The FSA put to the test: Maintaining market confidence during the financial crisis*

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Abstract

One of the main objectives of the UK Financial Services Authority (FSA) as the financial market regulator was to maintain market confidence. We examine whether the FSA achieved this objective during the recent financial crisis, a period when maintaining market confidence was of utmost importance. Analysing the period 2006-2009, we find that more positive tone in communications led to reduced market volatility, both in the overall stock market as well as in financial sector stocks in particular. This holds true for all types of FSA communication analysed. Stock returns were not strongly influenced. Furthermore, regardless of which top FSA official provided the communication, the effect was to lower volatility, with hardly an effect on returns. We also find a clear positive association between uncertainty in tone and volatility. As the FSA used the effect on volatility to measure achievement of its objective, our results overall indicate success on that objective.

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1 Introduction

Financial markets are based on trust and confidence in the solvency and liquidity of market participants, and the ability for continuous exchange. This includes confidence that contractual obligations will be met by market participants without interruption or outside intervention (Crockett, 1997), and that the playing field is level for all market participants and abuses are punished. The recent financial crisis has led to an unprecedented loss of confidence and uncertainty in the financial markets, and has demonstrated that the sudden disappearance of these systemic pillars leads to failures in the system and a possible breakdown of financial markets. The credit and liquidity crunch of 2008 has demonstrated that a loss of confidence among market participants can lead to a drying up of liquidity and freezing up of credit markets, which then severely disrupts and threatens the overall financial system (Brunnermeier, 2009). Instability in the financial sector may bring about significant economic costs as the overall economy requires a stable financial sector for its own functioning, with devastating consequences for the overall economy (see e.g. Levine, 2005; Reinhart and Rogoff, 2009; Knütter et al., 2011).

To prevent such adverse scenarios, national oversight bodies are charged with monitoring stability in the financial system and financial markets. On a macro level, predominantly central banks assume the role of monitoring stability of the overall financial system (see e.g. Knütter et al., 2011).[1] On a more micro-level, when it comes to monitoring financial markets, most countries maintain a dedicated financial regulatory authority to oversee capital markets and to take corrective action where needed to maintain or restore healthy functioning markets. In the United Kingdom (UK), the responsibility for overseeing the UK

[1] Some central banks (e.g. UK, Sweden) publish regular Financial Stability Reports "which review the condition of the financial system, identify and assess risks to the system, and suggest market or policy changes to address significant risk concerns" (Wilkinson et al., 2010, p. 41). For that purpose, they analyse financial market-based indicators such as Credit Default Swaps (CDS), stock prices, volatility, and credit spreads.

financial markets was given to the Financial Services Authority (FSA). The FSA was set up in 2001 as the official regulatory body for the financial services industry until its disbandment in 2013[2]. While its mandated objectives were generally similar to those of other countries' financial regulators, there was one specific task that set the FSA apart: Its mandated objective to maintain confidence in the UK financial system (FSA Annual Report 2012/13)[3]. While the Bank of England's (BOE) remit is the stability of the overall financial system, the FSA's mandate was focused on monitoring financial markets. Hence while the BOE issues Financial Stability reports on the overall financial system, the FSA had the specific task of maintaining market confidence.

The FSA used various channels to communicate with the market. These included the formal and quarterly Financial Risk Outlook (FRO), interviews and speeches, and parliamentary hearings. Maintaining market confidence is fundamental for the functioning of the financial system during good times, but becomes crucial during a crisis or market turmoil. During times of crisis and market panic, when confidence in the market is shaken or has disappeared, it has to be restored in order to ensure continuous trading and liquid markets. During these times, the market will be looking for clues from those bodies with deeper insight into the overall situation and critical issues in the financial system to obtain reassurance to continue their transactions. The FSA can spread confidence and send reassuring messages and thereby contribute to reducing uncertainty and anxiety in the market. This can calm markets and prevent interruptions or breakdowns. The tone of the communication is thereby of critical importance. Markets will interpret whether the FSA is overall more optimistic or pessimistic

[2] Following a restructuring of the UK's regulatory environment in 2012, the FSA was dissolved and its responsibilities taken over by its successor, the Financial Conduct Authority (FCA), and some part of its tasks now assumed by the Bank of England.

[3] The FSA's three other explicit objectives were (1) Public awareness: promoting public understanding of the financial system; (2) Consumer protection: securing the appropriate degree of protection for consumers; (3) The reduction of financial crime: reducing the extent to which it is possible for a business to be used for a purpose connected with financial crime.

about the condition of the markets, their stability, and their prospects. More positive tone will increase market confidence and more likely lead to continued or resumed normal business, whereas more pessimistic tone will make market participants more cautious in their behaviour and potentially scale back activities. Hence the tone of how the FSA communicates their assessment of the markets and its prospects are key to maintaining or restoring market confidence. If FSA communication is successful in maintaining or supporting confidence among market participants, it should reduce uncertainty and risk aversion, and be visible via lower volatility and better liquidity in financial markets. In light of the turmoil in the markets during the financial crisis, investigating the effectiveness of FSA communication during that period, whether it actually achieved its target of propping up and maintaining market confidence, is therefore an important issue to consider. Our paper addresses this issue and examines if, and to what extent, the FSA managed to influence market confidence during the recent financial crisis.

Prior research in the area has tended to focus on central bank communication. For instance, studies have shown that central bank communication affects economics variables such as interest rate expectations (e.g. Musard-Gies, 2006) or exchange rate volatility (e.g. Jansen and De Haan, 2005), but also more financial markets indicators such as stock returns and volatility (e.g. Hayo et al., 2015; Schmeling and Wagner, 2016). Closer to our investigation, some studies (e.g. Born et al., 2012; Born et al., 2014) have focused on central banks' communication regarding financial stability and the effects on financial markets. They have provided evidence that the tone of Financial Stability Reports (FSRs), speeches, and interviews during the financial crisis had a significant and potentially long-lasting effect on stock market returns, and also tended to reduce market volatility (Born et al., 2014). Born et al. (2012) provide evidence that the release of FSRs reduces volatility in returns on both the

financial sector stocks and the overall market. Moreover, they also find that returns increase after optimistic FSRs, and decrease after pessimistic FSRs.

So while there is evidence that Central Bank communication can exert a calming influence on markets and reduce uncertainty, the effect of FSA communication on confidence in financial markets has not been examined. Hence not much is known about whether communication by the UK financial regulator, the FSA, has achieved its explicit objective of maintaining market confidence in the most testing of situations, the most severe financial crisis of the last decades. Our study address this gap in the literature and analyses whether the tone of FSA communication during the depths of the recent financial crisis from 2006 to 2009 had a discernible impact on market confidence. As such, our investigation is akin to a case study since the FSA was only in existence during 2001 to 2013, thus allowing the examination of a mixed data set around an extraordinary situation in the financial markets. We provide specific evidence on the effectiveness of the UK regulatory arrangements during the most testing of times, when the FSA successfully achieving its objective of maintaining market confidence not only is most challenging, but also needed the most.

We content analyse a sample of FSA communication drawn from various channels (Quarterly Financial risk outlook, speeches, interviews and parliamentary hearings) and measure the strength of positivity and negativity in tone for the period from 2006 to 2009. Measuring the effect on market confidence with the same indicator the FSA itself used, market volatility, and an EGARCH model, we provide evidence that FSA communication events have significantly decreased market volatility. More positive tone in communication reduces market volatility, regardless of the type of communication or the FSA official from which the communication emanates. This holds for both overall FTSE 100 volatility as well as financial sector volatility. There is less strong evidence for an effect on average returns, which is mostly observed in overall FTSE returns. Moreover, we also find evidence that uncertainty in tone

affects market volatility. Our findings have also implications for the UK regulatory authorities to support evaluations of the effectiveness of regulatory arrangements and improvements to the current arrangements in place.

The rest of the paper is organised as follows. The next section reviews the existing literature. Section 3 presents the methodology, and Section 4 presents the analysis and discusses the results. Section 5 concludes the paper.

2 Prior research

While a lot of research has examined the effect of central bank communication on economic indicators, primarily interest rates and exchange rates, far less attention has been paid to the impact on more financial markets based indicators, such as stock prices and volatility, especially of communication regarding financial stability and confidence. Overall, the studies have provided evidence that this type of communication affects markets.

For instance, some studies have examined the tone of statements and the respective strength of the market impact. Rozkrut et al. (2007) analyse a sample of central bank communication from the Czech Republic, Hungary, and Poland, for the period 2001-2004, and show that statements implying monetary tightening have a positive impact on interest rates, mostly on short and medium term maturities. Communication was also found to increase interest rate volatility. Hayo et al. (2015) examine different types of Federal Reserve communication for the period 1998-2009 and show that markets move according to the tone of the statement: A negative economic outlook leads to lower stock returns, and more hawkish (dovish) communications are linked to higher (lower) bond yields. Moreover, all communication showed stronger market reactions during the financial crisis period. In terms of changes in tone, Musard-Gies (2006) provide evidence that, based on 66 press conferences

held after the ECB monetary policy council interest rate decisions between 1999-2004, the market reacts to the change in tone in the statements between meetings, rather than the absolute tone, and that the effect is mostly apparent at the short end of the yield curve. Hawkish (dovish) statements tend to raise (decrease) short-and long-term interest rates, with the strongest effect on the short end of the yield curve. Moreover, Schmeling and Wagner (2016) explore the effect of changes in the tone of the ECB president during press conferences on asset prices for the period 1999-2014. They find that when tone becomes more positive (negative) from the previous event, stock prices increase (decrease), with the effect becoming stronger the more time passes after the conference. They also find evidence that tone affects asset prices via affecting risk perception and aversion: More positive tone is associated with decreasing corporate credit spreads and decrease in the VSTOXX implied risk aversion. Similar results are found for the US and Fed communication.

Studies have also shown that the market reacts differently to communication by committees or by individual members. Market reaction to speeches and statements is significantly stronger when given by the Chairman rather than other board members (e.g. Andersson et al., 2006; Ehrmann and Fratzscher, 2007; Hayo et al., 2015). On the market effect of parliamentary hearings, the evidence is mixed. While Kohn and Sack (2003) find that congressional testimonies by the US FOMC Chairman had a significant effect on interest rates during their sample period 1989-2003, and Connolly and Kohler (2004) show that parliamentary hearings have a significant effect on interest futures in New Zealand, Australia and the UK and US during 1997-2004, Reeves and Sawicki (2007) did not find evidence that speeches by UK MPC members and testimonies to a parliamentary committee affect market expectations of interest rates during the period 1997-2004.

Most closely related to our study are Born et al. (2012) and Born et al. (2014), who study the effect of central bank communication regarding financial stability on financial market

variables. Born et al. (2012) examine a sample of 87 Financial Stability Reports (FSR) and 89 speeches and interviews by central banks from emerging economies for the period 2001-2009. They find that the views in the FSR regarding financial stability affect the financial market as expected: Optimistic (pessimistic) FSR are followed by an increase (decrease) in overall indices stock returns, with an even stronger effect on specific financial sector stock indices. FSR also reduce stock market volatility. Speeches and interviews had no effect on stock market returns, but were linked to an increase in volatility of interest rates and exchange rates. Similar results were obtained when focusing on the financial crisis period from 2007 on. Born et al. (2014) analyse the effects of central bank communication regarding financial stability on the financial market using a sample of more than 1000 Financial Stability Reports (FSR), speeches and interviews by 37 central banks for the period 1996-2009. The findings show that FSR have a significant and potentially long-lasting effect on stock market returns, with markets moving in the direction of the content (pessimistic/optimistic). FSR also tended to reduce market volatility, especially if the FSR was optimistic about the risks to financial stability. Speeches and interviews, by contrast, had little effect on market returns and did not generate a volatility reduction. Moreover, FSR had no systematic impact on financial markets during the 2007-10 financial crisis, while speeches and interviews by governors had a significant effect. Those findings suggest that during a crisis situation, speeches and interviews are much more influential.

Taken together, it becomes clear that while prior research has extensively examined central bank communication, including Financial Stability related communication, and provided evidence for an effect on financial markets, the effect of FSA communication has not yet been examined. Hence if and to what extent the FSA achieved its objective of maintaining market confidence during the recent financial crisis is not known. The next section lays out our approach to addressing this question.

3 Methodology

3.1 Data and sample

The sample consists of all available FSA communication during the period 2006 to 2009, which covers the run-up to the financial crisis, the depth of the crisis, and the immediate aftermath with decreasing intensity. This allows us to follow the changes in FSA communication over time with the unfolding of the crisis, and how the FSA has attempted to respond to outbreak of the crisis and to maintain market confidence. The data examined are the quarterly Financial Risk Outlook (FRO), speeches and interviews given by top FSA officials, and parliamentary hearings. A research assistant collected all FSA communications during the sample period. FRO are available from the FSA website's archive. Speeches and interviews given by top FSA officials in which market confidence was either the focus of the communication or was touched upon were identified via the FSA website archive and Press cutting services. Transcripts of parliamentary hearings involving either the head of the FSA or another top official that had a connection with market confidence were obtained from the Parliamentary Select Committee website. During collection we recorded (1) the communication channel (Financial Risk Outlook, speech, interview, or parliamentary hearing) and (2) for all non-printed communication, i.e. verbal public appearances by FSA officials, we record the speaker. We recorded the exact date of each communication event, which is crucial for an analysis of the effect of FSA communication on the market. Following Born et al. (2010), we allocate communication events during weekends to the following Monday and communications made in the evening to the next trading day, thus analyse the effect of events occurring out of trading hours as the effect on the next trading day. In total, our sample is composed of a total of 77 communication events: Four Financial Risk Outlooks, 55 speeches, 7 interviews by FSA officials, and 11 parliamentary hearings. Table 1 presents a summary of the data.

[Insert Table 1 here]

3.2 Measuring FSA communication content

We follow previous research in the area (e.g. Bligh and Hess, 2007; Armesto et al., 2009; Born et al., 2012; Born et al., 2014) and use the text-analysis software DICTION (version 7.1.3) to analyse the content of FSA communications and to capture positive and negative tone of the communication. As DICTION's in-built dictionary is a general English language dictionary, it is not necessarily focused on financial information (Kearney and Liu, 2014). Studies testing the dictionary in a financial context (e.g. Henry and Leone, 2009; Li, 2010; Loughran and McDonald, 2011) highlight that certain words may have a different use and meaning in financial communication which lead to misclassification of certain words in a financial context.

For that reason, our study uses the dictionary by Loughran and McDonald, 2011) (LM) who have developed a comprehensive dictionary specifically for the use with financial documents to address this limitation. It is based on the word lists of the General Inquirer (GI) software[4], and LM have adapted it to the finance area. It has become the dictionary of choice in the recent finance literature analysing companies' communication with the financial market (e.g. Doran et al., 2012; Garcia, 2013; Jegadeesh and Wu, 2013; Chen et al., 2013; Liu and McConnell, 2013; Loughran and McDonald, 2013; Huang et al., 2014; Ferguson et al., 2014). Schmeling and Wagner (2016) have recently also applied it to analysing central bank statements.[5] As the FSA material we analyse targets the financial market, thus employing a more finance-related language, we consider the LM dictionary as more appropriate for our

[4] The General Inquirer (GI) software is another widely used content analysis software in research in the social sciences as well as finance (e.g. (e.g. Tetlock, 2007; Feldman et al., 2010; Tetlock et al., 2008; Loughran and McDonald, 2011; Engelberg et al., 2012; Ferris et al., 2013; Twedt and Rees, 2012). Like DICTION, however, it is a general English language dictionary, thus shares the same limitations and disadvantages as DICTION when applied in a finance context, so its use for our study is not recommendable (see Henry and Leone, 2009; Li, 2010; Loughran and McDonald, 2011).

[5] See Loughran and McDonald (2016) for a recent survey of text analysis studies in accounting and finance.

purposes. The LM list contains 2,355 words in the 'negative' category, 354 words in the 'positive' category, and 297 words denoting 'uncertainty'.[6]

To measure FSA communication, we follow previous studies (e.g., Kothari et al., 2009; Frankel et al., 2010; Loughran and McDonald, 2011; Twedt and Rees, 2012; Chen et al., 2013; Ferguson et al., 2014; Huang et al., 2014); Tama-Sweet, 2014) and classify the content of each individual communication event (FRO, speech, interview, or parliamentary hearing) into either more positive or negative tone by taking the percentage of the number of positive (negative) words to the total number of words in the text. We also capture the level of uncertainty in the texts by measuring the tendency. This provides information about the level of uncertainty expressed by the FSA and the subsequent effect on market confidence. Analogous to the tones above, we follow Loughran and McDonald (2011) and measure uncertainty by taking the percentage of the number of words denoting uncertainty to the total number of words in the text.

To examine the magnitude of the effect of FSA communication events on market confidence in our econometric analysis, we create a scale indicator to measure the strength of the positivity or negativity in the communication. Similar to previous studies on the effect of central bank communication on the market[7] we convert our positivity/negativity scores into a scale indicator ranging from +2 (rather optimistic, thus presumably positive for the market) to -2 (rather pessimistic, thus presumably negative for the market). This indicator measures the magnitude of the market reaction to the strength of positivity/negativity of the communication. Combining this indicator with the information on the type of communication event, or which

[6] The word list (latest update: March 2015) is available from Bill McDonald's website at the University of Notre Dame: http://www3.nd.edu/~mcdonald/Word_Lists.html

[7] This literature uses a variety of indicators, for instance -1 to +1 (e.g. Born et al., 2012), -2 to +2 (e.g. Musard-Gies, 2006; Rosa and Verga, 2007), -3 to +3 (e.g. Berger et al., 2011).

FSA official provided verbal communication, gives a powerful tool to examine what type of FSA communication has the strongest (weakest) influence on the market.

3.3 Empirical models

To determine the effect of FSA communication on market confidence, we examine the effect on UK equity market volatility, one of the key metrics used by the FSA to measure its success against its market confidence objective (see FSA Annual Report 2012/2013). Equity market volatility is often used to measure uncertainty and risk aversion (see Bekaert et al., 2013; Schmeling and Wagner, 2016), and Crockett (1997) highlights that asset price volatility and confidence are linked. In this context, Ehrmann and Fratzscher (2007) stress that influencing volatility and uncertainty is one of the main aims of central bank and regulator communication with the financial market. To measure its success in maintaining market confidence, the FSA explicitly looks at market volatility. If FSA communications achieve their goal, we will find reduced post-event volatility. This view is supported by Schmeling and Wagner (2016) who suggest, and find, that more positive tone by ECB President statements lowers risk aversion in the market and therefore lowers implied equity volatility. Our approach is consistent with previous studies that also measured the impact of communication on the volatility of financial market variables (see e.g. Blinder et al., 2008; Knütter et al., 2011; Schmeling and Wagner, 2016).

To measure the effect on volatility, we follow previous studies (e.g.; Ehrmann and Fratzscher, 2007; Ehrmann and Fratzscher, 2009; Born et al., 2012) and specify an exponential GARCH (EGARCH) model as suggested by Nelson (1991), which explicitly accommodates the effects on asymmetric volatility. We examine the effect on the conditional mean and conditional volatility of the daily returns of the FTSE 100 stock index, the same measure the FSA itself uses. Stock returns should be positively affected by market confidence. In addition,

we follow Born et al. (2014) and analyse the effect on stocks from the financial sector. These include FTSE 100 banks, insurance companies, and general financial services. Born et al. (2014) suggest that focusing on the financial sector should be the best way to analyse effects of communication regarding financial stability. The equation for the mean is as follows:

$$r_t = \alpha + \beta COM_t + \gamma r_{t-1} + \delta z_t + \varepsilon_t$$

where r_r is the daily returns on the FTSE 100 Index, COM_t is our measure for FSA communication entered as a dummy variable that takes a value from +2 to -2 on days with a communication event, and 0 otherwise. The dummy also indicates the type of communication event that has taken place on that day: Financial Risk Outlook (COM_t^{FRO}), Speech (COM_t^S), Interview (COM_t^I), or Parliamentary hearing (COM_t^{PH}); r_{t-1} is past returns, and z_t is a vector of dummies that control for the day of the week effect.[8] The dummies take on the value of 1 if the day of the week is either a Monday, Tuesday, Wednesday, or Thursday, and 0 otherwise.[9] $\varepsilon_t \sim (0, h_t)$ is assumed to follow a conditional normal distribution with a zero mean and a conditional variance h_t. The conditional variance h_t can be expressed as

$$log(h_t) = \tau + \omega\left(\left|\frac{\epsilon_{t-1}}{\sqrt{h_{t-1}}}\right| - \sqrt{2/\pi}\right) + \emptyset log(h_{t-1}) + \kappa\left(\frac{\epsilon_{t-1}}{\sqrt{h_{t-1}}}\right) + \lambda COM_t + \xi z_t$$

where h_t is the conditional variance of r_t, h_{t-1} the past variance, ϵ_{t-1} past innovations, COM_t the communication dummies with a value between +2 and -2 on event days, and 0 otherwise, and z_t the vector of the day of the week controls. Model estimation is done by Maximum Likelihood. Stock prices were obtained from Datastream.

[8] It is a widely evidenced phenomenon in the literature that stock return volatility differs with the day of the week (e.g. Berument and Kiymaz, 2001; Kiymaz and Berument, 2003; Charles, 2010). A variety of possible explanations has been put forward (see Charles, 2010). It is a standard control variable in literature on the effect of central bank communication on market volatility (e.g. Jansen and De Haan, 2005; Ehrmann and Fratzscher, 2007; Ehrmann and Fratzscher, 2009; Born et al., 2011; Born et al., 2012), so we follow this approach.

[9] Friday is excluded to avoid the 'dummy trap' (Kiymaz and Berument, 2003; Charles, 2010). All analysis is therefore in relation to Friday as the baseline (see Charles, 2010).

We expect that positive (negative) communications to have a positive (negative) effect on returns and volatility. Further, we also expect that a more positive (negative) outlook for risk would lead to a stronger reduction (increase) in volatility. We analyse the effect of each type and source (i.e. which FSA official) separately since there is evidence that those communication channels have a different and effect (see e.g. Knütter et al., 2011; Born et al., 2012).

4 Results

4.1 Descriptive analysis

Table 1 contains a summary of the data. The table shows that there was not much communication by the FSA with the market during 2006 and 2007. While the number of communication events doubled from 2006 to 2007, from the pre-crisis period to the early stages of the financial crisis, it was still at a low intensity. This changes when the financial crisis strikes with full force in 2008. The number of communication events increases threefold in 2008, thus the FSA significantly steps up its communication with the financial market. This includes all types of events, but mostly speeches (see Table 1). Analysis of the dates of the communication events (not reported) also shows that the majority of communication events took place before the collapse of Lehman Brothers on 15th September 2008. Thus even before this decisive event, the FSA significantly increased their efforts at communicating with the market. This increase in communication is sustained throughout 2009, the depths of the financial crisis, when the highest number of communication attempts (32) with the market rakes place. Taken together, this suggests that the FSA, along with the increase in the severity of the crisis, increased the frequency of their communication correspondingly.

[Insert Table 2 here]

Table 2 presents the results of the descriptive analysis. The results show a clear change in the positivity, negativity, an uncertainty in communication over the crisis period. While the FSA's communications showed a neutral tone with balanced negativity and positivity in 2006, this changed drastically in 2007 with the onset and first effects of the financial crisis. Communications became significantly more negative, with an increase of 48% in overall negativity of communication, clearly highlighting the FSA's increasing concern with the ongoing events. Despite that, communication became also slightly more positive, potentially reflecting a more positive outlook for a future resolution of the crisis since the crisis had not yet reached its climax. Uncertainty level remained unchanged from the prior year. From 2007 to 2008, with the slowly unfolding crisis, the FSA's tone became less negative, but also significantly less positive. Positivity declined by 27%, which may reflect increasing concerns about the situation. Negativity reduced by a lesser 15%. In light of the majority of 2008 communication occurring before the Lehman Brothers event in September 2008, it may be that the expected negative effects from the unfolding financial crisis where still at a low level at that stage, so the FSA may have shown reduced negativity, which is reflected in the data. The FSA's tone also became significantly less uncertain. This 29% reduction in uncertainty may also stem from the initial effects of the crisis being less severe and visible prior to Lehman, thus suggesting a resolution of uncertainty, if only partly and temporarily.

In 2009, after Lehman, and when the most severe effects had started to unfold (i.e. the credit crunch), all measures of the FSA's communication tone dropped further from 2008. The FSA became less positive, negative, but also less uncertain. This clearly shows that the FSA had become more concerned about the markets and market confidence. Positivity had dropped 40% from 2006 levels prior to the crisis, thus reflecting the FSA's much reduced positivity regarding the financial system. The fact that, in 2009, negativity level was nearly double the level of positivity after being evenly balanced in 2006, suggests that the FSA had increasingly

focused on highlighting the negative aspects more than the positive aspects, in an attempt to point to possible issues and to caution the market. Uncertainty in 2009 had nearly halved from 2006 levels, which may reflect that the FSA, in 2006, was aware of built-in imbalances and rising risk in the system, but concerned and uncertain how those issues would be resolved in the future. In 2009, there was much more clarity and the effects form the financial crisis and credit crunch that had fully unfolded, thus less uncertainty.

4.2 Empirical results

4.2.1 Effect of type of FSA communication on financial markets

The results of the first empirical analysis of the effect of different types of FSA communication on indicators of market confidence are presented in Table 3.

[Insert Table 3 here]

Starting with the annual Financial Risk Outlook (FRO) in Panel A, we can see that the publication of FROs does not affect the means returns (column 2) of the FTSE 100 or the FTSE 100 Financial Sector returns. While the positive association suggests higher returns linked to the publication of FROs, the effect is not significant. By contrast, we find a significant negative association with volatility (column 3) of FTSE 100 returns. This suggests that the release of more positive FROs leads to reduced volatility, thus FSA communication may have the intended effect of bolstering market confidence. Next, the results in Panel B show that speeches by FSA officials seem to have a much stronger effect on average returns and volatility than FROs, with a significant negative effect on average FTSE returns. Financial sector returns are unaffected. This suggests that the tone and content move overall markets, but lead to lower returns. It may be that the tone of the speeches is not perceived positively by the market, hence lower returns. By contrast, speeches have a significant effect on volatility, both overall and the financial sector (column 3), possibly because speeches are ‘less stale’ than the prescheduled

and therefore expected FRO, from which some content may already have been discussed and known to the market, hence priced in. Consistent with the results for FRO, speeches lead to lower volatility of FTSE 100 returns, which suggests that the market perceives more positive tone in speeches as good news and possibly reducing uncertainty held by market participants. This creates confidence in the market, thus reducing volatility. The effect on the financial sector, however, seems to indicate increased volatility following speeches by FSA officials. It is possible that the impact of the communication on the financial sector may be less clear than the impact on the overall market, thus increasing volatility in that sector. Moreover, as Dewachter et al. (2014) point out, volatility following announcements and events may increase as market participants may interpret information and its likely impact differently, leading to different reactions. Hence while the potential effect of the information on the overall market may be easy to discern (thus more confidence and lower volatility), the consequences for the financial sector may be more ambiguous, thus leading to higher volatility.

The results for interviews by FSA officials (Panel C) are strikingly similar to those of speeches. Interviews with a more positive tone lead to significantly lower FTSE 100 returns, while financial sector returns remain unaffected (column 2). As with speeches, we find that interviews with a more positive tone significantly reduce (increase) volatility for FTSE 100 returns (financial sector returns). This may again suggest that more positive tone in interviews may be perceived as positive for the overall market and economy, thus increasing market confidence and therefore lower volatility. The effects on the financial sector might not be perceived as so clear-cut and easy to understand, and fail to foster confidence in this market segment, therefore increasing volatility.

Lastly, the results for parliamentary hearings in Panel D show a very different picture to the other types of communication. As can be seen from column 2, while hearings have no effect on FTSE 100 average returns, they have a significant negative effect (1% level) on

financial sector returns. This result is not surprising since those parliamentary hearings are on issues in the financial market and the financial system, especially during the depth of the financial crisis. The matters discussed and their tone are of direct relevance to the financial sector, but much less for the overall market. More specifically, while more positive tone in the FSA officials' communication during such hearings may indicate confidence regarding the stability and working of financial markets, the nature of these hearings means that failings in the financial sector may have been discussed, along with possible measures (already implemented or planned) that may negatively impact the financial sector. Hence a strongly negative reaction to such hearings. The effect of hearings on volatility (column 3) leads to a uniform reduction in volatility, both for FTSE 100 and the financial sector (1% significance level). This indicates that more positive tone in these hearings, which tend to be broadcast live on television, thus can be traded upon instantly by the market, can provide confidence in the market and thereby decrease volatility.

4.2.2 Effect of source of FSA communication on financial markets

[Insert Table 4 here]

Table 4 presents the results of our analysis of the effect of FSA communication on financial markets by source of communication. As with the analysis of effect by type of communication, we examined the effect on financial markets separately for who made the communication, that is which type of FSA official: The Chairman, the Chief Executive, or other top ranking officials. As can be seen, more positive communications by the FSA Chairman have no effect on FTSE 100 average returns (column 2), but lead to a significant reduction in FTSE 100 return volatility (column 3). This suggests that communication by the Chairman, the most senior and authoritative figure in the FSA, while not impacting on returns, manages to spread and increase confidence in the market overall, as evidenced by lower FTSE 100 volatility. The insignificant

result for financial sector volatility further indicates that this communication has a positive and calming effect on general market confidence, and not necessarily specifically on financial sector confidence. The results for communication by the FSA Chief Executive (Panel B) are similar to our findings for the Chairman. Chief Executive communication does not influence FTSE 100 returns (column 2), whereas it leads to a significant reduction in volatility, this time for both the FTSE 100 overall and the financial sector as well (see column 3). The results indicate that more positive tone in FSA Chief Executive communication is successful at bolstering confidence in the financial markets, leading to a reduction in volatility. Panel C presents the effect of other FSA top officials' communication on the markets. Somewhat surprisingly, as can be seen in column 2, more positive tone in communications by FSA officials other than the Chairman or Chief Executive have a significant negative effect on FTSE 100 returns (1% level). This suggests that the market does not perceive those officials communication to be positive for the market, hence leading to lower returns. By contrast, consistent with the results in Panel A and B for Chairman and Chief Executive, more positive communication by other officials also leads to a reduction in volatility. This is consistent with a more positive tone sending reassuring messages to the market, which are perceived as such, and therefore lead to increased market confidence and reduced volatility. Finally, we find no effect of communication by other FSA top officials on the financial sector, neither on returns nor on volatility.

4.3 Additional analysis

4.3.1 Comparison of the *Pre-Lehman* and *Post-Lehman* period

The distribution of FSA communication over the sample period in Table 1 showed that the majority of communication had taken place in the second half of the sample period, in 2008 and 2009, particularly after the Lehman Brothers collapse on 15th September 2008. To test

whether the tone in communication has changed after that event, which may have led to a different effect on market confidence, we split the sample into a pre-Lehman and post-Lehman period and test the effect separately. The results are presented in Table 5.

[Insert Table 5 here]

First, the effect on average returns. FROs consistently have no effect on mean returns, for both FTSE 100 and financial sector, for both subsample periods. By contrast, FROs reduce FTSE 100 volatility in both periods, and financial sector volatility marginally in the *Pre-Lehman* period. Speeches by FSA officials did not have an effect on average returns before Lehman, but lead to a significant reduction in financial sector returns *Post-Lehman*. Interviews by FSA officials had a significant negative effect on average returns in the *Pre-Lehman* period, but lost their effect after Lehman on FTSE 100 returns while leading to a significant increase in financial sector returns *Post-Lehman*. Parliamentary hearings, when looking at the subsamples, lose their effect on returns. Second, the effect on volatility. For FROs (Panel A), we see a consistent significant negative effect on volatility, even if it loses strength *Post-Lehman* and loses its effect on financial sector returns. A similar effect can be observed for Speeches (Panel B), Interviews (Panel C), and parliamentary hearings (Panel D) by FSA officials. While the tendency of a negative effect on returns remains intact, the effects become less significant *Post-Lehman* with, again, a loss of effect on financial sector returns.

Taken together, the results from analysing the effect of FSA communication before and after the Lehman collapse suggest that FSA communication did not necessarily have the desired effect of reducing market confidence during those turbulent *Post-Lehman* times when the FSA's calming hand would have been needed most to provide market confidence.

4.3.2 Effect of uncertainty in FSA tone on financial markets

We also examine whether uncertainty in the tone of FSA communication affects the markets. The measure of uncertainty is defined in the methodology section. The results are presented in Table 6. Panel A displays the results for the entire sample period, while Panel B shows the split for the period *Pre-Lehman* and *Post-Lehman* separately. As we can see from Panel A, uncertainty in the tone did not influence average returns, neither for the overall market (FTSE 100) nor for financial sector returns. By contrast, more uncertainty in tone clearly increases volatility in the markets, both in the overall FTSE 100 and in the financial sector. This result is intuitive since, if the financial regulator displays more uncertainty about the markets and their functioning, this will translate into a negative market reaction in terms of heightened uncertainty among participants, less confidence, and ultimately higher volatility. As can be seen from Panel B, we find similar and consistent results for both the *Pre-Lehman* and *Post-Lehman* period. Uncertainty in FSA tone does not affect average market returns (except a marginal positive effect on FTSE 100 returns *Pre-Lehman*), while it leads to significantly higher volatility. This also suggests that lower uncertainty in FSA tone will lead to less market volatility, which is consistent with the objective of FSA communication bolstering and spreading market confidence, and would be visible via lower volatility. So taken together, this suggests that the FSA was somewhat successful in achieving their stated objective of maintaining market confidence.

[Insert Table 6 here]

5 Conclusion

This study examines how successful the Financial Services Authority (FSA), in its role as the UK financial markets regulator, was in achieving its stated objective of maintaining confidence in the financial markets. We focus on the recent financial crisis and the period 2006 (the run-up to the crisis) to 2009 (the year after the Lehman Brothers collapse) and analyse whether the

tone in FSA communication had a discernible impact on market confidence during this time of severe crisis. We find evidence that FSA communication with the markets had some success in spreading and fostering confidence. The results show a clear reduction in market volatility following communication events, both for the overall stock market and the financial sector more specifically. This holds true for all types of FSA communication analysed. The effects on stock returns are less strong. While only Speeches and Interviews by top FSA official affect overall stock market returns, there is no effect on financial sector returns. Further analysis confirmed this relationship, in that regardless of which top FSA official provided the communication, the effect was to lower volatility, with hardly an effect on returns. In addition, we also find a clear positive association between uncertainty in tone and volatility: higher (lower) uncertainty would lead to higher (lower) volatility. Taken together, as the FSA itself used the effect on volatility to measure achievement of its objective, our results overall indicate success on that objective.

Our evidence is consistent with previous research (e.g. Ehrmann and Fratzscher, 2009; Born et al., 2012; Born et al., 2014) showing that Central Bank communication influences financial markets. The findings are also relevant for the UK regulatory authorities to support evaluations of the effectiveness of regulatory arrangements and improvements to the current arrangements in place.

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Table 1. Summary Statistics for FSA communication types

Year	FRO	Interview	Speech	Hearing	Total
2006	1		4		5
2007	1		8	1	10
2008	1	4	18	7	30
2009	1	3	25	3	32
Total	4	7	55	11	77

Notes: The FSA communication examined are the quarterly Financial Risk Outlook (FRO), speeches and interviews given by top FSA officials, parliamentary hearings, and other oral evidence.

Table 2. Average tone characteristics of FSA communication

	Average tone in FSA communication in percentages		
	Positive	**Negative**	**Uncertainty**
Year			
2006	0.23%	0.23%	0.24%
2007	0.26%	0.34%	0.24%
2008	0.19%	0.29%	0.17%
2009	0.14%	0.26%	0.13%

Notes: This measures the average number of positive, negative, or uncertainty words in each communication as percentage of overall words in each communication.

Table 3. Effect of type of FSA communication on financial markets

	Mean	Volatility	Log-Likelihood
Panel A			
FRO			
FTSE 100	0.337	-0.074**	-1749.517
	(1.343)	(0.029)	
FTSE 100 Financial Sector	0.004	-0.077	2082.64
	(0.099)	(0.096)	
Panel B			
Speech			
FTSE 100	-158.803**	-0.072**	-1748.342
	(65.052)	(0.029)	
FTSE 100 Financial Sector	-1.364	2.472***	2083.093
	(1.046)	(0.060)	
Panel C			
Interview			
FTSE 100	-583.419***	-0.066**	-1745.251
	(92.108)	(0.029)	
FTSE 100 Financial Sector	4.883	2.433***	2082.822
	(5.766)	(0.059)	
Panel D			
Hearing			
FTSE 100	0.158	-0.0719**	-1748.536
	(0.563)	(0.029)	
FTSE 100 Financial Sector	-3.532***	-2.088***	1973.436
	(0.644)	(0.099)	

Notes: Numbers in brackets denote standard errors. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Table 4. Effect of source of FSA communication on financial markets

	Mean	Volatility	Log-Likelihood
Panel A			
Chairman			
FTSE 100	0.482	-.0754**	-1749.093
	(1.041)	(0.029)	
FTSE 100 Financial Sector	0.001	-0.031	2082.432
	(0.001)	(0.102)	
Panel B			
Chief executive			
FTSE 100	0.130	-0.0742**	-1749.406
	(0.251)	(0.029)	
FTSE 100 Financial Sector	0.001	-0.211**	2080.138
	(0.003)	(0.098)	
Panel C			
Other			
FTSE 100	-0.7260***	-0.075**	-1748.06
	(0.278)	0.029	
FTSE 100 Financial Sector	-0.004	-0.089	2082.996
	(0.003)	(0.095)	

Notes: Numbers in brackets denote standard errors. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Table 5. Effect of type of FSA communication on financial markets pre/post Lehman Brothers bankruptcy

	Mean	Volatility	Log-Likelihood
Panel A			
FRO			
Pre-Lehman			
FTSE 100	-1.083	-0.157***	-1009.094
	(2.465)	(0.055)	
FTSE 100 Financial Sector	-0.004	-.055*	2060.573
	(0.099)	(0.033)	
Post-Lehman			
FTSE 100	-1870.051	-0.0583*	-674.806
	(457209.4)	(0.031)	
FTSE 100 Financial Sector	77.785	-0.207	404.782
	(3058.504)	(0.288)	
Panel B			
Speech			
Pre-Lehman			
FTSE 100	-.1599	-0.174***	-1008.405
	(0.166)	(0.057)	
FTSE 100 Financial Sector	0.398	-0.056*	2060.622
	(1.573)	(0.033)	
Post-Lehman			
FTSE 100	-162.672	-.052*	-674.213
	(133.828)	(0.029)	
FTSE 100 Financial Sector	-5.155**	0.219	407.173
	(2.315)	(0.302)	
Panel C			
Interview			
Pre-Lehman			
FTSE 100	-0.112***	-0.166***	-1008.754
	(0.039)	(0.056)	
FTSE 100 Financial Sector	-0.004**	-0.0568*	2063.842
	(0.002)	(0.033)	
Post-Lehman			
FTSE 100	0.291	.-0.054*	-674.303
	(0.294)	(0.030)	
FTSE 100 Financial Sector			
	0.007**	0.291	406.071
	(0.034)	(0.298)	
Panel D			
Hearing			
Pre-Lehman			
FTSE 100	-5.563	-.1574**	-1007.877
	(111.453)	(0.054)	
FTSE 100 Financial Sector	0.008	-0.063*	2061.501
	(0.009)	(0.034)	
Post-Lehman			

FTSE 100	-0.679	-0.057*	-674.829
	(0.786)	(0.030)	
FTSE 100 Financial Sector			
	-45.621	-0.143	404.518
	(131.554)	(0.288)	

Notes: Sample is split into pre-/post-Lehman bankruptcy period with cut-off 15th September 2008; Numbers in brackets denote standard errors. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Table 6. Effect of uncertainty in FSA tone in communication on financial markets

	Mean	Volatility	Log-Likelihood
Panel A			
FTSE 100	0.007	0.0733**	-1749.158
	(0.048)	(0.029)	
FTSE 100 Financial Sector	-0.0001	0.246**	2080.66
	(0.0001)	(0.099)	
Panel B			
Pre-Lehman			
FTSE 100	0.132*	0.169***	-1005.306
	(0.079)	(0.057)	
FTSE 100 Financial Sector	-0.004	0.060*	2062.034
	(0.002)	(0.034)	
Post-Lehman			
FTSE 100	0.026	0.056*	-674.799
	(0.058)	(0.031)	
FTSE 100 Financial Sector			
	0.0007	1.213***	403.3643
	(0.0006)	(0.257)	

Notes: Numbers in brackets denote standard errors. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.