIPS banks do not react to the announcements of the SMP program, it essentially has a positive impact on the stock returns of European banks during those two announcements. Therefore, Hypothesis 1 is not rejected regarding the SMP.

The CARs of the LTRO program are shown in the third column of Table 7 and are graphed in Figure 2. During the announcements, only six banks experience significant cumulative abnormal increase in stock returns. In addition, two of those six banks' CARs are significant to a 10% level. Notably, not one GIIPS bank has a significant CAR in December 2011. By the content of the program, one would expect that the stock returns of European banks should considerably increase at that time, because the government announced that it was going to extend the maturity of European banks' lendings. To this end, banks could become more liquid and could provide more credit to firms and households. Obviously, the announcements do not have the effect on the stock returns as expected and so the evidence is strikingly absent. Nonetheless, even though only six banks have significant positive CARs in 2011, the whole sample shows positive stock returns during the announcements. After analyzing the results of the LTRO program, it is concluded that the announcements have a minimal positive impact on European banks' stock returns in 2011, but certainly not a significant effect on European Banks in general. Hence, Hypothesis 1 is rejected for the LTRO program.

Next, the effect of the OMT program is explored by analyzing the CARs of three different dates. In Table 7 and Figure 3 it is seen that only three banks' stock returns respond significantly to the OMT news. Also, as shown, two banks are significant at one percent and one bank at 5 percent. Remarkably, two affected banks are situated in Spain and one in Ireland (both belong to GIIPS countries). This observation is further explained by Hypothesis 3. Concerning the other nineteen banks, no evidence is found for a positive impact on stock returns. In short, it seems that GIIPS countries benefit in the form of a significant increase in stock returns mid 2012. Still, there is no conclusive evidence for a generally positive impact on stock returns of European banks after the OMT announcement. Consequently, Hypothesis 1 is rejected concerning the OMT program.

Finally, as displayed in Table 7 and Figure 4, the impact of the APP is nihil. Unfortunately, only Nordea Bank Abp have a significant CAR. Still worth mentioning, except for the UBS Group AG, all other banks have positive returns in the first quarter of 2015. In brief, the APP lead to no significant cumulative increase in stock returns during the APP

announcements. Nevertheless, there is no question of a negative impact either in the beginning of 2015. Therefore, Hypothesis 1 is also rejected regarding the APP.

5.2 Combined effect of UMPs

In this section, it is investigated whether UMPs together have a positive effect on European banks' stock returns. The matching hypothesis is: "The announcements of unconventional monetary policies have a positive combined effect on the stock returns of top European banks". The results of the CAARs for the 22 banks are given in Table 8 and Figure 5, with again its corresponding t-value below the CAAR-value. By analyzing Table 8, conclusions are drawn about the effect of the UMPs combined on the stock returns of European banks.

In accordance with the results, eleven banks have a significant CAAR. The results are interpreted as the average effect per UMP over the estimated period. For instance, Svenska Handelsbanken AB have an average CAR of four percent per program. Concerning significance, only three of the banks are significant at a one percent level. In addition, six banks are significant at five percent and two banks at ten percent. Commerzbank and Natixis SA even suffered from the announcements, showing a negative CAAR. It is complicated to draw meaningful conclusions, because the CAAR exists of only four CARs. Therefore, the outcome is probably biased by the SMP program, referring to its extremely high returns at the time. Furthermore, the LTRO program, OMT program –and APP have little explanatory power by themselves, which indicates that the overall effect is probably biased. On the other hand, comparing to the fourteen banks which have significant CARs respecting the SMP, only half of them presents significant CAARs. This means that some banks are significant under the CAAR hypothesis and non-significant under the SMP. Hence, these banks experienced a smaller continuous effect over the years with less variance. To conclude, one could argue that the four UMPs do have a combined effect on the stock returns of European Banks in the period of 2010-2015, mainly because eleven banks have significant CAARs. However, due to the presence of only four CARs and the considerable probability of outliers, the credibility of the CAAR should be questioned. Therefore, Hypothesis 2 is rejected.

5.3 Distinction GIIPS –and non-GIIPS countries

Lastly, it is explored whether the UMPs react more heavily towards GIIPS countries. As mentioned before, Hypothesis 3 is: "The effect of unconventional monetary policies on top European banks differs between GIIPS and non-GIIPS banks". The results of the cross-sectional regressions can be seen in Table 9. By using Model 1, the four individual UMPs with its corresponding CARs are analyzed. Moreover, it is examined by Model 2 if the geographical location of a certain bank matters for the extent of the combined UMP effect. [7] As discussed, in both Models two control variables are included to increase the explanatory power of the results. Additionally, to adjust for heteroscedasticity, robust standard errors are implemented in the two regressions.

Considering Table 9, the coefficients are shown for the independent variables, with its corresponding p-value underneath. As expected, seeing previous results and figure 1 - 5, a more positive reaction in stock returns is found for GIIPS banks regarding the SMP program and the programs combined. The dummies of both regressions are very significant at a one percent level. Unfortunately, the control variables and the constant are far from significant.

For instance, interpretation of the results is as follows regarding the SMP program: GIIPS bank' stock returns experienced on average a fourteen percent higher CAR, as consequence of SMP announcements. A possible explanation can be found by analyzing the contents of the program. As aforementioned, the ECB was going to purchase government debt of GIIPS countries in 2010 and 2011. In that sense, it is logical that GIIPS banks show the highest CARs during the announcements, because their countries' government debt was going to be bought. In addition, by improving the creditworthiness of banks, the probability of sovereign default could be decreased by reducing the potential necessity of bank bailout by a government. Correspondingly, because of the presence of abundant liquidity then, banks could buy sovereign bonds and therefore the prices could return to its steady state. In short, it seems that the stock return of GIIPS banks differs from non-GIIPS banks during the announcements of the SMP. However, only 0.58 percent can be explained by the estimated regression and the omitted variable bias may be present due to the number of control variables. Hence, it cannot be fully concluded with certainty whether there is an actual difference between GIIPS –and non-GIIPS banks. Nevertheless, the results are so extremely significant, that it is concluded that

[7] See methodology section for Model 1 and 2

there is evidence for the difference in impact between GIIPS banks and non-GIIPS banks. Hence, Hypothesis 3 is not rejected for the SMP.

The results for the CAAR can be interpreted as that a random GIIPS bank react on average with a five percent higher CAR per UMP, than a non-GIIPS bank. It is again hard to draw any conclusions about the outcome, because the results are probably biased through the SMP. Moreover, the R-squared is 0.47, which means that less than half is estimated correctly. Additionally, the LTRO program, OMT program –and APP have little explanatory value on their own. Finally, again the omitted variable bias can also apply here. All things considered, it is concluded that the regression concerning the combined effect have little to none explanatory power and so there is no difference between GIIPS –and non GIIPS banks over the whole period. In summary, Hypothesis 3 is rejected for all programs combined.

Reviewing Figure 2 and 4, one would expect no evidence for the LTRO program and APP, which is in accordance with the results in Table 9. However, when analyzing the CARs of the OMT in Figure 3, a visual difference between distressed and non-distressed countries can be seen. The OMT announcement led to a decrease in the bond yields of Spain and Italy. Krishnamurthy et al. (2017) find that this decrease in bond yields can be attributed to the decrease in amongst others default risk. This can be an explanation for the increase in stock prices of banks in Spain (for example, the first –and third orange dot are Spanish banks), because the potential necessity of bank bailout by a government is then reduced. Conversely, the Italian banks (fourth –and fifth orange dot) have insignificant negative CARs. In short, the effects of the LTRO program, OMT program and APP on European banks' stock returns, do not differ between GIIPS and non-GIIPS banks during its announcements, which means that Hypothesis 3 is rejected.

6 Conclusions

The main goal of this paper was to investigate the impact of UMPs on top European banks' stock returns over the period of 2010 including 2015. The three hypotheses encompassed respectively the (Hypothesis 1) individual effect of an UMP, (Hypothesis 2) combined effect of the UMPs and (Hypothesis 3) whether the UMPs have different amount of impact between GIIPS and non-GIIPS banks. By using time series regressions for the first two hypotheses and cross-sectional regressions for the third hypotheses, conclusions are drawn.

First, this paper concludes that especially the SMP program has an approximately positive impact on the stock returns of top European banks in 2010. This finding is in accordance with the previous literature of Chodorow-Reich (2014) which states that UMPs have positive impact on stock returns of financial institutions. Moreover, evidence is found that the effect of the SMP was more powerful for the stock returns of GIIPS banks. This is explained by the fact that the program consisted of government bond purchases of GIIPS countries. Hence, the market interpreted the SMP as a step in regaining economic stability.

On the contrary, there is no evidence found for positive effects, after the introduction of the LTRO program, OMT program –and APP. Furthermore, no conclusions can be drawn about the overall effect due to biasedness. Consequently, it is not scientifically correct to draw any conclusions whether the impact differs between GIIPS –and non-GIIPS banks. In summary, the general conclusion is that UMPs do not have that much impact on the stock returns of top European banks. With the exception for the SMP program, which lead to an observable cumulative increase in stock returns, for especially GIIPS banks.

Finally, I make some caveats and recommendations for further research. Firstly, the sample of the banks could be bigger, as in this paper only the "Large Cap European Bank Top Competitive Peer" peer group is used. In further research, the sample could be extended, by incorporating insurance companies or smaller banks. Secondly, daily data was used over the five years. More frequent data could be used (e.g. tick-by-tick price data per twenty minutes), because stock prices process news very fast. Therefore, the use of the daily data is in fact a limitation. Thirdly, the research could be extended for the period after 2015. Although the economy has been booming during the last years, it is relevant to examine the effects of UMPs on European Banks' stock returns in the period 2016 - 2019.

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8 Appendix - Figures

Figure 1: CARs SMP

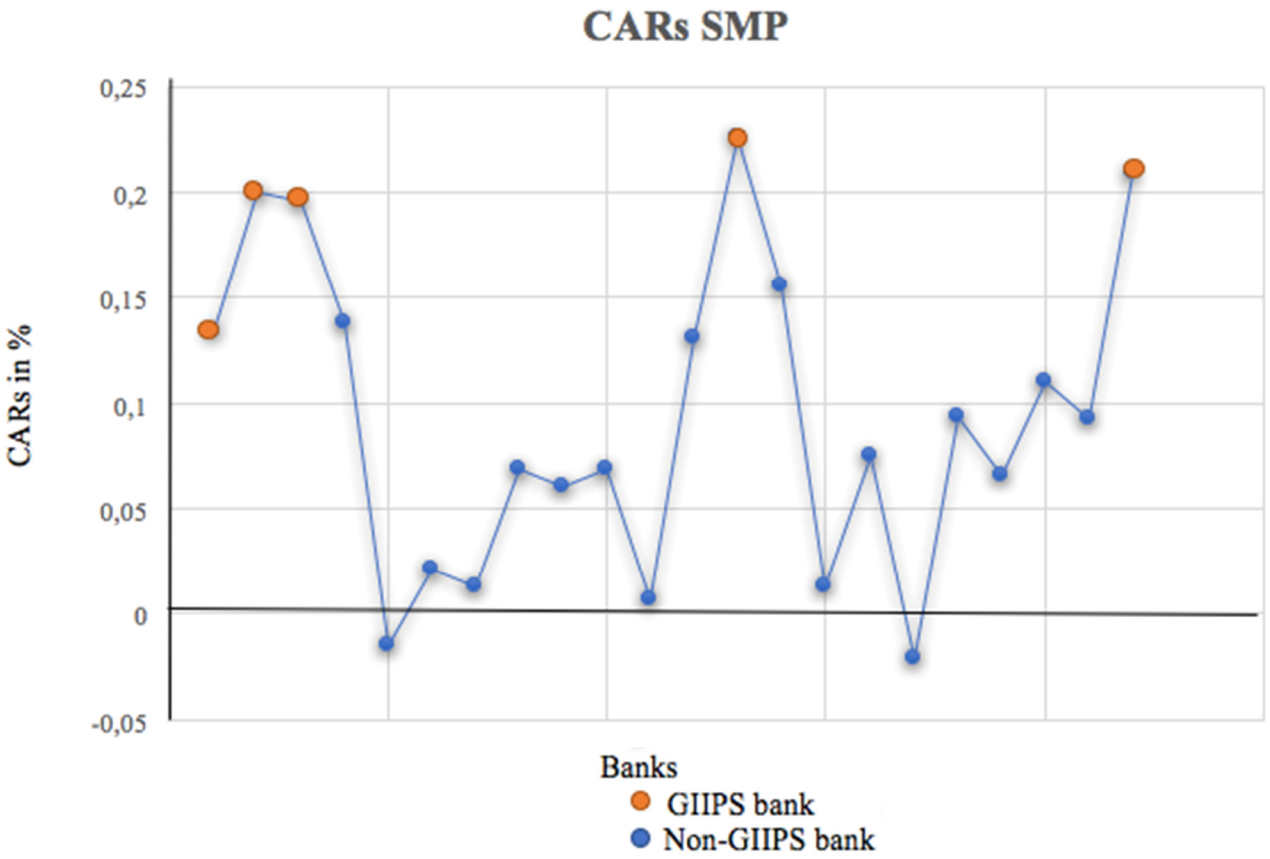

Figure 1: CARs SMP illustrates the CAR of 22 banks, regarding the SMP program. The Y-axis represent the value of CARs in % and the X-axis is where the CAR is zero. The orange dots are GIIPS banks and the blue dots are non-GIIPS banks.

Figure 2: CARs LTRO

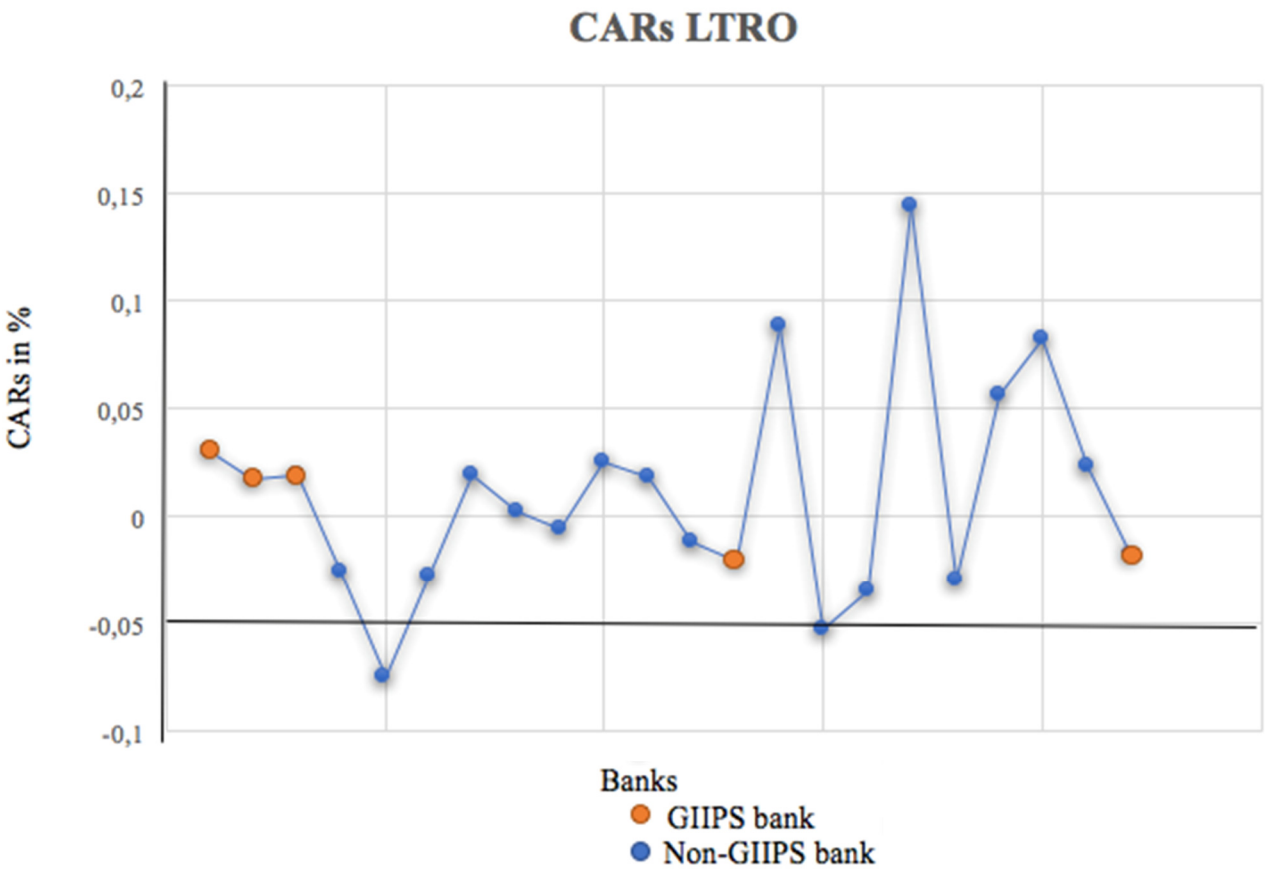

Figure 2: CARs LTRO illustrates the CAR of 22 banks, regarding the LTRO program. The Y-axis represent the value of CARs in % and the X-axis is where the CAR is zero. The orange dots are GIIPS banks and the blue dots are non-GIIPS banks.

Figure 3: CARs OMT

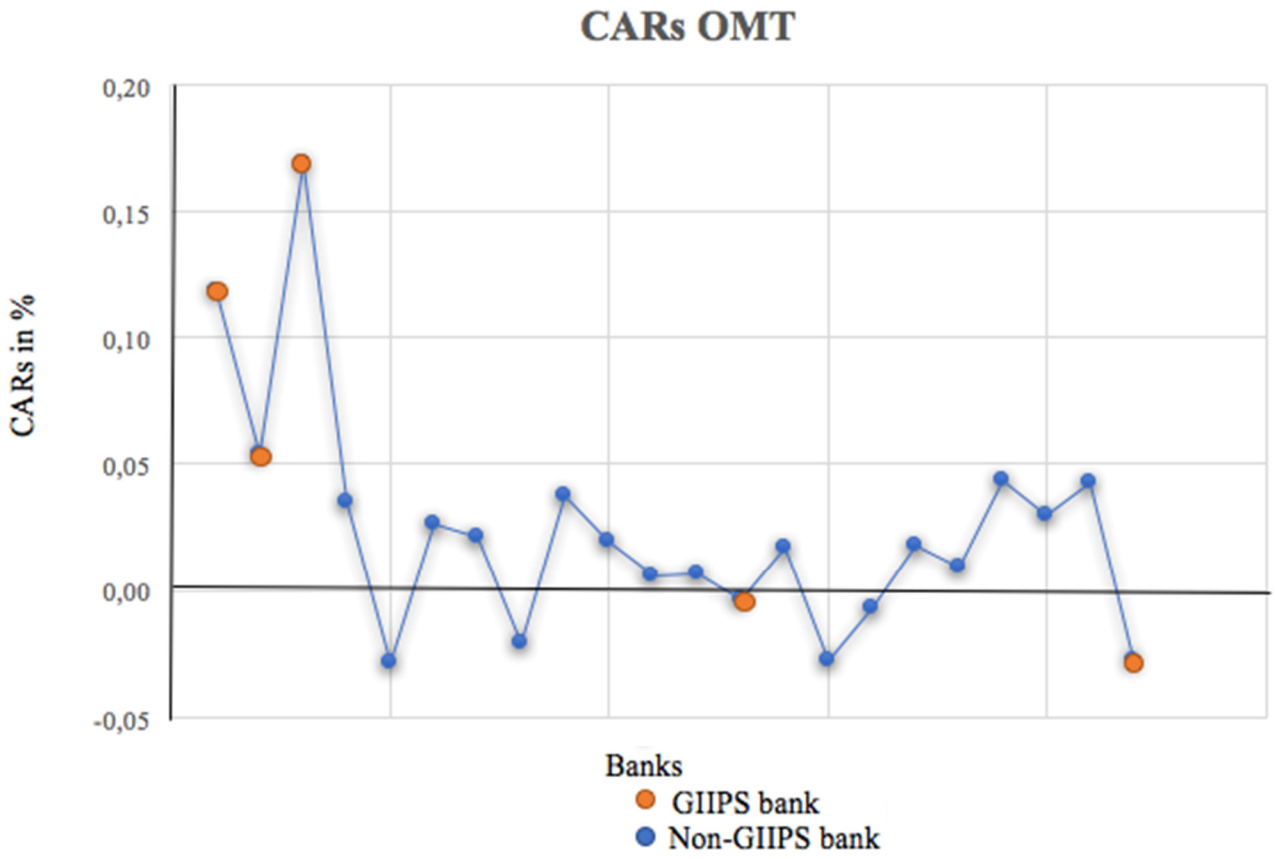

Figure 3: CARs OMT illustrates the CAR of 22 banks, regarding the OMT program. The Y-axis represent the value of CARs in % and the X-axis is where the CAR is zero. The orange dots are GIIPS banks and the blue dots are non-GIIPS banks.

Figure 4: CARs APP

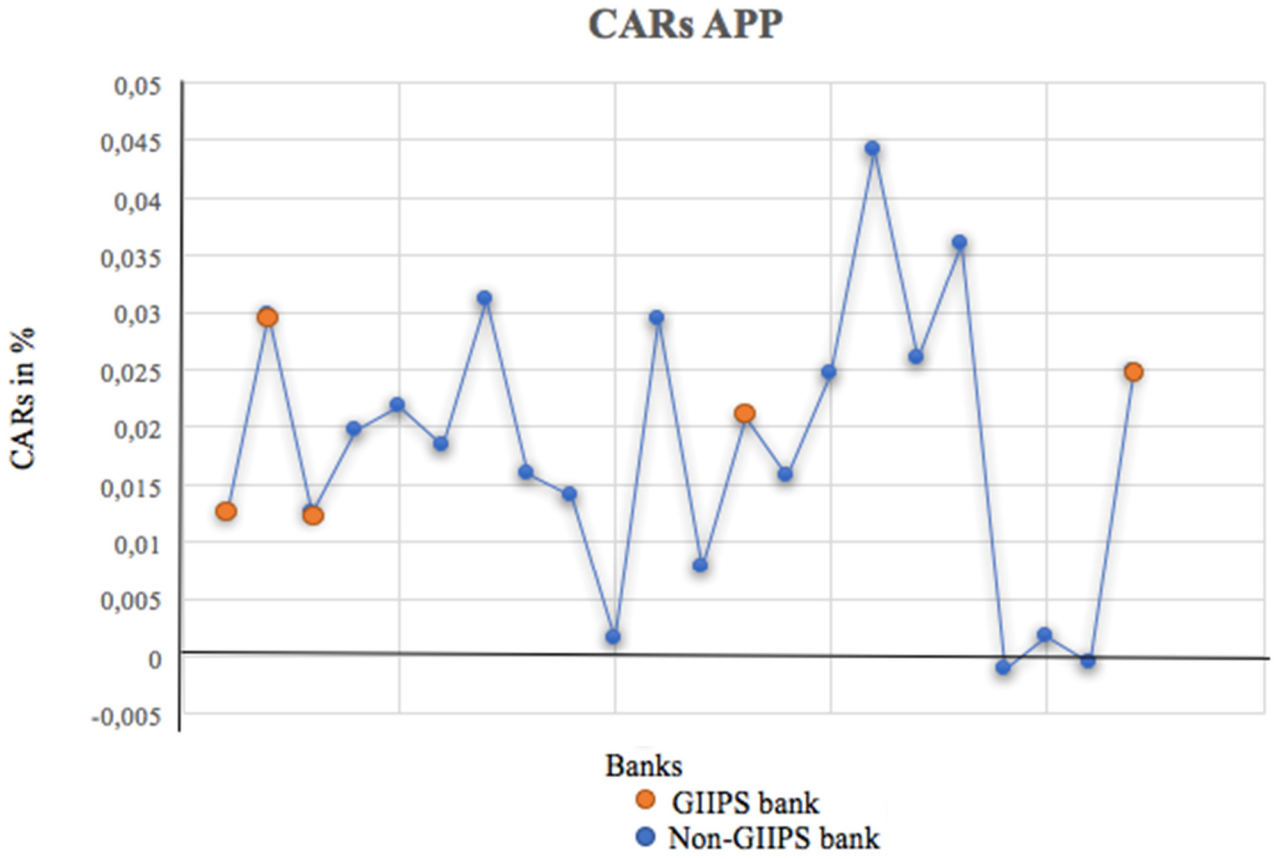

Figure 4: CARs APP illustrates the CAR of 22 banks, regarding the APP program. The Y-axis represent the value of CARs in % and the X-axis is where the CAR is zero. The orange dots are GIIPS banks and the blue dots are non-GIIPS banks.

Figure 5: CAARs

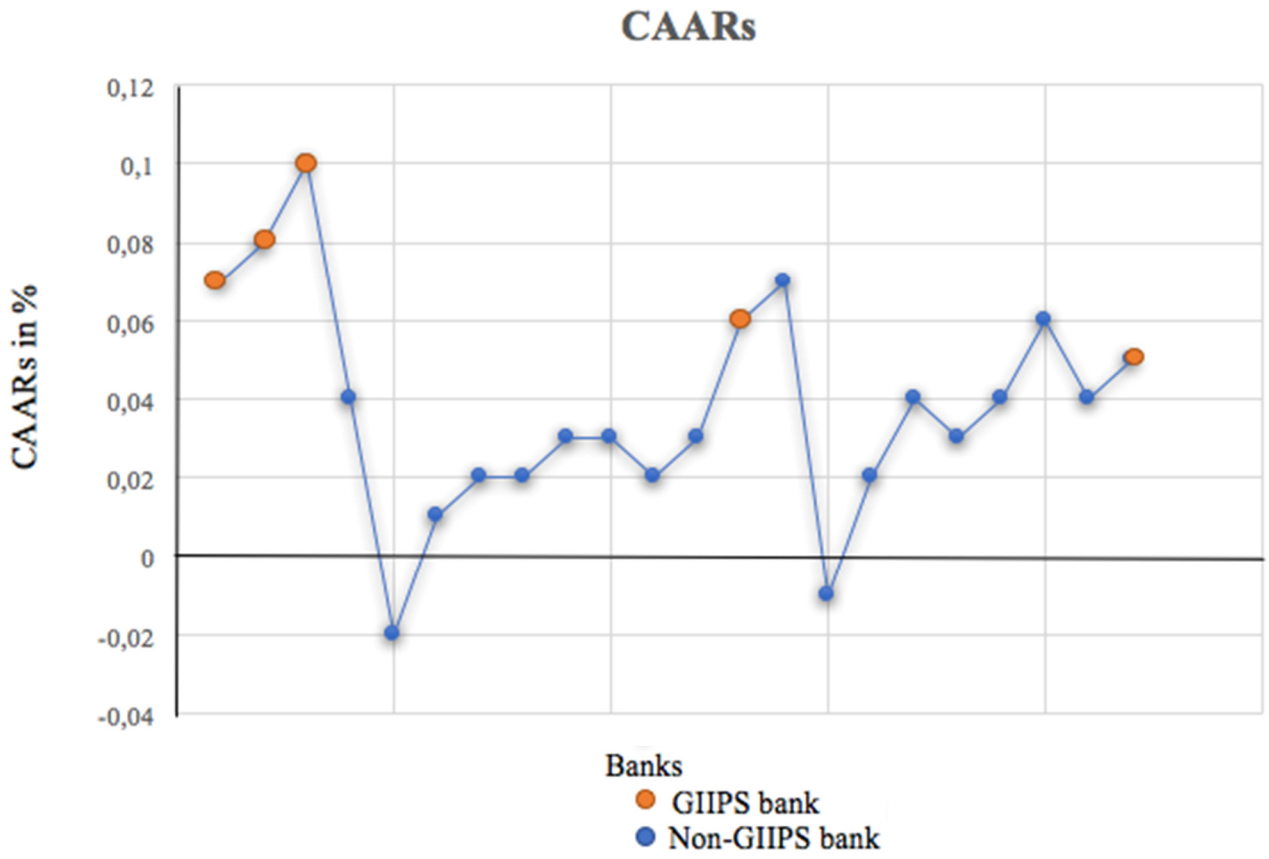

Figure 5: CAARs illustrates the CAAR of 22 banks, regarding all programs combined. The Y-axis represent the value of CAARs in % and the X-axis is where the CAAR is zero. The orange dots are GIIPS banks and the blue dots are non-GIIPS banks.

9 Appendix - Tables

Table 1: Announcement dates and descriptions

Program	Date	Description
SMP	10-05-10	Announcement SMP
SMP	08-08-11	Reactivation of SMP purchases
LTRO	01-12-11	Market interpreted as expansion SMP or intro three-year LTRO
LTRO	08-12-11	Announcement LTRO
OMT	26-07-12	"Whatever it takes speech"
OMT	02-08-12	Announcement OMT
OMT	06-09-12	Technical details OMT
APP	22-01-15	Announcement APP
APP	09-03-15	Purchases started

Table 1 presents the announcement dates per program and its corresponding short descriptions. Note: Date is defined as DD/MM/YY. Source: website ECB

Table 2: Market cap European banks on announcement dates

Bank	SMP1	SMP2	LTRO1	LTRO2	OMT1	OMT2	OMT3	APP1	APP2
Banco Bilbao Vizcaya Argentari	41,87	38,92	40,63	39,30	28,87	28,79	33,23	50,30	54,09
Banco Santander SA	89,12	68,03	79,91	68,43	48,79	49,62	56,75	85,59	88,07
Bank of Ireland Group PLC	2,28	2,65	2,23	2,94	3,23	3,13	3,33	10,03	10,86
BNP Paribas SA	71,73	60,08	70,13	56,96	39,51	39,97	45,98	62,35	62,58
Commerzbank AG	8,36	13,58	7,83	14,25	7,77	7,48	8,15	13,30	13,04
Credit Agricole SA	28,43	21,35	28,47	20,63	8,83	8,88	10,30	29,83	32,24
Credit Suisse Group AG	29,48	23,06	15,81	14,52	15,39	14,84	15,92	26,34	28,51
Deutsche Bank AG	35,99	40,64	36,45	36,98	23,92	23,31	26,07	37,19	39,23
DNB ASA	15,80	17,39	20,31	17,19	14,92	14,84	15,63	20,70	23,44
Erste Group Bank AG	13,89	12,74	15,36	12,71	6,34	5,95	6,60	8,86	9,88
HSBC Holdings PLC	154,73	139,70	177,18	142,59	133,90	135,72	142,20	159,37	146,51
ING Groep NV	30,01	29,17	34,02	29,89	21,15	20,91	23,61	45,35	49,73
Intesa Sanpaolo SpA	34,53	26,68	31,54	25,72	17,21	16,51	19,67	43,99	48,17
KBC Group NV	13,54	9,29	10,46	9,48	10,35	6,29	7,16	20,82	22,35
Natixis SA	12,54	15,14	8,79	9,08	6,58	6,31	7,08	18,79	19,37
Nordea Bank Abp	31,96	31,72	39,64	32,48	32,61	33,28	34,24	41,79	47,44
Skandinaviska Enskilda Banken	11,84	14,19	15,69	16,13	13,99	14,02	14,29	24,07	24,24
Societe Generale SA	34,25	24,67	37,61	23,90	14,47	14,20	16,31	31,06	32,36
Svenska Handelsbanken AB	14,46	15,08	18,43	15,09	18,87	19,41	19,92	26,09	27,37
Swedbank AB	10,32	13,87	15,01	14,36	16,91	17,29	17,91	23,64	25,97
UBS Group AG	50,73	47,52	53,37	54,80	36,03	35,03	37,33	58,55	60,30
UniCredit SpA	43,36	26,08	37,18	25,84	16,37	16,15	17,63	34,15	34,79

Table 2 presents the market caps of all banks on the concerning announcement dates. For clarification, SMP1 is the first announcement date and SMP2 the second announcement date of the SMP. This method of labeling applies to the other programs as well. Note: market cap is in EUR billions. Source: Bloomberg Terminal

Table 3: Earnings per share European banks on announcement dates

Bank	SMP1	SMP2	LTRO1	LTRO2	OMT1	OMT2	OMT3	APP1	APP2
Banco Bilbao Vizcaya Argentari	41,87	38,92	40,63	39,30	28,87	28,79	33,23	50,30	54,09
Banco Santander SA	89,12	68,03	79,91	68,43	48,79	49,62	56,75	85,59	88,07
Bank of Ireland Group PLC	2,28	2,65	2,23	2,94	3,23	3,13	3,33	10,03	10,86
BNP Paribas SA	71,73	60,08	70,13	56,96	39,51	39,97	45,98	62,35	62,58
Commerzbank AG	8,36	13,58	7,83	14,25	7,77	7,48	8,15	13,30	13,04
Credit Agricole SA	28,43	21,35	28,47	20,63	8,83	8,88	10,30	29,83	32,24
Credit Suisse Group AG	29,48	23,06	15,81	14,52	15,39	14,84	15,92	26,34	28,51
Deutsche Bank AG	35,99	40,64	36,45	36,98	23,92	23,31	26,07	37,19	39,23
DNB ASA	15,80	17,39	20,31	17,19	14,92	14,84	15,63	20,70	23,44
Erste Group Bank AG	13,89	12,74	15,36	12,71	6,34	5,95	6,60	8,86	9,88
HSBC Holdings PLC	154,73	139,70	177,18	142,59	133,90	135,72	142,20	159,37	146,51
ING Groep NV	30,01	29,17	34,02	29,89	21,15	20,91	23,61	45,35	49,73
Intesa Sanpaolo SpA	34,53	26,68	31,54	25,72	17,21	16,51	19,67	43,99	48,17
KBC Group NV	13,54	9,29	10,46	9,48	10,35	6,29	7,16	20,82	22,35
Natixis SA	12,54	15,14	8,79	9,08	6,58	6,31	7,08	18,79	19,37
Nordea Bank Abp	31,96	31,72	39,64	32,48	32,61	33,28	34,24	41,79	47,44
Skandinaviska Enskilda Banken	11,84	14,19	15,69	16,13	13,99	14,02	14,29	24,07	24,24
Societe Generale SA	34,25	24,67	37,61	23,90	14,47	14,20	16,31	31,06	32,36
Svenska Handelsbanken AB	14,46	15,08	18,43	15,09	18,87	19,41	19,92	26,09	27,37
Swedbank AB	10,32	13,87	15,01	14,36	16,91	17,29	17,91	23,64	25,97
UBS Group AG	50,73	47,52	53,37	54,80	36,03	35,03	37,33	58,55	60,30
UniCredit SpA	43,36	26,08	37,18	25,84	16,37	16,15	17,63	34,15	34,79

Table 2 presents the earnings per share of all banks on the concerning announcement dates. For clarification, SMP1 is the first announcement date and SMP2 the second announcement date of the SMP. This method of labeling applies to the other programs as well. Note: EPS is in EUR. Source: Bloomberg Terminal

Table 4: GIIPS –and non-GIIPS countries

Bank	Country	GIIPS/non-GIIPS
Banco Bilbao Vizcaya Argentari	Spain	Yes
Banco Santander SA	Spain	Yes
Bank of Ireland Group PLC	Ireland	Yes
BNP Paribas SA	France	No
Commerzbank AG	Germany	No
Credit Agricole SA	France	No
Credit Suisse Group AG	Swiss	No
Deutsche Bank AG	Germany	No
DNB ASA	Norway	No
Erste Group Bank AG	Austria	No
HSBC Holdings PLC	England	No
ING Groep NV	The Netherlands	No
Intesa Sanpaolo SpA	Italy	Yes
KBC Group NV	Belgium	No
Natixis SA	France	No
Nordea Bank Abp	Finland	No
Skandinaviska Enskilda Banken	Sweden	No
Societe Generale SA	France	No
Svenska Handelsbanken AB	Sweden	No
Swedbank AB	Sweden	No
UBS Group AG	Swiss	No
UniCredit SpA	Italy	Yes

Table 4 presents the distinction in distressed and non-distressed countries. “Yes” means distressed (GIIPS) and “No” means non-distressed (non-GIIPS). Source: Bloomberg Terminal

Table 5: Descriptive statistics stock returns

Bank	Observations	Mean	Median
Banco Bilbao Vizcaya Argentari	1527	0,0000	0,0000
Banco Santander SA	1536	(0,0000)	0,0002
Bank of Ireland Group PLC	1521	(0,0001)	0,0000
BNP Paribas SA	1527	0,0004	0,0006
Commerzbank AG	1527	(0,0007)	(0,0005)
Credit Agricole SA	1534	0,0004	0,0000
Credit Suisse Group AG	1527	(0,0000)	(0,0004)
Deutsche Bank AG	1527	(0,0001)	0,0000
DNB ASA	1527	0,0005	0,0009
Erste Group Bank AG	1529	0,0004	0,0000
HSBC Holdings PLC	1527	0,0003	0,0006
ING Groep NV	1528	0,0007	0,0006
Intesa Sanpaolo SpA	1528	(0,0005)	0,0000
KBC Group NV	1535	0,0009	0,0000
Natixis SA	1534	0,0007	0,0000
Nordea Bank Abp	1530	0,0005	0,0000
Skandinaviska Enskilda Banken	1527	0,0023	0,0001
Societe Generale SA	1527	0,0004	(0,0002)
Svenska Handelsbanken AB	1527	0,0118	0,0000
Swedbank AB	1527	0,0034	0,0015
UBS Group AG	1527	0,0006	0,0000
UniCredit SpA	1528	(0,0002)	0,0000

Table 5 present the descriptive statistics, which includes the number of observations and stock returns' means and medians of 22 banks. Note: mean and median are not percentages. Source: Bloomberg Terminal

Table 6: Descriptive statistics independent variables

Variables	Observations	Mean	Standard deviation
GIIPSbank	22	0,23	0,43
Size SMP	22	23,90	0,85
EPS SMP	22	1,57	2,41
Size LTRO	22	23,87	0,92
EPS LTRO	22	1,36	2,35
Size OMT	22	23,64	0,86
EPS OMT	22	0,72	3,63
Size APP	22	23,81	0,75
EPS APP	22	0,76	1,68
Size all UMPs	22	23,90	0,76
EPS all UMPs	22	0,98	1,89

Table 6 present the descriptive statistics, which includes the number of observations, means and standard deviation of the independent variables. Note: GIIPSbank is a dummy variable which hold one if it is a GIIPS bank and zero if it is a non-GIIPS bank. Source: Bloomberg Terminal

Table 7: Results individual UMP time series regressions
(please turn over)

Bank	CAR SMP	CAR LTRO	CAR OMT	CAR APP
Banco Bilbao Vizcaya Argentari	**0,13**	0,03	**0,12**	0,01
	4,61* **	1,04	**3,36*** **	0,43
Banco Santander SA	**0,20**	0,02	**0,05**	0,03
	9,15* **	0,83	**2,05** **	1,38
Bank of Ireland Group PLC	**0,20**	0,02	**0,17**	0,01
	3,59* **	0,35	**2,55** **	0,23
BNP Paribas SA	**0,14**	(0,03)	0,04	0,02
	5,26* **	(0,99)	1,11	0,76
Commerzbank AG	(0,02)	**(0,07)**	(0,03)	0,02
	(0,46)	**(2,29)** **	(0,70)	0,66
Credit Agricole SA	0,02	(0,03)	0,03	0,02
	0,70	(0,94)	0,72	0,62
Credit Suisse Group AG	0,01	0,02	0,02	0,03
	0,48	0,70	0,65	1,15
Deutsche Bank AG	**0,07**	0,00	(0,02)	0,02
	2,88* **	0,09	(0,72)	0,68
DNB ASA	**0,06**	(0,01)	0,04	0,01
	2,06 **	(0,20)	1,04	0,48
Erste Group Bank AG	**0,07**	0,03	0,02	0,00
	2,24* **	0,83	0,53	0,05
HSBC Holdings PLC	0,01	0,02	0,01	0,03
	0,35	1,03	0,26	1,63
ING Groep NV	**0,13**	(0,01)	0,01	0,01
	4,97* **	(0,46)	0,21	0,30
Intesa Sanpaolo SpA	**0,23**	(0,02)	(0,00)	0,02
	3,00* **	(0,28)	(0,04)	0,28
KBC Group NV	**0,16**	**0,09**	0,02	0,02
	4,56* **	**2,61*** **	0,40	0,47
Natixis SA	0,01	**(0,05)**	(0,03)	0,02
	0,43	**(1,81)***	(0,77)	0,85
Nordea Bank Abp	**0,08**	**(0,04)**	(0,01)	**0,04**
	3,61* **	**(1,70)***	(0,28)	**2,15** **

Skandinaviska Enskilda Banken	(0,02)	**0,14**	0,02	0,03
	(0,44)	**3,02*** **	0,30	0,54
Societe Generale SA	**0,09**	(0,03)	0,01	0,04
	2,75* **	(0,88)	0,22	1,08
Svenska Handelsbanken AB	0,07	0,06	0,04	(0,00)
	0,07	0,06	0,04	(0,00)
Swedbank AB	0,11	0,08	0,03	0,00
	1,60	1,21	0,36	0,03
UBS Group AG	**0,09**	0,02	0,04	(0,00)
	3,24* **	0,83	1,24	(0,02)
UniCredit SpA	**0,21**	(0,02)	(0,03)	0,02
	6,38* **	(0,55)	(0,71)	0,77

Table 6 presents the results of the individual time series regressions. For every bank and corresponding UMP, the regression stated in the methodology is used. Four cumulative abnormal returns are shown for every bank, with its corresponding t-value underneath. Statistical significance at 1%, 5% and 10% level is indicated by ***, ** and *, respectively.

Table 8: Results time series regressions combined effect UMPs

Bank	CAAR	Bank	CAAR
Banco Bilbao Vizcaya Argentari	**0,07** **2,40****	ING Groep NV	0,03 1,02
Banco Santander SA	**0,08** **1,78***	Intesa Sanpaolo SpA	0,06 0,97
Bank of Ireland Group PLC	**0,10** **2,05****	KBC Group NV	**0,07** **2,06****
BNP Paribas SA	0,04 1,21	Natixis SA	(0,01) (0,60)
Commerzbank AG	(0,02) (1,21)	Nordea Bank Abp	0,02 0,78
Credit Agricole SA	0,01 0,75	Skandinaviska Enskilda Banken	0,04 1,16
Credit Suisse Group AG	**0,02** **5,71*****	Societe Generale SA	0,03 1,06
Deutsche Bank AG	0,02 0,87	Svenska Handelsbanken AB	**0,04** **2,78*****
DNB ASA	**0,03** **1,85***	Swedbank AB	**0,06** **2,28****
Erste Group Bank AG	**0,03** **2,02****	UBS Group AG	**0,04** **2,00****
HSBC Holdings PLC	**0,02** **2,69*****	UniCredit SpA	0,05 0,85

Table 7 presents the results of the combined UMP effect. For every bank, the regression stated in the methodology is used. The cumulative average abnormal return is shown for every bank, with its corresponding t-value underneath. Statistical significance at 1%, 5% and 10% level is indicated by ***, ** and *, respectively.

Table 9: Results cross sectional regressions

Variables	CAR SMP (1)	CAR LTRO (2)	CAR OMT (3)	CAR APP (4)	CAAR (5)
Constant	0,13	0,20	0,20	(0,07)	0,11
	0,611	0,405	0,585	0,315	0,488
GIIPS	**0,14**	(0,01)	0,06	0,00	**0,05**
	0,000* **	0,608	0,107	0,742	**0,000*** **
Market Cap	(0,00)	(0,01)	(0,01)	0,00	(0,00)
	0,768	0,425	0,603	0,218	0,585
Earnings per Share	0,01	(0,00)	0,00	0,00	0,00
	0,325	0,133	0,267	0,718	0,467
Observations	22	22	22	22	22
R-squared	0,58	0,52	0,27	0,07	0,47

Table 9 presents the results of the performed cross-sectional regressions for every individual CAR and the CAAR. The coefficients are shown for independent variables, with its corresponding p-value underneath. Statistical significance at 1%, 5% and 10% level is indicated by ***, ** and *, respectively.