Effective Policy Actions in Banking in time of crisis

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Abstract

Since the financial crisis erupted in mid-2007, policy makers throughout the world have run a wide set of policy interventions using new instruments and techniques to restore the stability of the banking system. What types of policy maker interventions were more effective in the banking sector during the financial crisis? We posit that a policy intervention is "effective" if, once it is announced, we observe abnormal returns suggesting an increase of the net expected present value of future bank's cash flow. By using a detailed dataset of policy interventions on a global basis over June 2007-June 2012, we analyze their effect on the banking system at three different levels: 1) the interbank credit market, using the 3-month Libor-OIS spread; 2) the banking sector stock indices; and 3) the price of single large banks, focusing on Global-Systematically Important Financial Institutions (G-SIFIs). We show that different policy interventions from governments and central banks have produced a diverse market reaction. We show that most of the policy interventions are ineffective in the interbank market, while a large set of policy interventions are positively statistically related to abnormal stock reaction of both banking stock indices and G-SIFIs. An interesting result is that monetary actions (both expansionary or restrictive measures) are an effective tool for G-SIFIs and banks in general, suggesting that in time of crisis stock market participants trust monetary policy authorities more than the type of intervention.

Keywords: Financial crisis; Policy; Event study; Banking

JEL classification: E52, E58, G14, G21

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1. Introduction

Policy makers throughout the world have run a wide set of policy interventions using new instruments and techniques to restore the monetary stability during the financial crisis and thus re-establish the stability of the financial and banking systems. At the beginning of the financial crisis in 2007, central banks' interventions to contain it seemed to be working. Although the losses in the subprime mortgage market were substantial, these still seemed manageable so that most policy makers hoped that the worst was over and that the financial system would begin to recover (see Mishkin, 2010). However, a tremendous set of shocks was recorded in September 2008, such as the Lehman Brothers and AIG collapses, and the run of the Reserve Primary Fund (Mishkin, 2010). From that moment , the financial crisis evolved into a global crisis generating a severe economic contraction.

The central question is now: what types of policy maker interventions were more effective in the banking sector during the financial crisis? Our paper aims to answer this question by assessing the market reaction to various policy interventions undertaken during the financial crisis. In short, we posit that a policy intervention is "effective" if, once it is announced, we observe abnormal returns suggesting an increase of the net expected present value of future bank's cash flow. We have three main results. First, most policy interventions are ineffective in the interbank market, expect except? The policy decisions allowing a single bank to fail or bail out, which has a positive and statistically significant link with the OIS-Libor spread. Second, a large set of policy interventions are statistically related to abnormal stock reaction of both banking stock indices and G-SIFIs, such as the decisions allowing a single bank to fail or bail out; financial sector policies including all instruments used to resolve systemic banking crises; and the both expansionary and restrictive monetary actions. Third, all monetary actions (both expansionary or restrictive measures) are an effective tool for G-SIFIs and banks in general (i.e. the ones included in the banking indices) since these react positively at the announcement of policy measures. This suggests that, in time of crisis, stock market participants trust monetary policy authorities rather than the type of intervention.

Consistently with Jawadi et al. (2010), we adopt a short run perspective in this paper and consider each announced intervention as effective on the basis of the accuracy and rapidity of stock market reactions in the direction expected by policy makers. Specifically, we select a wide set of policy makers interventions between June 1st, 2007 and June 30th, 2012. Then, adopting an event study approach, we assess the effectiveness of policy interventions at three different levels. First of all, we estimate the impact on the 3-month Libor-OIS spread, which is generally considered an indicator of financial and banking distress (see, for example, van Rixtel and Gasperini, 2013). Secondly, we measure how policy intervention influenced the whole banking industry, focusing on the abnormal reaction of 12 worldwide banking market indices covering all major developing countries[1]. Third, we focus on the stock returns of the 27 worldwide Globally-Systemically Important Financial Institutions (G-SIFIs), as released by the Financial Stability Board on the 4th November 2011. G-SIFIs are the largest and most interconnected banks on the global scene so that the financial stability cannot be achieved without the stability of each of these banks. In addition, all G-SIFIs are listed banks so that we can assess the effect of policy interventions on financial stability by estimating the stock market reaction (focusing on Cumulative Abnormal Returns, as Caiazza et al., 2011 and Becchetti et al., 2010) around the announcement date of each policy intervention.

The remainder of the paper is organized into the following sections. Section 2 reviews previous papers, highlights our contribution and discusses research hypotheses. Section 3 contains a description of the collection procedure we follow to create a unique dataset of worldwide policy interventions. In Section 4, we provide a detailed analysis of our measures of financial and banking distress. Section 5 illustrates our econometric approach, Section 6 presents the empirical results, and the final Section concludes.

[1]Specifically: S&P Banks Sel. Ind - Price Index, Djgl Japan Banks - Price Index, Ftse China Banks - Price Index, FtseUk Banks - Price Index, Djgl Switzerland Banks - Price Index, Ftse Italy Banks - Price Index, Ftse France Banks - Price Index, Ftse Germany Banks - Price Index, Ftse Belgium Banks - Price Index, Ftse Spain Banks - Price Index, Ftse Sweden Banks - Price Index, Ftse W Netherlands Banks L - Price Index.

2. Literature, contributions and hypotheses

Our paper brings together two strands of the literature. The first is the literature assessing the impact of monetary policy interventions on stock market prices and volatility (Bomfin, 2003;Ehrmann and Fratzscher, 2004; Bernanke and Kuttner, 2005; Chuliàet al., 2010; Rangel, 2011; Rosa, 2011), international bond returns (Bredinet al., 2010), interest rates (Hausman and Wongswan, 2011; Leòn and Sebestyén, 2012) and exchange rates (Hausman and Wongswan, 2011). This literature has expanded up during the last decade; most papers (Bomfin, 2003; Ehrmann and Fratzscher, 2004; Bernanke and Kuttner, 2005; Chuliàet al., 2010; Hausman and Wongswan, 2011; Rangel, 2011; Rosa, 2011) focus on the U.S. assessing how the central banks' intervention on interest rates relates to asset prices, while there are very few papers dealing with other currency areas. Bredinet al. (2010) consider the impact and spillover effects of monetary policy surprises on international bond returns in the U.K., the U.S. and the Euro area. Jawadi et al. (2010) investigate the relationship between changes in the 3-month interest rate and the closing price of CAC 40, Dow Jones and FTSE 100 indices (for France, U.S., and U.K., respectively). Leòn and Sebestyén(2012) analyze the impact of the ECB monetary policy surprises on interest rates.

While there is a large body of literature assessing the effect of traditional monetary policy interventions, there is a lack of contributes dealing with non-conventional measures. An exception is the work of Aït-Sahaliaet al. (2012), which considers both conventional and non-conventional measures and comparing their impact on the 3-month Libor-OIS spread.

The second strand of literature is the one assessing the effectiveness of policy responses to the global financial crisis. In this case, the number of studies is much smaller than for the former literature strand, with empirical analyses that are generally quite narrow in scope and focus on single measures in specific markets. For example, McAndrews et al. (2008) examine the effectiveness of the Federal Reserve's Term Auction Facility (TAF) in mitigating liquidity problems in the interbank funding market, while Baba and Packer (2009) analyze the effect of the swap lines among Central Banks in reducing the dollar shortage problem. Meaning and Zhu

(2011) explore the impact of the recent purchases of Treasury securities by the Federal Reserve and of gilts by the Bank of England on government bond yields.

The starting point for our research is the work by Aït-Sahalia et al. (2010, 2012): in comparison to other studies investigating policy response to the financial crisis, this paper has the merit of assessing the effect on the credit market of a wide set of policy interventions in various countries. Specifically, Aït-Sahalia et al. (2012) examine the effect of policy announcements (fiscal and monetary policy, liquidity support, financial sector policy, and ad-hoc bank failures) on the interbank credit and liquidity risk premia in the U.S., the Euro area, the U.K. and Japan between June 2007 and March 2009. The authors assess the policy effect on the day-to-day changes in the 3-month LIBOR–Overnight Indexed Swap (OIS) rate spread (where the authors consider the LIBOR-OIS spread as a proxy for the liquidity and counterparty risk premia in the global interbank markets). In summary, the authors show that policy announcements were usually associated with reductions in the Libor–OIS spreads, but there is not such a policy action better than the others for containing the crisis.

Our paper contributes to the previous literature in several ways. First and foremost, our paper analyzes a large set of policy interventions in the credit industry during the whole time period of the crisis. In addition, we provide novel evidence since we extend Aït-Sahalia et al. (2012) along three important paths: the time period analyzed, the policy interventions and the number of variables capturing the credit industry.

Specifically, we extended the time period analyzed from June 2007 to June 2012. This extension is crucial in the light of the most recent events revealing that the global financial crisis is not ended in 2009 as supposed by Aït-Sahalia et al. (2012). By including three more years of observation, we are also able to cover the Euro sovereign debt crisis. Specifically, our paper is the first to distinguish three distinct phases of the financial crisis (from 1 June 2007 to 30 June 2012): the US subprime crisis (from 1June 2007 to 14 September 2008), the global financial

crisis (from 15 September 2008 to 1 May 2010) and the sovereign debt crisis (from 2 May 2011[2] to 30 June 2012).

Regarding the policy interventions investigated, we add new types of interventions to those analyzed in previous studies: e.g. we consider state aids (i.e., financial support from international monetary institutions to countries experimenting strong difficulties), while previous studies limit the analysis of fiscal policy interventions to stimulus measures to foster economic growth. In order to check the consistency of our studies to previous papers, policy intervention have been classified in the same macro categories defined by Aït-Sahalia et al. (2012): monetary policy, fiscal policy, financial sector policy, ad-hoc bank bailouts and failures, and other measures.

Third, we do not limit our investigation to the interbank market focusing on the Libor-OIS spread (as in Aït-Sahalia et al., 2012), but we also measure the impact of policy interventions by using three different indicators of the credit industry: 1) the Libor-OIS spread; 2) all listed banks: specifically, we use banking-industry stock indices to capture the effect of policy intervention on the banking industry; 3) the Globally-Systemically Important Financial Institutions (hereafter, G-SIFIs). We believe this is quite novel to the literature and provides a relevant contribution to understand the effectiveness of governments' response to the financial crisis. While there is a substantial literature assessing the effect of interest rate decisions on stock markets, there is a lack of studies on both the effect of non-conventional monetary policy interventions (such as monetary easing and liquidity support decisions) and policy maker interventions other than monetary ones. This is surprising since policy makers run a large and wide range of interventions during the crisis that are likely to produce different results on financial stability. Focusing on monetary policy interventions, monetary targets (output and inflation) are in fact influenced by monetary instruments by an indirect process that passes through financial markets so that the final effect is uncertain. Traditionally, central banks'

[2] On the 2nd May 2010 the Euro zone members and the International Monetary Fund agreed on a bailout package to rescue Greece.

interest rate cuts (in normal circumstances) are transmitted smoothly to short term interest rates, and thereby to the longer-maturity rates that are the most relevant for the private sector decision taking (what is known as the "interest rate channel"). Recently, central banks have been increasingly using different interventions as monetary easing (e.g. central banks' purchases of government or corporate bonds), and liquidity support (e.g. the provision of liquidity in the domestic currency by more frequent auctions, longer maturities for refinancing operations or extension of accepted collateral). All these monetary policy interventions aim to support the economic activity and banking stability, but the market reaction to their announcement may be different (ECB, 2010, p. 62; ECB, 2011, p.55). Overall, the effectiveness of these monetary policy actions on asset prices may be different and need to be empirically assessed.

The recent global financial crisis has been also a period of unprecedented intensity for policy maker interventions other than monetary ones. These other types of intervention (such as recovery measures for the whole financial sector or for single banking institutions) have been rarely explored by the financial literature because they were rare and circumscribed events. Furthermore, the crisis has revealed a strong interconnection between real economy, public finance and stability in the financial markets, so we believe it is important to consider also fiscal policy interventions, state aids, financial sector policies and other interventions.

Finally, we do not limit the analysis to the impact on banking indices, but we also consider the individual stock price of G-SIFIs. We believe this is an important contribution to the existing literature that, up to now, has always considered the impact of policy interventions focusing on monetary policy and individual stock prices of non-financial companies. The relevance of this point is even more apparent if we consider that financial intermediaries, and especially large banks, have been at the center of the financial crisis, and have given renewed impetus to reflect on the interconnection between financial stability and monetary policy (Adrian & Smith, 2008). As a consequence, banks are no more only part of the monetary transmission channel, but are now often the main subjects of some policy interventions. At our knowledge, the only paper assessing the effectiveness of policy interventions on the stock market price of

banks is the one by Panetta et al. (2009). However, the authors investigate government rescue plans, finding no evidence of a positive market reaction. In their opinion, results are probably explained by concerns about the dilution of shareholders' rights, public intervention in the bank management and uncertainty regarding the duration of the plan.

The research hypothesis investigated here relates to the effectiveness of each policy intervention considered during the financial crisis. Specifically, we posit that each intervention made during the crisis was "effective", this means that, once the policy makers announce an intervention, abnormal returns increase (AR). The underlying idea is that the announcement of an "effective" policy intervention increases the net expected present value of a single stock (as in the G-SIFIs case) or a portfolio of banks (as in the case of the banking-industry stock indices) so that it generates positive ARs. A policy intervention can increase the net expected present value of stock indicators for two reasons: first, the intervention will reduce interest rates (so the cash flows' discount rate); and second, the intervention will reduce the probability of default of the listed banks and/or G-SIFIs by increasing the expected value of future cash flows. As such, our research hypothesis is that:

H_1: A given policy intervention is an effective tool during the crisis.

As detailed above, we tested this hypothesis for a large set of interventions and for different phases of the crisis.

3. Collecting policy interventions

We analyze the policy maker interventions relative to five geographical areas: countries in the Euro area (EUR), Japan (JPN), United Kingdom (UK), United States (US) and Switzerland (CH), considering a 5-year period, from June 2007 to June 2012. We divide the time period investigated into three different sub-periods. Consistently with Aït-Sahalia et al. (2010, 2012), the first period is between the 1st June 2007 and 14th September 2009 (i.e. the day before the collapse of Lehman Brothers), labeled as "subprime crisis phase". The second period runs from

15 September 2008 to 1 May 2010 (i.e. the day before the beginning of the European sovereign debt crisis phase, generally identified with 2 May 2010, when the Euro zone members and the International Monetary Fund agreed on a bailout package of €110 billion to rescue Greece): we label this sub-period as "global financial crisis". Finally,, the third period is between 2 May 2010 and the end of the investigated period: we labeled this sub-period as "sovereign debt crisis".

Data have been collected from different sources. For the period June 2007 – March 2009, we draw information from the database compiled by the National Bureau of Economic Research (Aït-Sahalia et al., 2010, 2012). For the period from April 2009 to the end of June 2012, we collect data from official announcements (in the form of press releases) from European Central Bank, Bank of Japan, Bank of England, Federal Reserve and Swiss National Bank. We also draw information from other sources:Factiva, Federal Reserve Bank of St. Louis, Bank for International Settlement, Lauder Institute – Wharton School – University of Pennsylvania, Bank of Ireland, InstitutfürBankrecht (IBR) Universitat Bern, Mayer Brown LTD.

Policy interventions have been classified in the following macro categories (consistently with Aït-Sahalia et al., 2012): fiscalpolicy, monetary policy, financial sector policy, ad-hoc bank bailouts and failures, and other measures. For each of these macro-categories, we have identified some micro-category of policy interventions. Table 1, Panel A and B, reports our classification of policy interventions, the description of each macro- and micro-category and the source of information.

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One of the main problems in assessing the impact of policy interventions is to deal with overlapping events. A first intuitive solution to face this problem would be to set a subjective criteria to select the most relevant event and drop the others overlapping in the same time period. However, this approach is unsuitable for us because we would lose a large number of observations since there was a large number of policy interventions during the financial crisis,

often at a very small time distance.. Second, any criteria would imply an arbitrary evaluation of the relative importance of two or more close policy interventions that may alter the results. As a consequence, we prefer to keep all policy interventions in our sample, then estimate the ARs for each currency area spread/banking index/G-SIFI for every single day of the investigated period in which at least one policy intervention was announced and, finally, account for the overlapping effect by including dummy variables for each macro- and micro-category of policy interventions. Specifically, in the second step of our analysis, when we investigate with a multivariate regression the determinants of the market reaction, we control for possible overlapping of different types of intervention using a set of dummies.

At the end of the selection process, our final sample (excluding overlapping announcements) includes 1,129 events. Since we have few events in some categories (e.g. austerity packages), we need to reclassify these events to conduct statistical tests on estimated cumulated abnormal returns (CARs) as shown in Table 1, Panel C.

4. Measuring financial and banking distress

In this section, we present our methodology to measure the impact of several policy interventions on interbank credit and liquidity risk premia (section 4.1) and on stock markets (section 4.2). Finally, in section 4.3, we present our regression model used to estimate the impact of policy interventions.

4.1 Estimating Variations in the Libor-OIS spread

The Libor-OIS spread[3] turned into a widely monitored indicator of financial distress (Taylor and Williams, 2009) and a useful measure of the effectiveness of policy interventions. In times of

[3]The Libor fixing is meant to capture the rates paid on unsecured interbank deposits at large, that is of internationally active banks (McAndrews et al., 2008). The Overnight Indexed Swap (OIS) rate is a measure of the expectation of the average overnight rates over a specific term of secured transactions. The OIS rate is closely connected to the average overnight interest

sufficient liquidity and in the absence of market dislocations, the Libor-OIS spread is close to an equilibrium level, which periodically is disturbed by external events. For instance, when markets are under stress, as it happened in the fall of 2007, uncertainty about credit and liquidity risk creates an opportunity cost of term funding, which results in a significantly increase in most major currencies.

We define the spread between the term rate and the OIS rate as follows. Let $i_t^{(n)}$ denote the three-month LIBOR reported by the British Bankers Association around 6:00 a.m. Eastern Time on date t + 1 ,for the country/cross n and $s_t^{(n)}$ the three-month OIS rate as reported at the close (Eastern Time) of date t. The spread between the LIBOR and OIS rate is defined as follows:

$$S\,\mathrm{n}\,t = i_t^{(n)} - s_t^{(n)} \qquad (1)$$

Figures from 1 to 5 show the daily observations path of these indicators over the crisis period[4] between June 1, 2007 and June 30, 2012. We observe that the Libor-OIS spread went up substantially for the U.S. in early October, 2008, and then fell sharply during the beginning of 2009. The situation is quite different for Switzerland, where the 3-month Libor is the reference rate for monetary policy. In this case, the Libor is mainly driven by monetary policy, rather than by market forces. However, we do not observe the Libor alone, but also its difference with respect to the OIS spread, a rate that is not controlled by monetary authorities. Furthermore, applying a consistent methodology for each country allows to have the same sample for both conventional and non-conventional measures and for both the interbank and the equity markets analyses.

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rate expected to prevail over the next *n* days. An OIS is structured as follows: at maturity, the parties exchange the difference between the interest that would be accrued from repeatedly rolling over an investment in the overnight market and the interest that would be accrued at the agreed OIS fixed rate (Taylor and Williams, 2009).

[4]The U.K. spread time series begins from 28 August 2007 due to missing data in Reuters Thompson.

We estimate the spread between the Libor and OIS over four event windows [i.e. (0,0), (0,+1), (-1,+1), and (-1,+3)] corresponding to one day, two, three and five days intervals. We test the null hypothesis that the spread level related to an event announcement is not equal to zero, and thus concerns the average affect of an event on the spread. According to Aït-Sahaliaet al. (2012), the parametric test statistic is a t-statistic considering historical volatility of the Libor-OIS spread over an estimation period of 20 days before the event window. This allows us to restrict the statistical significance only to those observations that were truly exceptional in terms of large changes in the Libor-OIS spread prior to the policy event.

We define as abnormal all the differences occurring in the Libor-OIS spread related to a policy announcement event with respect to expected daily change. The expected daily change of the market indicator is estimated as the average daily change over the previous 20 working days, and is subtracted from the actual daily change on each day of the event window to obtain abnormal differences.

Abnormal differences are generally defined as the daily changes $AD = \left(x_{i,\tau,m} - x_{i,\tau-1,m}\right)$ of a market variable x in response to policy announcement i of category m on event time day τ., where $\tau \epsilon [d1,d2]$ with d2>d1 and d1 correspond to the day of the event window and d2 to the final day of the event window. For instance $\tau \epsilon [-1,3]$ denotes a day within the event window (with the event occurring at $\tau = 0$), with the event occurring at $\tau = 0$ and $T = 5$ denotes the total length of the event window of 5 days.

As in Aït-Sahaliaet al. (2012), we apply parametric tests of means before and after announcements to abnormal differences to ascertain whether the announcement induces a statistically significant effect on interbank risk premia. The estimator of volatility is based on the expected prediction error that is derived from a simple autoregressive process and is adjusted by the ratio between volatility during both the estimation window and the event window. This accounts for changes in volatility on a day- to-day basis related to the empirical experience within a short event window. Such specification is particularly relevant for cases when investors

anticipated policy intervention and had an effect on the Libor-OIS spread before the event window. To calculate this test statistic, we first derive a measure of the standard deviation:

$$\sigma_{i,\tau,l,m} = \sqrt{var(\varepsilon_{i,l})\left(1 + \frac{1}{L} + \frac{(AD_{i,\tau} - \overline{AD}_{i,l})^2}{\sum_{l \epsilon L}(AD_{i,\tau} - \overline{AD}_{i,l})^2}\right)} \sim student - t\left(\frac{0}{L-2}\right) \quad (2)$$

where*i* indicates the announcement, τ is a day within the event window, l is a day within the pre-event estimation period and m is the type of monetary policy intervention, $\varepsilon_{i,l}$ denotes the ordinary prediction error of the AR(1) process of the Libor-OIS spread at first differences subject; L denotes the total length of the pre-event estimation window; *m* denotes a type of crisis interventions; and *N* denotes the number of events of type m in our sample. We estimate $\sigma_{i,\tau,l,m}$ by performing an auto-regression in a sample period of 20 days, according to the estimating period of the different sample measures adopted in the test procedure.

Following Brown and Warner (1985), we estimate the (daily) Standardized Prediction Error (SPE) as follows:

$$SPE_{i,\tau,l,m} = \frac{1}{\sqrt{T+1}} \sum_{\tau \epsilon T} \frac{AD_{i,\tau}}{\sigma_{i,\tau,m}} \quad (3)$$

and then derive the average standardized interval prediction error (ASIPE) to compute our test statistic , as follows:

$$Z = \frac{\sqrt{N_m}}{N_m} \sum_{i \in N_m} SPE_{i,\tau,m} \sim \begin{cases} \Phi(0,1) \\ G(0, \sigma_x, \xi_x) \end{cases} \quad (4)$$

This test statistic asymptotically converges on the standard normal distribution Φ(.) (Aït-Sahaliaet al. 2012). Given the test for spread, the statistical significance of the event period excess returns is assessed also for each sub-sample, country and time period, taken into account. We performed a consistency test to check for outliers. Our test is run both on CAAR and Z- Stat, and simply checks if each observation, of both two distributions of CAAR (stated as *X*) and SPE

statistic (stated as T), as it came out from Eq. (4), is an outlier according to the following formula:

$$O_{x,T} = \begin{cases} if\ Abs\ (Max(X) > Abs\ (Min(X)\ and\ Abs\ (Max(X) > 10 * Abs\ (Min(X)\ then\ O_{x,} = Outliers \\ if\ Abs\ (Max(X) < Abs\ (Min(X)\ and\ Abs\ (Max(X) < 10 * Abs\ (Min(X)\ then\ O_{x,} = Outliers \\ \\ or \\ \\ if\ Abs\ (Max(T) > Abs\ (Min(T)\ and\ Abs\ (Max(T) > 10 * Abs\ (Min(T)\ then\ O_{t,} = Outliers \\ if\ Abs\ (Max(T) < Abs\ (Min(T)\ and\ Abs\ (Max(T) < \ 10 * Abs\ (Min(T)\ then\ O_{t,} = Outliers \\ \\ otherwise\ O_{x,T} \neq Outliers \end{cases} \quad (5)$$

4.2 Estimating Abnormal Returns

We measure the market reaction following the policy interventions at two levels. Specifically, we estimate abnormal returns (ARs), which is the forecast error of a specific normal return-generating mode, by focusing on banking sector indices and stock returns of single G-SIFIs[5].

Regarding banking indices, we select twelve indices, as a proxy for stock market returns for all major developed countries (S&P Banks Sel. Ind - Price Index, Djgl Japan Banks - Price Index, Ftse China Banks - Price Index, FtseUk Banks - Price Index, Djgl Switzerland Banks - Price Index, Ftse Italy Banks - Price Index, Ftse France Banks - Price Index, Ftse Germany Banks - Price Index, Ftse Belgium Banks - Price Index, Ftse Spain Banks - Price Index, Ftse Sweden Banks - Price Index, Ftse W Netherlands Banks L - Price Index).

For G-SIFIs, we select stock price time-series for each of the 27 G-SIFIs. A list of the G-SIFIs with their currency area of reference is presented in Table 2.

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[5] From the G-SIFIs list released by the Financial Stability Board on the 4th November 2011, we exclude Bank of China and Nordea since they are not based in one of the five currency areas investigated.

Regarding the estimation procedure, we estimate the AR adopting the market model (MacKinlay, 1997). Normal returns for every *i-th* observation (R_{it}) – that is the broad equity index or a single bank index – are obtained as a function of the market portfolio return (R_{Mt}), represented by a world equity index:

$$R_{it} = \alpha_i + \beta_i R_{Mt} + \varepsilon_{it} \qquad E(\varepsilon_{it}) = 0,\ \text{var}(\varepsilon_{it}) = \sigma^2{}_{\varepsilon_i} \tag{6}$$

Market model parameters are obtained with daily log returns of currency area/ G-SIFIs and a local stock market index, as stated in section 1, able to represent the market portfolio over a 252-day estimation period, ending 20 days before the announcement. ARs are then obtained as the difference between the actual stock return and the return predicted by the market model:

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{Mt}) \tag{7}$$

ARs are cumulated over a time period (Cumulative Abnormal Return, CAR) around the announcement date (t=0). Following Aït-Sahalia et al. (2010, 2012), we focus on the following short event windows: 5-day (-1; +3), 3-day (-1;+1) and one-day (0;0). For each event window, CARs are obtained as follows:

$$CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \tag{8}$$

wheret_1 and t_2 are the starting and the ending date of the considered window. ARs can be aggregated on a time or a cross-section basis for a portfolio of *N* observations. The Cumulative Average Abnormal Return (CAAR) is calculated as:

$$CAAR(t_1, t_2) = \frac{1}{N} \sum_{i=1}^{N} CAR_i(t_1, t_2) \tag{9}$$

After the calculation of CAARs, we test the hypothesis of a market reaction significantly different from zero. As noted in Cummins and Weiss (2004), various studies have documented a variance increase in ARs as an effect of the announcement during the days near to the event, with respect to the estimation period,. If hypothesis testing is conducted without

considering this increase in variance, results can be biased in the direction of a too frequent rejection of the null hypothesis in favor of the alternative one. In order to overcome this limitation and avoid considering as significant a null value creation or destruction, we follow the approach first proposed by Mikkelson and Partch (1988) and then adopted in some recent studies (e.g. Harrington and Shrider, 2007; Mentz and Schierek, 2008), suggesting using the Boehmer et al. (1991) test statistic. First of all, we calculate a standardization factor:

$$SR_i = \frac{CAR_i(t_1,t_2)}{\hat{\sigma}_{\varepsilon_i}\sqrt{T_s + \frac{T_s^2}{T} + \frac{\sum_{t=t_1}^{t_2}\left(R_{Mt} - T_s(\overline{R}_M)\right)^2}{\sum_{t=1}^{T}\left(R_{Mt} - \overline{R}_M\right)^2}}} \tag{10}$$

where $\hat{\sigma}_{\varepsilon_i}$ is the standard deviation of abnormal returns estimated with the market model; T_s is the number of days in the considered event window (t_1, t_2); T is the number of days in the estimation period; R_M is the market portfolio return and $\overline{R}_M$ is the average market portfolio return during the estimation period. Then, the Z statistic (with a t-distribution with T-2 degrees of freedom and converging to a unit normal) is determined as follows (Mentz and Schierek, 2008, p. 207):

$$Z = \frac{\frac{1}{N}\sum_{i=1}^{N} SR_i}{\sqrt{\frac{1}{N(N-1)}\sum_{i=1}^{N}\left(SR_i - \sum_{i=1}^{N}\frac{SR_i}{N}\right)^2}} \tag{11}$$

A recent study by Kolari and Pynnönnen (2010) proposes a new test statistic that modifies the one suggested by Boehmer*et al.* (1991) in order to consider possible cross-sectional correlation among abnormal returns. The adjusted test statistic is obtained applying the following correction factor to the above defined Z:

$$\sqrt{\frac{1-\bar{r}}{1+(N-1)\bar{r}}} \tag{12}$$

where $\bar{r}$ is the average of the sample cross correlations of the estimation period residuals and N is the number of observations in the considered sample.

5.Econometric approach

The research hypothesis investigated in the paper relates to the effectiveness of each policy intervention considered during the financial crisis, i.e. the announcement of a policy intervention increases abnormal returns (AR). In order to test this hypothesis, we run a multivariate regression model to link policy interventions to CARs. Specifically, after estimating CARs, we run different models for each of our three levels of investigation: the Libor-OIS spread, whole banking industries, and G-SIFIs. Specifically, our dependent variables (*y*) are the following: SPREAD, i.e. the abnormal return of the 3-month Libor-OIS spread in the considered event window for the i-th currency area (Switzerland, Japan, Euro area, the U.K. and the U.S.); IND_CAR, i.e. the abnormal return of the banking sector index in the considered event window for the i-th country; and CAR, i.e. the abnormal return for the stock price of the single G-SIFI in the considered event window. Our independent variables are a vector (X) of dummy variables indicating anannouncement (or not) in each of the j-th macro-category of policy interventions, a dummy variable (W) indicating if the policy intervention is announced in another currency area, and Stage is a set of dummy variables indicating different stages of the financial crisis. When we assess G-SIFIs, we also add a set of dummy indicating the level of systemic risk attributed to the bank by the Financial Stability Board. As such, we run the following OLS model:

$$y_i = \alpha + \sum_j \beta_j x_{j,i} + \lambda W_i + \sum_k \gamma Stage_{k,i} + \varepsilon_i \quad (13)$$

After running our base model, we also run a set of "impact models" for each level of investigation in which, one by one, the dummies indicating a macro-category of interventions are substituted by a set of dummies indicating the relative micro-categories of interventions as represented in Table 1 Panel C (e.g., expansionary monetary policy measures are split in interest

rate cuts, monetary easing and provision of liquidity). In addition to this, in order to consider the possibility that several interventions have a different effect depending on the moment in which they are released, we also add the interactions between dummies identifying the micro-type of interventions and dummies indicating several stages of the financial crisis.

6. Results

In this section, we discuss our empirical findings. First, we illustrate the effectiveness of different type of policy interventions all together (base model) and then we focus on each type of intervention by distinguishing between various specific tools[6].

6.1 A general assessment of various type of policy intervention

Our findings for the general model show that policy interventions have different effectiveness on the interbank market and on the banking market. Specifically, we find that most policy interventions are ineffective in the interbank market and only the policy decisions allowing a single bank to fail or bail out has a positive and statistically significant link with the OIS-Libor spread(table 3). Conversely, we observe that various policy interventions are statistically related to abnormal stock reaction of both banking stock indices and G-SIFIs (respectively, tables 4 and 5), such as the decisions allowing a single bank to fail or bail out; financial sector policies including all instruments used to resolve systemic banking crises; and the both expansionary and restrictive monetary actions. We also show that stimulus packages as financial support to countries are effective for G-SIFIs, but not for all listed banks (i.e. banking stock indices).

<<<INSERT TABLES FROM 3 TO 5>>>

[6]We are able to run the follow up only for monetary and financial policies measures by distinguishing across different types of interventions made during the financial crisis. For other types of policy measures (e.g. fiscal policies, State aids, etc), we do not have a sufficient number of observations across the type of instruments in each class so we cannot run the follow-up analysis.

Specifically, monetary actions (both expansionary or restrictive measures) are positively and statistically significant (at least at the 5% confidence level) to abnormal returns showing that G-SIFIs and banks in general (i.e. the one included in the banking indices) reacts positively at the announcement of policy measures. This suggest that stock market participants "appreciate" monetary policy interventions, even if these are restrictive measures: this is a very interesting result suggesting that market participants trust monetary policy authorities in time of crisis more than the type of intervention. In time of stability, one would expect that a monetary restriction intervention would lead to lower abnormal returns (i.e. a monetary r estriction intervention increases interest rates and, therefore, decreases the net present value of the bank's future cash flows). Instead, we find that in time of crisis, market participants believe that any monetary policy action (even restrictive-ones) "improve" the probability of survival of banks and this has a positive influence on abnormal returns. This result is consistent for all event windows considered (tables 4 and 5) showing that, even if market participants are able to forecast the announcement of monetary policy actions (i.e. event window -1,0), the positive link between monetary policy actions and abnormal return persist over time (e.g. event windows -1,+3 and 0,+1). This result is also consistent between G-SIFIs and banking stock indices (respectively, tables 5 and 4).

We still find that policy decisions allowing a single bank to fail or bail out have a statistically significant (at the 10% confidence level or less) link with both G-SIFIs and banking stock indices, but now the estimated coefficients are negative. As such, we find that, when policy makers let a single bank to fail or bail out, stock market participants perceive the decision as a signal of crisis in the banking industry and, consequently, this has a negative link with abnormal returns of banks and G-SIFIs. The result obtained is consistent for all event windows considered (tables 4 and 5) showing that, even if market participants are able to forecast the announcement of monetary policy actions (i.e. event window -1,0), the positive link between monetary policy actions and abnormal return persists over time (e.g. event windows -1,+3 and

0,+1). This result is also consistent between G-SIFIs and banking stock indices (respectively, tables 5 and 4).

We also show that financial sector policies (FIN_SEC_POL), i.e.all instruments used to resolve systemic banking crises, display a positive and statistic link with abnormal returns of both G-SIFIs and stock banking indices (capturing all listed banks). This suggests that market participants welcome all policy actions to solve systemic crisis: such interventions reduce the probability of defaults of G-SIFIs and listed banks, increase their expected value of future cash flows and,, overall, generate positive abnormal returns around the announcement of such interventions. This result is consistent for all event windows considered (tables 4 and 5), except windows [0;0] and [-1;0], showing that market participants are not able to forecast the announcement of this type of actions. This result is also consistent between G-SIFIs and banking stock indices (respectively, tables 5 and 4).

We also find that stimulus packages as financial support to countries (FISSTATE) are an effective policy intervention for G-SIFIs: all estimated coefficients are positive and statistically significant, except windows [-1;+1] and [-1;0], showing that market participants are not able to forecast the announcement of this type of actions. Conversely, we cannot maintain that financial support to countries is an effective policy tool for all listed banks in a country.

6.2Monetary policy interventions

In this section, we discuss our empirical findings focusing on various monetary policy interventions. First, we investigate the effectiveness of various expansionary monetary interventions [specifically, interest rate cuts (IR_CUT), liquidity provision (LIQ), and monetary easing intervention (MON_EASE)] and then we focus on monetary restriction and unchanged measures [i.e. liquidity drain or end/reduction of monetary easing programs (CONTR), and interest rates increased or unchanged (IR_UNC/INCR)].

Consistently with previous results, any type of monetary policy interventions (any of the expansionary, restriction or unchanged measures) do not display a statistically significant

relationship (at the 10% confidence level or less) with the Libor-OIS spread suggesting than monetary policy intervention are ineffective in the interbank market (table 6 and 7). Conversely, such interventions are effective in the banking industry showing a statistically significant link with abnormal returns for G-SIFIs or banking-industry stock indices. We have two main results: first, both expansionary or restrictive/unchanged monetary measures display a statistically significant relationship with CAR around the announcement of the policy. This shows that stock market participants "appreciate" monetary policy interventions, even if these are restrictive measures trusting monetary policy authorities, rather than the type of intervention. Second, we find that not all expansionary or restrictive/unchanged monetary measures are an effective policy instrument.

<<< INSERT TABLES 6 AND 7>>>

Focusing on each monetary measure, we start from monetary expansion measures (table 6). We observe that the interest rate cut displays a positive and statistically significant link (at the 10% confidence level or less) with CAR around the announcement of these measures for both G-SIFIs and listed banks (captured by banking-industry stock indices). An interesting result is that the marginal contribution of interest rate cut during the Global financial crisis period (15 September 2008 – 1 May 2010) and the Sovereign debt crisis period (2 May 2010 – 30 June 2012). In other words, while we find that the interest rate cuts are effective during the whole sample period, the effectiveness of such measure tends to decline in the second and third phase of the crisis. This suggests that, after the first phase of the crisis, stock market participants "learn" how monetary policy authorities use the interest rate cuts and the positive relationship between the announcement of such intervention and CAR is marginally negative in the second and third period of the crisis. Once again, these results are consistent for both G-SIFIs and listed banks (captured by banking-industry stock indices).

The second type of monetary expansion measure we analyze is the liquidity provision. We show that liquidity provision has a positive and statistically significant link (at the 10% confidence level or less) with CAR around the announcement of these measures for both G-SIFIs and listed banks (captured by banking-industry stock indices). In this case, the marginal contribution of liquidity provision during the Global financial crisis period (15 September 2008 – 1May 2010) is positive for banking indices, but it is negative during the Sovereign debt crisis period (2 May 2010 – 30 June 2012). Regarding the G-SIFIs, the marginal contribution of liquidity provision during the second and third stages of the crisis is always negative. In other words, the liquidity provision interventions are in general an effective tool during the "whole" sample period, but we show that their effectiveness declined during the second and, especially, the third phase of the crisis. Perhaps, stock market participants learned during the crisis that such a measure may be sufficient to reduce the probability of default of large banks. The third type of monetary expansion measure is the monetary easing (MON_EASE). We show that monetary easing interventions have a positive and statistically significant link (at the 10% confidence level or less) with CAR around the announcement of these measures for listed banks (captured by banking-industry stock indices). For G-SIFIs, we find that there is a positive link not for the whole sample period, but only during the sovereign debt crisis period (2 May 2010 – 30 June 2012).

We shift now our attention on restrictive and unchanged monetary measures (table 6). First, we show that liquidity drain or end/reduction of monetary easing programs do not have a statistically significant relationship with CARs estimates for the OIS-Libor spread, banking industry stock indices (capturing listed banks), and G-SIFIs. In the whole sample period, such a type of measures does not seem to be able to reduce the market participants' expected probability of defaults in the banking industry. This is also consistent with our results for the monetary easing actions that are found to be an effective tool. The only exception is the period of the Sovereign debt crisis period (2May 2010 – 30 June 2012) where liquidity drain or end/reduction of monetary easing programs displays a statistically significant link with the G-

SIFI's CAR. In this period of Sovereign debt crisis, such an intervention seem to be able to reduce the market participants' expected probability of defaults for G-SIFIs.

Regarding the second instruments (interest rates increased or unchanged), we would like to point out that most of the actions refer to decision of not changing interest rates rather than increasing. The cases of interest rate increases have been very rare during the financial crisis. This type of measures displays a positive link with CARs of both banking-industry stock indices and G-SIFIs, suggesting that their announcement is welcome by market participants' (by reducing the expected probability of defaults in the banking industry and/or not increasing interest rates that would reduce the net present value of future cash flows). We also found that policy makers' decision of not changing interest rates (or increasing) was particularly appreciated by G-SIFIs investors during the Global financial crisis period (15 September 2008 – 1 May 2010) providing a marginal positive contribution to the positive relationship between G-SIFIs' CAR and the announcement of such interventions.

6.3 Financial Policy Interventions

In this section, we discuss our empirical findings focusing on three financial policy interventions: 1) recovery measures for banks in form of asset purchase or ring-fencing of bad assets and asset guarantees (FIN_LIABL); 2)recovery measures for banks in form of guarantees for old or new liabilities, enhancement of depositor protection schemes, and provision of lender of last resort facilities (FIN_LIABL); and 3) capital injections and nationalization, i.e. acquisition of controlling share (FIN_RECAP).

<<< INSERT TABLE8>>>

Consistently with our results for the base model, we find that none of the three financial policy interventions is an effective instrument to influence the Libor-OIS spread. Conversely, we find that the three financial policy instruments display a statistically significant relationship with

banking-industry stock indices and G-SIFIs' CARs. The first result is that recovery measures for banks in form of asset purchase or ring-fencing of bad assets and asset guarantees exhibit a negative link with CARs' of listed banks and G-SIFIs during the financial crisis. Looking at the different phases of the financial crisis, we show a positive contribution in the second and third stage of the crisis suggesting that asset purchase or ring-fencing of bad assets and asset guarantees have been an effective policy interventions only for G-SIFIs (but not for listed banks included in the banking-industry indices) and after the 15 September 2008. The other two instruments in the financial sector policies are found to be statistically related (at the 10% confidence or less) to G-SIFI's CAR and not to the banking-industry stock indices. Specifically, both recovery measures for banks in form of guarantees for old or new liabilities, enhancement of depositor protection schemes, and provision of lender of last resort facilities (FIN_LIABL), and capital injections and nationalization (FIN_RECAP) exhibit a negative link with CARs' of G-SIFIs during the financial crisis. Looking at the different phases of the financial crisis, we find a positive contribution in the second and third stage of the crisis suggesting that these two types of intervention become effective only for G-SIFIs and after the 15September 2008.

7. Conclusions

What types of policy maker interventions were more effective to restore the stability of the banking sector? Our paper answers this question by analyzing the effect of a wide set of policy makers interventions, between June 1, 2007 and June 30, 2012, at three different levels: the 3-month Libor-OIS spread, the banking sector stock indices and the G-SIFIs.

We show that most policy interventions are ineffective in the interbank market and only the policy decisions allowing a single bank to fail or bail out has a positive and statistically significant link with the OIS-Libor spread. Conversely, a large set of policy interventions are statistically related to abnormal stock reaction of both banking stock indices and G-SIFIs, such as the decisions allowing a single bank to fail or bail out; financial sector policies including all

instruments used to resolve systemic banking crises; and both expansionary and restrictive monetary actions.

An interesting result is that monetary actions (both expansionary or restrictive measures) are an effective tool for G-SIFIs and banks in general (i.e. the one included in the banking indices) since these reacts positively at the announcement of policy measures. This suggests that stock market participants trust monetary policy authorities in time of crisis, rather than the type of intervention. In time of stability, one would expect that monetary restriction intervention would lead to lower abnormal returns (i.e. a monetary restriction intervention increases interest rates and, therefore, decreases the net present value of bank's future cash flows). Instead, we find that in time of crisis, market participants believe that any monetary policy action (even restrictive-ones) "improve" the probability of survival of banks and this has a positive influence on abnormal returns.

We also show that financial sector policies are an effective policy tool. Market participants welcome all policy actions to solve systemic crisis: such interventions decline the probability of defaults of G-SIFIs and listed banks, increase their expected value of future cash flows and, overall, generate positive abnormal returns around the announcement of such interventions. Stimulus packages as financial support to countries are also an effective policy intervention for G-SIFIs, while we cannot support that financial support to countries is an effective policy tool for all listed banks in a country.

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Table 1
Policy announcements between June 2007 and June 2012 – Sample description

This table lists all policy interventions collected over June 2007 – June 2012.

Panel A reports a sample description using the following macro-categories: **Financial Sector policies** includeall instruments used to resolve systemic banking crises. **Policy Inaction and Bank Failures/Bailouts** includes decisions allowing single banks to fail or decisions to bail out. **Monetary Policy** includes both expansionary and restrictive measures taken by Central Banks. **State aid** refers to financial support to countries; **Fiscal Policy** includes both stimulus and austerity packages; **Other Measures** includes administrative measures, restrictions on short selling and other announcements that do not belong to previous categories but are believed to generate a significant market reaction.

Panel B reports a sample description using the following micro-categories: FIN_ASSET includes recovery measures for banks in form of asset purchase or ring-fencing of bad assets and asset guarantees; FIN_ASSET- indicates the termination of these measures; FIN_LIABL includes recovery measures for banks in form of guarantees for old or new liabilities, enhancement of depositor protection schemes, and provision of lender of last resort facilities; FIN_LIABL- indicates the termination of these measures; FIN_RECAP includes capital injections and nationalization (acquisition of controlling share); FIN_RECAP- indicates the end of these measures. INA_BAIL indicates bank bailouts and assisted mergers; INA_FAIL indicates bank failures; IR_CUT indicates interest rate cuts; MON_EASE indicates monetary easing interventions; LIQ+ indicates liquidity provision, in both domestic or foreign currencies; CONTR indicates liquidity drain or end/reduction of monetary easing programs; IR_UNC/INCR indicates interest rates increased or unchanged; AUST indicates fiscal policies in the form of austerity packages; STIM indicates fiscal policies in the form of stimulus packages; STATE_AID refers to financial support to countries; STATE_AID- indicates the termination of these measures; OTHER_AMM indicates administrative measures; OTHER_SS indicated short selling restrictions and OTHER is a residual category.

Panel C reports the operating classification of announcements. FIN_ASSET- , FIN_LIABL-, and FIN_RECAP- are collapsed in a single category together with the end of state aids STATE- and austerity packages AUST . This category indicates end of recovery measures or austerity measures and is identify as END. In addition OTHER_SS and OTHER are collapsed in a single category named OTHER

Panel A – Sample description by macro-type of announcement

	Financial Sector Policies	Policy Inaction and Bank Failures/Bailouts	Monetary Policy	State Aid	Fiscal Policy	Other Measures	Total
2007	8	4	45	0	0	8	65
2008	136	29	129	1	22	48	365
2009	131	6	133	0	31	71	372
2010	24	4	77	6	5	31	147
2011	7	1	87	7	7	11	120
2012	4	1	44	1	5	5	60
Total	310	45	515	15	70	174	1129

Panel B – Sample description by micro-type of announcement

	Financial Sector Policies						Bank Failures/Bailouts		Expansionary Monetary Policy			Restrictive Monetary Policy	
	FIN_ASSET	FIN_ASSET-	FIN_LIABL	FIN_LIABL-	FIN_RECAP	FIN_RECAP-	INA_BAIL	INA_FAIL	IR_CUT	LIQ+	MON_EASE	CONTR	IR_UNC/INCR
2007			8				3	1	4	17			24
2008	22		68		46		26	3	21	65	5	1	37
2009	28	3	39	3	52	6	5	1	8	55	21	7	42
2010	2		19	2		1	4		1	12	5	10	49
2011			3		4		1		4	12	19	7	45
2012			2		2		1			8	9	4	23
Total	52	3	139	5	104	7	40	5	38	169	59	29	220

	Fiscal Policy		State Aid		Other Measures		
	AUST	STIM	STATE_AID	STATE_AID-	OTHER_AMM	OTHER_SS	OTHER
2007					8		
2008		22	1		27	17	4
2009		31			55	11	5
2010	2	3	5	1	25	6	
2011	1	6	7		11		
2012		5	1		5		
Total	3	67	14	1	131	34	9

Panel C – Operating classification of announcements

	Financial Sector Policies			Policy Inaction &Bank Failures/Bailouts	Expansionary Monetary Policy		Restrictive Monetary Policy		Fiscal Policy & State Aid	Other Measures	End of recovery or austerity measures
	FIN_ASSET	FIN_LIABL	FIN_RECAP	INABAIL_FAIL	IR_CUT	LIQ+	CONTR	IR_UNC/INCR	FISPOL	OTHER	END_
2007		8		4	4	17		24		8	0
2008	22	68	46	29	21	65	1	37	23	48	0
2009	28	39	52	6	8	55	7	42	31	71	12
2010	2	19		4	1	12	10	49	8	31	6
2011		3	4	1	4	12	7	45	13	11	1
2012		2	2	1		8	4	23	6	5	0
Total	52	139	104	45	38	169	29	220	81	174	19

Table 2 - Globally Systemically Important Banks

This table reports the list of the Globally Systemically Important Financial Institutions (G-SIFIs) released by the Financial Stability Board on the 4th November 2011.The list has been updated on 1st November 2012. Compared with the group of G-SIBs published in 2011, two banks have been added (BBVA and Standard Chartered) and three banks removed (Dexia, Commerzbank and Lloyds), as result of a decline in their global systemic importance. Given that the observed period is 2007-2012, we considered also the institutions that have been removed in November 2012, having a total sample of 31 large banks.

Bank	Country	Currency area
CREDIT SUISSE GROUP	CHE	CHE
UBS	CHE	CHE
DEXIA	BEL	EUR
COMMERZBANK	DEU	EUR
DEUTSCHE BANK	DEU	EUR
GROUPE BPCE	FRA	EUR
BNP PARIBAS	FRA	EUR
CREDIT AGRICOLE	FRA	EUR
SOCIETE GENERALE	FRA	EUR
UNICREDIT	ITA	EUR
ING	NED	EUR
BANCO SANTANDER	ESP	EUR
BBVA	ESP	EUR
MITSUBISHI UFJ FINL	JPN	JPN
MIZUHO FINL	JPN	JPN
SUMITOMO MITSUI FINL	JPN	JPN
HSBC	UK	UK
LLOYDS	UK	UK
BARCLAYS	UK	UK
ROYAL BANK OF SCTL	UK	UK
CITIGROUP	US	US
BANK OF NEW YORK MELLON	US	US
GOLDMAN SACHS	US	US
JP MORGAN CHASE	US	US
MORGAN STANLEY	US	US
STATE STREET	US	US
BANK OF AMERICA	US	US
WELLS FARGO	US	US
STANDARD CHARTERED	US	US
NORDEA BANK	SWE	Other
BANK OF CHINA	CHI	Other

Source: Financial Stability Board (2011, 2012)

Table 3 -The effect of policy interventions on the Libor-OIS Spread

This table reports empirical results by running base model over Cumulated Abnormal Returns calculated on the Libor-OIS spread over various event windows for policy interventions announced over June, 2007 – June, 2012. ***,**,* denote that estimates are statistically significant at the 1, 5 and 10% levels. MONPOLEXP is a dummy variable indicating expansionary measures taken by Central Banks; MONPOLRES is a dummy variable indicating restrictive measures taken by Central Banks, FIN_SEC_POL is a dummy variable corresponding to financial sector policies including all instruments used to resolve systemic banking crises; FISSTATE is a dummy variable indicating stimulus packages as financial support to countries, INA is a dummy variable indicating decisions allowing single banks to fail or decisions to bail out; OTHER is a dummy variable indicating administrative measures, restrictions on short selling and other announcements that do not belong to previous categories but are believed to generate a significant market reaction. END indicates the end of all interventions. W is a dummy variable equal to one if the intervention is announced in another currency area. DUMMYSTAGE2, DUMMYSTAGE3, are two control dummy variables equal to one if the observation lies in Global financial crisis period (15th September 2008 – 1st May 2010) and Sovereign debt crisis period (2nd May 2010 – 30th June 2012), respectively, as stated in AitSahalia (2010,2012), and zero otherwise. CONS is the intercept of the model.

	y=CAR(0;0)		*y*=CAR(0;+1)		*y*=CAR(-1;+1)		*y*=CAR(-1;+3)		*y*=CAR(-1;0)	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
MONPOLEXP	0.0003	0.0024	-0.0005	0.0016	0.0016	0.0013	0.0004	0.0010	0.0034	0.0016
MONPOLRES	0.0012	0.0026	0.0033	0.0018	0.0020	0.0014	0.0018	0.0011	0.0033	0.0018
FIN_SEC_POL	-0.0029	0.0027	0.0004	0.0018	0.0010	0.0015	-0.0004	0.0012	0.0002	0.0018
INA	0.0099**	0.0044	0.0117***	0.0030	0.0156***	0.0024	0.0120***	0.0019	0.0186***	0.0030
OTHER	-0.0017	0.0025	-0.0007	0.0017	0.0021	0.0014	0.0012	0.0011	0.0041	0.0017
FISSTATE	-0.0046	0.0033	-0.0015	0.0023	-0.0009	0.0019	-0.0017	0.0015	-0.0028	0.0023
END	0.0015	0.0070	-0.0006	0.0048	0.0013	0.0038	-0.0007	0.0030	0.0044	0.0048
W	0.0025	0.0032	-0.0011	0.0022	0.0007	0.0017	0.0009	0.0014	0.0022	0.0022
DUMMYSTAGE2	-0.0031	0.0030	-0.0051***	0.0021	-0.0055***	0.0017	-0.0026**	0.0013	-0.0029	0.0021
DUMMYSTAGE3	-0.0039	0.0031	0.0010	0.0021	0.0018	0.0017	0.0032**	0.0013	0.0011	0.0021
CONS	0.0022	0.0039	0.0035	0.0026	0.0000	0.0021	-0.0012	0.0017	-0.0046	0.0027
Number of obs	2,989		2,989		2,989		2,989		2,989	

Table 4 - The effect of policy interventions on the Banking Sector Stock Index

This table reports empirical results by running our base model over Cumulated Abnormal Returns calculated on the banking-industry stock indices over various event windows for policy interventions announced over June, 2007 – June, 2012. The banking-industry stock indices are S&P Banks Sel. Ind - Price Index, Djgl Japan Banks - Price Index, Ftse China Banks - Price Index, FtseUk Banks - Price Index, Djgl Switzerland Banks - Price Index, Ftse Italy Banks - Price Index, Ftse France Banks - Price Index, Ftse Germany Banks - Price Index, Ftse Belgium Banks - Price Index, Ftse Spain Banks - Price Index, Ftse Sweden Banks - Price Index, Ftse W Netherlands Banks L - Price Index. ***,**,* denote that estimates are statistically significant at the 1, 5 and 10% levels. MONPOLEXP is a dummy variable indicating expansionary measures taken by Central Banks; MONPOLRES is a dummy variable indicating restrictive measures taken by Central Banks, FIN_SEC_POL is a dummy variable corresponding to financial sector policies including all instruments used to resolve systemic banking crises; FISSTATE is a dummy variable indicating stimulus packages as financial support to countries, INA is a dummy variable indicating decisions allowing single banks to fail or decisions to bail out; OTHER is a dummy variable indicating administrative measures, restrictions on short selling and other announcements that do not belong to previous categories but are believed to generate a significant market reaction. END indicates the end of all interventions. W is a dummy variable equal to one if the intervention is announced in another currency area. DUMMYSTAGE2, DUMMYSTAGE3, are two control dummy variables equal to one if the observation lies in Global financial crisis period (15th September 2008 – 1st May 2010) and Sovereign debt crisis period (2nd May 2010 – 30th June 2012), respectively, as stated in AitSahalia (2010,2012), and zero otherwise. CONS is the intercept of the model.

	y=CAR(0;0)		*y*=CAR(0;+1)		*y*=CAR(-1;+1)		*y*=CAR(-1;+3)		*y*=CAR(-1;0)	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
MONPOLEXP	0.0015**	0.0005	0.0017**	0.0008	0.0014	0.0010	0.0056***	0.0012	0.0024***	0.0008
MONPOLRES	0.0018***	0.0006	0.0029***	0.0008	0.0039***	0.0011	0.0066***	0.0013	0.0019**	0.0008
FIN_SEC_POL	0.0005	0.0006	0.00174**	0.0009	0.0028***	0.0011	0.0082***	0.0014	0.0023***	0.0009
INA	-0.0016*	0.0010	-0.0018	0.0015	-0.0005	0.0018	0.0049**	0.0023	-0.0005861	0.0014
OTHER	0.0007	0.0005	0.0019**	0.0008	0.0002	0.0010	0.0014	0.0013	-0.0012	0.0008
FISSTATE	0.0008	0.0007	0.0017	0.0011	-0.0007	0.0014	0.0003	0.0017	0.0004	0.0011
END	0.0019	0.0015	0.0036	0.0022	-0.0016	0.0028	-0.0010	0.0036	-0.0020	0.0022
W	-0.0005	0.0007	-0.0024**	0.0010	-0.0025**	0.0013	-0.0018	0.0016	-0.0012	0.0010
DUMMYSTAGE2	-0.0009	0.0006	0.0003	0.0010	0.0010	0.0012	-0.0002	0.0015	-0.0004	0.0010
DUMMYSTAGE3	-0.0005	0.0007	0.0008	0.0010	0.0003	0.0012	0.0014	0.0016	-0.0006	0.0010
CONS	-0.0005	0.0008	-0.0010	0.0013	-0.0004	0.0016	-0.0048**	0.0020	0.0003	0.0013
Number of obs	7,169		7,169		7,169		7,169		7,169	

Table 5 - The effect of policy interventions on Globally-Systemically Important Financial Institutions (G-SIFI)

This table reports empirical results by running our base model over Cumulated Abnormal Returns calculated for the G-SIFIs over various event windows for policy interventions announced over June, 2007 – June, 2012. ***,**,* denote that estimates are statistically significant at the 1, 5 and 10% levels. MONPOLEXP is a dummy variable indicating expansionary measures taken by Central Banks; MONPOLRES is a dummy variable indicating restrictive measures taken by Central Banks, FIN_SEC_POL is a dummy variable corresponding to financial sector policies including all instruments used to resolve systemic banking crises; FISSTATE is a dummy variable indicating stimulus packages as financial support to countries, INA is a dummy variable indicating decisions allowing single banks to fail or decisions to bail out; OTHER is a dummy variable indicating administrative measures, restrictions on short selling and other announcements that do not belong to previous categories but are believed to generate a significant market reaction. END, indicates the end of all interventions, RISKD1, RISKD2, RISKD3, are all dummy variables representing the G-SIBs risk as introduced in the bucket approach (Table 3 of the Basel Committee document Global systemically important banks: Assessment methodology and the additional loss absorbency requirement, November 2011). B, C, R, W, are all control dummy variables equal to one if the stock is subject to an intervention, respectively, at the bank, country, currency, or rest of the world level. DUMMYSTAGE2, DUMMYSTAGE3, are all control dummy variables equal to one if the observation lies in Global financial crisis period (15th September 2008 – 1st May 2010) and Sovereign debt crisis period (2nd May 2010 – 30th June 2012) respectively as stated in AitSahalia (2010,2012), and zero otherwise. CONS is the intercept of the model.

	y=CAR(0;0)		*y*=CAR(0;+1)		*y*=CAR(-1;+1)		*y*=CAR(-1;+3)		*y*=CAR(-1;0)	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
MONPOLEXP	0.0018***	0.00050	0.0004	0.00065	0.0002	0.00075	0.0037***	0.00083	0.0016**	0.00065
MONPOLRES	0.0013**	0.00055	0.0012*	0.00071	0.0021**	0.00082	0.005***	0.00091	0.0021***	0.00072
FIN_SEC_POL	0.0003	0.00059	0.0017**	0.00076	0.0013	0.00088	0.0048***	0.00097	-0.0001	0.00077
INA	-0.0038***	0.00097	-0.0033***	0.00125	-0.0034**	0.00144	0.0049***	0.00160	-0.004***	0.00126
OTHER	0.0001	0.00054	0.0016**	0.00070	0.001	0.00081	0.0039***	0.00089	-0.0004	0.00070
FISSTATE	0.0025***	0.00071	0.0046***	0.00092	0.0012	0.00106	0.0039***	0.00117	-0.0009	0.00092
END	0.0001	0.00142	0.0004	0.00184	-0.0063***	0.00213	-0.0039*	0.00235	-0.0066***	0.00185
RISKD1	-0.0005	0.00050	0.0002	0.00065	0.0002	0.00075	-0.0004	0.00083	-0.0005	0.00065
RISKD2	-0.0006	0.00089	0.0000	0.00116	0.0001	0.00133	0.0000	0.00148	-0.0004	0.00116
RISKD3	-0.0003	0.00065	0.0001	0.00084	-0.0007	0.00097	-0.0012	0.00108	-0.0011	0.00085
B	-0.0054	0.00444	0.0008	0.00575	-0.0057	0.00664	-0.0056	0.00735	-0.0119**	0.00579
C	0.0012	0.00075	0.0015	0.00097	0.0014	0.00112	0.0008	0.00124	0.0011	0.00098
R	0.0009	0.00078	0.0016	0.00101	0.0044***	0.00117	0.0031**	0.00129	0.0037***	0.00102
W	0.0005	0.00083	0.001	0.00108	0.0026**	0.00125	0.0011	0.00138	0.002*	0.00109
DUMMYSTAGE2	0.0009	0.00059	-0.0007	0.00076	-0.001	0.00088	-0.0012	0.00097	0.0006	0.00077
DUMMYSTAGE3	0.0004	0.00059	-0.0015**	0.00077	-0.0019**	0.00089	-0.0043***	0.00098	0.0000	0.00077
CONS	-0.0021**	0.00090	-0.0029***	0.00116	-0.0039***	0.00134	-0.0058***	0.00149	-0.0032***	0.00117
Number of obs	17,404		17,404		17,404		17,404		17,404	

Table 6 - The effect of the Monetary Expansionary measures in the banking industry during the crisis

This tablereports empirical results by running a follow up of Model 13for expansionary monetary policy announcements from single Central Banks over June 2007 – June, 2012. Specifically, we include now a variable for each monetary expansionary instrument(and keep the other variables for each category of intervention) by using different response variables. In models (2), (4) and (6), we also interact each monetary expansionary instrument with the phases of the financial crisis.. ***,**,* denote that estimates are statistically significant at the 1, 5 and 10% levels. Specifically, IR_CUT is a dummy variable indicating interest rate cuts, LIQ is a dummy variable indicating liquidity provision, MON_EASE is a dummy variable indicating monetary easing intervention, MONPOLRES is a dummy variable indicating restrictive measures taken by Central Banks, FIN_SEC_POL is a dummy variable corresponding to financial sector policies including all instruments used to resolve systemic banking crises; FISSTATE is a dummy variable indicating stimulus packages as financial support to countries, INA is a dummy variable indicating decisions allowing single banks to fail or decisions to bail out; OTHER is a dummy variable indicating administrative measures, restrictions on short selling and other announcements that do not belong to previous categories but are believed to generate a significant market reaction. END indicates the end of all interventions, RISKD1, RISKD2, RISKD3, are all dummy variables representing the G-SIBs risk as introduced in the bucket approach (Table 3 of the Basel Committee document Global systemically important banks: Assessment methodology and the additional loss absorbency requirement, November 2011). B, C, R, W, are all control dummy variables equal to one if the stock is subject to an intervention, respectively, at the bank, country, currency, or rest of the world level. DUMMYSTAGE2, DUMMYSTAGE3, are two control dummy variables equal to one if the observation lies in Global financial crisis period (15th September 2008 – 1st May 2010) and Sovereign debt crisis period (2nd May 2010 – 30th June 2012) respectively as stated in AitSahalia (2010,2012), and zero otherwise. CONS is the intercept of the model. IRCUT*DUMSTAGE2, LIQ*DUMSTAGE2, MON_EASE*DUMSTAGE2, IRCUT*DUMSTAGE3, LIQ*DUMSTAGE3, MON_EASE*DUMSTAGE3, are all interaction terms between sub-sample crisis period and expansionary monetary policy interventions. N/A for MON_EASE*DUMSTAGE2 means dropping of variables for perfect collinearity due to full empty sample for Monetary easing interventions in Stage 1.

	Y= CAR (0;0) for the LIBOR-OIS SPREAD				*y*= CAR (0;0) for the Banking-Industry StockIndices				*y*= CAR (0;0) for G-SIFIs			
	(1)		(2)		(3)		(4)		(4)		(5)	
	coefficient	Std. Err.	coefficient	Std. Err.	coefficient	Std. Err.	coefficient	Std. Err.	coefficient	Std. Err.	coefficient	Std. Err.
IR_CUT	0.0107**	0.005	0.0086	0.009	0.0019*	0.0011	0.0066***	0.0019	0.00200*	0.00103	0.00332*	0.00177
LIQ	0.0022	0.0026	0.0013	0.004	0.0014*	0.0006	0.0009	0.0009	0.00096*	0.00054	0.00436***	0.00111
MON_EASE	-0.0072*	0.0039	-0.005	0.0053	0.0006	0.0009	0.0011	0.0013	0.00198**	0.0008	-0.00143	0.00131
MONPOLRES	0.0015	0.0026	0.002	0.0026	0.0017**	0.0006	0.0015***	0.0006	0.00119**	0.00054	0.00197***	0.00057
FIN_SEC_POL	-0.0026	0.0027	-0.0022	0.0027	0.0005	0.0006	0.0004	0.0006	0.00006	0.00058	0.00044	0.00059
INA	0.0103**	0.0044	0.0102**	0.0044	-0.0017*	0.001	-0.0017*	0.001	-0.00396***	0.00096	-0.00359***	0.00096
OTHER	-0.0013	0.0025	-0.0011	0.0025	0.0007	0.0005	0.0008	0.0005	-0.00001	0.00053	0.00056	0.00054
FISSTATE	-0.0049	0.0034	-0.0045	0.0034	0.0007	0.0007	0.0007	0.0007	0.00231***	0.00071	0.00258***	0.00071
END	0.0017	0.0069	0.0017	0.007	0.0019	0.0015	0.0018	0.0015	0.00008	0.00142	0.00028	0.00142
RISKD1									-0.00046	0.0005	-0.00046	0.0005
RISKD									-0.00056	0.00089	-0.00058	0.00089
RISKD3									-0.00028	0.00065	-0.00029	0.00065
B									-0.00549	0.00444	-0.00537	0.00443
C									0.00115	0.00075	0.0008	0.00075
R									0.00089	0.00078	0.0008	0.00078
W	0.0022	0.0032	0.0022	0.0032	-0.0005	0.0007	-0.0005	0.0007	0.00045	0.00083	0.00019	0.00083
DUMMYSTAGE2	-0.0024	0.003	-0.003	0.0033	-0.0008	0.0006	-0.0008	0.0007	-0.00048	0.00059	0.00043	0.00068
DUMMYSTAGE3	-0.0019	0.0032	-0.0028	0.0033	-0.0003	0.0007	0.0001	0.0007	-0.00102*	0.00061	0.00032	0.00069
CONS	0.0008	0.0039			-0.0005	0.0008	-0.0006	0.0009	-0.00091	0.00091	-0.0022**	0.00095
IRCUT*DUMSTAGE2			0.0016	0.0113			-0.0056**	0.0024			0.00062	0.00236
LIQ*DUMSTAGE2			0.0047	0.0333			0.0221***	0.0059			-0.00264**	0.0013
MON_EASE*DUMSTAGE2			-0.0056	0.0082			NA	NA			N/A	N/A
IRCUT*DUMSTAGE3			0.0111	0.0152			-0.0114***	0.0032			-0.00944***	0.00293
LIQ*DUMSTAGE3			-0.0025	0.0333			-0.0212***	0.0058			-0.00768***	0.00155
MON_EASE*DUMSTAGE3			(dropped)				-0.0004	0.0018			0.00598***	0.00168
Number of obs	2989		2989		7169		7169		17404		17404	

Table 7 - The effect of the Monetary Restrictive and Unchanged measures in the banking industry during the crisis

This table reports empirical results by running a follow up of Model 13 for restrictive and unchanged monetary policy announcements from single Central Banks over June 2007 – June, 2012. Specifically, we include now a variable for each monetary restrictive and unchanged measure (and keep the other variables for each category of intervention) by using different response variables. In models (2), (4) and (6), we also interact each monetary expansionary instrument with the phases of the financial crisis. ***,**,* denote that estimates are statistically significant at the 1, 5 and 10% levels. Specifically, IR_CUT is a dummy variable indicating interest rate cuts, LIQ is a dummy variable indicating liquidity provision, MON_EASE is a dummy variable indicating monetary easing intervention, MONPOLRES is a dummy variable indicating restrictive measures taken by Central Banks, FIN_SEC_POL is a dummy variable corresponding to financial sector policies including all instruments used to resolve systemic banking crises; FISSTATE is a dummy variable indicating stimulus packages as financial support to countries, INA is a dummy variable indicating decisions allowing single banks to fail or decisions to bail out; OTHER is a dummy variable indicating administrative measures, restrictions on short selling and other announcements that do not belong to previous categories but are believed to generate a significant market reaction. END indicates the end of all interventions, RISKD1, RISKD2, RISKD3, are all dummy variables representing the G-SIBs risk as introduced in the bucket approach (Table 3 of the Basel Committee document Global systemically important banks: Assessment methodology and the additional loss absorbency requirement, November 2011). B, C, R, W, are all control dummy variables equal to one if the stock is subject to an intervention, respectively, at the bank, country, currency, or rest of the world level. DUMMYSTAGE2, DUMMYSTAGE3, are two control dummy variables equal to one if the observation lies in Global financial crisis period (15th September 2008 – 1st May 2010) and Sovereign debt crisis period (2nd May 2010 – 30th June 2012) respectively as stated in Ait Sahalia (2010,2012), and zero otherwise. CONS is the intercept of the model. IRCUT*DUMSTAGE2, LIQ*DUMSTAGE2, MON_EASE*DUMSTAGE2, IRCUT*DUMSTAGE3, LIQ*DUMSTAGE3, MON_EASE*DUMSTAGE3, are all interaction terms between sub-sample crisis period and expansionary monetary policy interventions. N/A for MON_EASE*DUMSTAGE2 means dropping of variables for perfect collinearity due to full empty sample for Monetary easing interventions in Stage 1.

	Y= CAR (0;0) for the LIBOR-OIS SPREAD				*y*= CAR (0;0) for the Banking-Industry Stock Indices				*y*= CAR (0;0) for G-SIFIs			
	(1)		(2)		(3)		(4)		(5)		(6)	
	coefficient	Std. Err.	coefficient	Std. Err.	coefficient	Std. Err.	coefficient	Std. Err.	coefficient	Std. Err.	coefficient	Std. Err.
MONPOLEXP	0.0003	0.0024	0.0011	0.0026	0.0014***	0.0005	0.0015***	0.0006	0.00168***	0.0005	0.00159***	0.0005
CONTR	0.0015	0.0053	0.0013	0.0068	-0.0001	0.0011	0.0008	0.0014	-0.00052	0.001	-0.00381**	0.0017
IR_UNCINCR	0.0016	0.0026	0	0.0051	0.0019***	0.0006	0.0017	0.0011	0.00103*	0.0006	-0.00045	0.001
FIN_SEC_POL	-0.0028	0.0027	-0.0028	0.0027	0.0005	0.0006	0.0005	0.0006	0.00008	0.0006	0.00005	0.0006
INA	0.0100**	0.0044	0.0100**	0.0044	-0.0016	0.001	-0.0015	0.001	-0.00391***	0.001	-0.00387***	0.001
OTHER	-0.0016	0.0025	-0.0018	0.0025	0.0007	0.0005	0.0006	0.0005	-0.00007	0.0005	-0.00019	0.0005
FISSTATE	-0.0044	0.0033	-0.0046	0.0033	0.0007	0.0007	0.0007	0.0007	0.0023***	0.0007	0.00226***	0.0007
END	0.0017	0.007	0.0019	0.007	0.0018	0.0015	0.0018	0.0015	-0.0001	0.0014	0	0.0014
RISKD1									-0.00047	0.0005	-0.00046	0.0005
RISKD2									-0.00057	0.0009	-0.00058	0.0009
RISKD3									-0.00028	0.0007	-0.00028	0.0007
B									-0.0053	0.0044	-0.00533	0.0044
C									0.00137*	0.0008	0.00154**	0.0008
R									0.00102	0.0008	0.0012	0.0008
W	0.0025	0.0032	0.0026	0.0032	-0.0005	0.0007	-0.0004	0.0007	0.00068	0.0008	0.00094	0.0008
DUMMYSTAGE2	-0.0032	0.003	-0.0043	0.0035	-0.0008	0.0006	-0.0009	0.0008	-0.00049	0.0006	-0.00128*	0.0007
DUMMYSTAGE3	-0.004	0.0031	-0.0026	0.0041	-0.0003	0.0007	-0.0001	0.0009	-0.00077	0.0006	-0.00113	0.0008
CONS	0.002	0.0039	0.0023	0.0042	-0.0005	0.0008	-0.0005	0.0009	-0.00114	0.0009	-0.00082	0.0009
CONTR*DUMSTAGE2			-0.0019	0.0107			-0.003	0.0023			N/A	N/A
IR_UNCINC*DUMSTAGE2			0.0044	0.0063			0.0009	0.0014			0.0033***	0.0012
CONTR*DUMSTAGE3			N/A	N/A			NA	NA			0.0046**	0.0021
IR_UNCINC*DUMSTAGE3			-0.001	0.0063			-0.0004	0.0014			0.0008	0.0012
Number of obs	2989		2989		7169		7169		17404		17404	

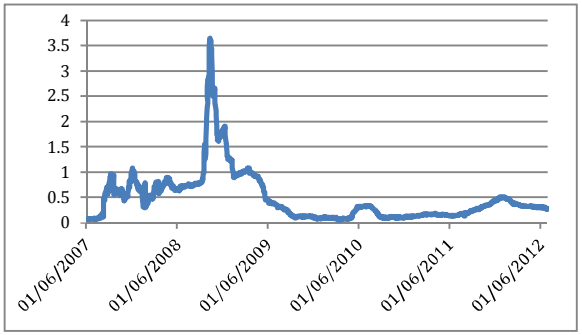
Table 7 - The effect of the Financial Policy Measures in the banking industry during the crisis

This table reports empirical results by running a follow up of Model 13 for financial policy announcements from single Central Banks over June, 2007 – June, 2012. Specifically, we include now a variable for each financial Policy instrument (and keep the other variables for each category of intervention) by using different response variables. In models (2), (4) and (6), we also interact each all monetary expansionary instrument with the phases of the financial crisis. ***,**,* denote that estimates are statistically significant at the 1, 5 and 10% levels. Specifically,MONPOLEXP is a dummy variable indicating expansionary measures taken by Central Banks; MONPOLRES is a dummy variable indicating restrictive measures taken by Central Banks; FIN_ASSET is a dummy variable indicating recovery measures for banks in form of asset purchase or ring-fencing of bad assets and asset guarantees; FIN_LIABL is a dummy variable indicating recovery measures for banks in form of guarantees for old or new liabilities, enhancement of depositor protection schemes, and provision of lender of last resort facilities; FIN_RECAP is a dummy variable indicating capital injections and nationalization (acquisition of controlling share); FISSTATE is a dummy variable indicating stimulus packages as financial support to countries, INA is a dummy variable indicating decisions allowing single banks to fail or decisions to bail out; OTHER is a dummy variable indicating administrative measures, restrictions on short selling and other announcements that do not belong to previous categories but are believed to generate a significant market reaction. END indicates the end of all interventions. B, C, R, W, are all control dummy variables equal to one if the stock is subject to an intervention, respectively, at the bank, country, currency, or rest of the world level. DUMMYSTAGE2, DUMMYSTAGE3, are two control dummy variables equal to one if the observation lies in Global financial crisis period (15th September 2008 – 1st May 2010) and Sovereign debt crisis period (2nd May 2010 – 30th June 2012) respectively as stated in AitSahalia (2010,2012), and zero otherwise. CONS is the intercept of the model. FIN_ASSET*DUMSTAGE2, FIN_LIABL*DUMSTAGE2, FIN_RECAP*DUMSTAGE2, FIN_ASSET*DUMSTAGE3, FIN_LIABL*DUMSTAGE3, FIN_RECAP*DUMSTAGE3 are all interaction terms between sub-sample crisis period and financial sector policy interventions

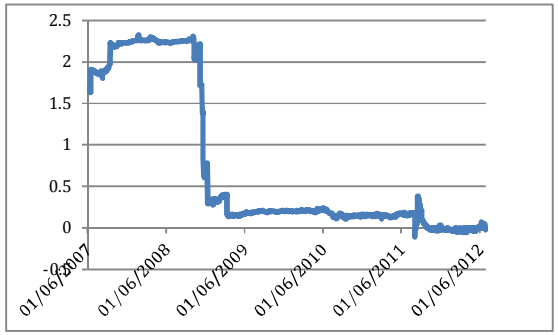
	Y= CAR (0;0) for the LIBOR-OIS SPREAD				*y*= CAR (0;0) for the Banking-Industry Stock Indices				*y*= CAR (0;0) for G-SIFIs			
	(1)		(2)		(3)		(4)		(5)		(6)	
	coefficient	Std. Err.	coefficient	coefficient	Std. Err.	coefficient	coefficient	Std. Err.	coefficient	coefficient	Std. Err.	coefficient
MONPOLEXP	0.0007	0.0023	0.0003	0.0024	0.0013***	0.0005	0.0013***	0.0005	0.00183***	0.00049	0.00175***	0.00049
MONPOLRES	0.0017	0.0025	0.0012	0.0026	0.0016***	0.0006	0.0016***	0.0006	0.00136**	0.00054	0.0012**	0.00055
FIN_ASSET	0.0013	0.0041	0.0136	0.0162	-0.0001	0.0009	-0.0066*	0.0034	0.00114	0.00088	-0.00641**	0.00296
FIN_LIABL	-0.0008	0.003	-0.0071	0.0103	-0.0002	0.0007	-0.0019	0.0019	0.00039	0.00066	-0.00601***	0.00174
FIN_RECAP	-0.0041	0.0035	-0.0001	0.0191	-0.0004	0.0008	-0.003	0.0041	-0.00052	0.00077	-0.00761**	0.00387
INA	0.0098**	0.0044	0.0095**	0.0044	-0.0017*	0.001	-0.0014	0.001	-0.0039***	0.00096	-0.00359***	0.00097
OTHER	-0.0013	0.0025	-0.0017	0.0026	0.0006	0.0005	0.0005	0.0005	0.00018	0.00053	-0.00005	0.00054
FISSTATE	-0.0043	0.0033	-0.0042	0.0034	0.0007	0.0007	0.0007	0.0007	0.00246***	0.0007	0.00244***	0.0007
INTERVEINTERR	0.0019	0.007	0.0018	0.007	0.0016	0.0015	0.0017	0.0015	0.00017	0.00142	0.00031	0.00142
RISKD1									-0.00047	0.0005	-0.00047	0.0005
RISKD2									-0.00057	0.00089	-0.00053	0.00089
RISKD3									-0.00029	0.00065	-0.00029	0.00065
B									-0.00559	0.00445	-0.0058	0.00445
C									0.00109	0.00076	0.00102	0.00076
R									0.00089	0.00079	0.00073	0.00079
W	0.0024	0.0032	0.0024	0.0032	-0.0004	0.0007	-0.0004	0.0007	0.00041	0.00084	0.00036	0.00084
DUMMYSTAGE2	-0.0034	0.003	-0.0039	0.0033	-0.0005	0.0006	-0.001	0.0007	-0.00058	0.00059	-0.00168***	0.00063
DUMMYSTAGE3	-0.0039	0.0031	-0.0042	0.0033	-0.0005	0.0007	-0.0009	0.0007	-0.00092	0.00059	-0.00173***	0.00063
CONS	0.0016	0.0038	0.0026	0.004	-0.0003	0.0008	0.0001	0.0009	-0.00114	0.0009	-0.00017	0.00093
FIN_ASSET*DUMSTAGE2			-0.012	0.016			0.007**	0.0034			0.00802***	0.0031
FIN_LIABL*DUMSTAGE2			0.0089	0.0097			0.0011	0.0021			0.0068***	0.00189
FIN_RECAP*DUMSTAGE2			-0.0001	0.0192			0.0033	0.0041			0.00805**	0.00396
FIN_ASSET*DUMSTAGE3			-0.0028	0.0237			0.0062	0.0052			0.00877*	0.00459
FIN_LIABL*DUMSTAGE3			0.0112	0.011			0.0042*	0.0024			0.00827***	0.00215
FIN_RECAP*DUMSTAGE3			-0.0181	0.0219			-0.0005	0.0047			0.00333	0.0044
Number of obs	2989		2989		7169		7169		17404		17404	

Figure 1 - Pattern of the Libor-OIS Spread between June 1st, 2007 and June 30th, 2012

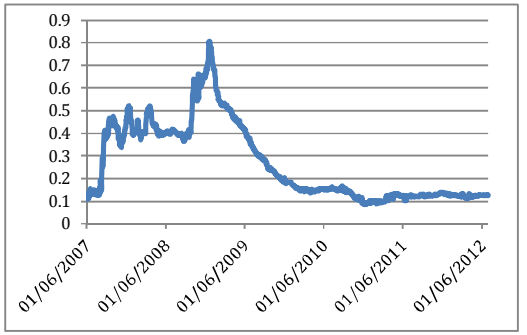
Panel A) US



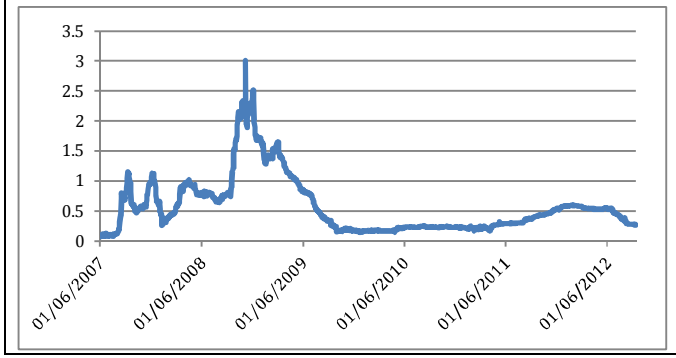
Panel B) Switzerland



Panel C) Japan



Panel C) United Kingdom



Panel D) Euro Area