Ca' Foscari
University
of Venice

Department
of Economics

Working Paper

Roberto Casarin and
Flaminio Squazzoni

Financial press and stock markets in times of crisis

ISSN: 1827-3580
No. 04/WP/2012

Working Papers
Department of Economics
Ca' Foscari University of Venice
No. 04/WP/2012
ISSN 1827-3580

Financial press and stock markets in times of crisis

Roberto Casarin
University Ca' Foscari of Venice

Flaminio Squazzoni
University of Brescia

17 May 2012

Abstract
This paper investigates the relationship between negative news in financial newspapers and stock markets in times of global crisis, such as the 2008/2009 period. We analysed one year of front page banner headlines of three financial newspapers, such as the Wall Street Journal, Financial Times, and Il Sole24ore and created an index of bad news at a daily base. We examined the influence of bad news both on market volatility and dynamic correlation of American, Britain and Italian stock markets to look at the impact of bad news on global investment strategies. Our results show that press and markets co-influenced each other in generating market volatility. The three newspapers showed significant differences in their stance on the crisis, with Financial Times more pessimistic. Our results also show that Wall Street Journal bad news had higher predictability value for the correlation between US and the foreign markets. This confirms the international influence of Wall Street Journal.

Keywords
2008/2009 financial crisis; financial press; bad news; market volatility; dynamic correlation; Wall Street Journal; pessimism

JEL Codes
G14, G15, C58

Address for correspondence:
Roberto Casarin
Department of Economics
Ca' Foscari University of Venice
Cannaregio 873, Fondamenta S.Giobbe
30121 Venezia - Italy
Phone: (++39) 041 2349149
Fax: (++39) 041 2349210
e-mail: r.casarin@unive.it

Financial press and stock markets in times of crisis

Roberto Casarin[†] Flaminio Squazzoni[‡]

[†]University Ca' Foscari of Venice

[‡]University of Brescia

May 16, 2012

Abstract

This paper investigates the relationship between negative news in financial newspapers and stock markets in times of global crisis, such as the 2008/2009 period. We analysed one year of front page banner headlines of three financial newspapers, such as the Wall Street Journal, Financial Times, and Il Sole24ore and created an index of bad news at a daily base. We examined the influence of bad news both on market volatility and dynamic correlation of American, Britain and Italian stock markets to look at the impact of bad news on global investment strategies. Our results show that press and markets co-influenced each other in generating market volatility. The three newspapers showed significant differences in their stance on the crisis, with Financial Times more pessimistic. Our results also show that Wall Street Journal bad news had higher predictability value for the correlation between US and the foreign markets. This confirms the international influence of Wall Street Journal.

KEYWORDS: 2008/2009 financial crisis; financial press; bad news; market volatility; dynamic correlation; Wall Street Journal; pessimism.

1 Introduction

Global financial crises have always followed specific patterns, which historically showed certain common properties (e.g., Reinhart and Rogoff (2009)). Among

[¶]Address: Departments of Economics, University Ca' Foscari of Venice, San Giobbe 873/b, 30121 Venice, Italy. E-mail: r.casarin@unive.it

these, there is the crucial role of financial press (e.g., Tickell (1995); Thrift (2001); Clark et al. (2004); Suttles and Jacobs (2010)). From the bursting of Tulip mania in 1637 in the Netherlands to the dot.com bubble in 2001 in America, financial press has largely influenced the stock market, often amplifying the animal spirits of investors (e.g., Pixley (2002); Shiller (2002)).

Recent psychological and sociological studies showed that market responses to news can be asymmetric. Indeed, investors are more sensitive to negative news especially when the market situation is dominated by uncertainty and predicting future outcomes is difficult (e.g., Thaler (1993); Borges et al. (1999); Soroka (2006)). This can be explained as the result of the "framing effect", according to which investors react disproportionally to negative news especially if information source is authoritative (e.g., Entman (1996); Kahneman and Tversky (2000); Tan and Chua (2004)). While the importance of these psychological and sociological aspects has been largely underestimated in economics (e.g., Shiller (2005), Knorr Cetina and Preda (2005)), they have been recently investigated in empirical finance (e.g., Antweiler and Frank (2004); Tetlock (2007); Engelberg and Parsons (2011)).

These studies showed that investors are largely influenced by media, rumours and gossip even in 'normal' market periods, where there is no reason why prices should not contain all the needed information (e.g., Antweiler and Frank (2004); Schindler (2007)). Therefore, we should expect in times of crisis that not only does investors' overconfidence have a crucial effect in moulding the market sentiment; it may even bring investors to overestimate the economic relevance of non-strictly economic, general picture media information.

To look at this, we have investigated the relationship between negative news in financial newspapers and volatility and correlation between stock markets during the recent global financial crisis. We analysed one year of front page banner headlines of three financial newspapers, such as the Wall Street Journal, Financial Times, and Il Sole24ore and created an index of bad news per newspaper at a daily base. Then, we studied the relationship between this index and the closing values of three stock market indexes, such as DowJones, FTSE and MIB.

Unlike previous studies in empirical finance, which looked at the impact of media information on market volatility in 'normal' market periods (e.g., Tetlock (2007)), we focused here on a period of financial turmoil and looked more at the impact of general picture information provided by financial press. While studies on the impact of social media on stock markets have been recently carried out that focused on similar periods of crisis (e.g.,Preis et al. (2010); Bollen et al. (2011)), our idea was that, in a situation of financial turmoil, the authoritative columns of certain influential financial newspapers could even have a stronger impact on investors' mood. We opted to look at the front page banner headlines

as they are crucial to summarize the meaning, tone and importance of the news but are not expected to contain true, precise and detailed information about economic facts extremely relevant for investors, unlike specialized columns. This is because: (i) headline information is too succinct and (ii) front page messages heavily reflect specific information strategies of the newspapers, which are mainly interested to impress and attract the reader. Furthermore, unlike Antweiler and Frank (2004), we did not restrict our interest to financial news strictly speaking. Unlike Barber and Loeffler (1993) and Tetlock (2007), we did not focus on precise information concerned with specific stocks. Therefore, we looked at general picture information, which reflects more interpretation than objective detail. Finally, by comparing three newspapers and their respective stock markets, we also wanted to measure differences in interpretation of this global crisis in the financial press (e.g., Griffin et al. (2011)).

To our knowledge, this is the first contribution that extended the analysis from the impact of financial press on market volatility to that on market correlation. Combining these two aspects is essential to look at the impact of bad news on global investment decisions from the point of view of risk and risk diversification. This also was to provide a clearer outlook on the causal interplay of press and market in generating global pessimism.

Our analysis was performed by estimating the volatility and correlation dynamics based on generalized autoregressive conditional heteroskedasticity (GARCH) models (see Engle (1982)) with dynamic conditional correlation (Engle (2002)). Secondly, we estimated the dynamic relationship between market volatility/correlation and bad news by using vector autoregressive models (VAR). We also performed a Granger-causality test to verify whether bad news time series had predictive value for market volatility/correlation (Granger (1969)).

The rest of the paper is organized as follows. Sect. 2 illustrates the background and our research hypotheses. Sect 3 presents our dataset and illustrates the bad news index that we used to measure the relationship between newspapers and markets. It also shows data on market volatility and correlation. Sect 4 introduces our model that looked at the impact of newspapers on markets. Sect 5 focuses on causal relationships between press and markets. Finally, Sect 6 summarizes our main findings.

2 Background and Hypotheses

Many studies showed that stock market prices incorporate financial press information (e.g., Pearce and Roley (1985); Liu et al. (1990); Tivegna and Chiofi (2004)). While this may be expected in case of quantitative information on

important economic statistics, such as those regularly released by important institutional agencies (e.g., Stickel and Verrecchia (1994); Balduzzi et al. (2001); Kim and Sheen (2001); Pritamani and Singal (2001), Brenner et al. (2009); Tetlock (2010, 2011)), it is less likely to find a positive impact of qualitative information, such as journalists' opinion or report of market rumors, which is subjective (Coval and Shumway (2001); Schindler (2007)). Nevertheless, empirical evidence is also growing on this.

For instance, Barber and Loeffler (1993) examined "Dartboard", a monthly column of the Wall Street Journal reporting analysts' recommendations, from 1988 to 1990. They found that for the two days following the publication, average positive abnormal returns of 4 percent of the stock recommended were documented that were partially reversed only within 25 trading days. Similarly, Tetlock (2007) examined "Abreast of the Market", a popular column of the Wall Street Journal, from 1984 to 1999. It is worth noting that, unlike "Dartboard", which involved market analysts, this column should be viewed as closer to entertainment than information. He found that even qualitative information, such as the fraction of negative words in this column, was incorporated in aggregate market valuations. More specifically, results showed that high level of pessimism robustly predicted downward pressure on market prices and that high or low values of pessimism helped to predict high market trading volumes. More recently, Dougal et al. (2012) examined 30 years of "Abreast of the Market" and showed that even particular columnists can influence stock market behaviour. Tetlock et al. (2008) extended this type of empirical analyses by addressing the impact of negative words in all Wall Street Journal and Dow Jones News Service stories about individual S&P 500 firms from 1980 to 2004. They found that negative words in the financial press forecasted low firm earnings and that stock market prices incorporated the information embedded in negative words only with a slight delay.

Other studies showed that this effect was even true for unconventional, not specialized media, whose information should be less relevant for investors. For example, Antweiler and Frank (2004) examined the effect of more than 1.5 million messages posted on Yahoo! Finance and Raging Bull about 45 companies in the Dow Jones Industrial Average and the Dow Jones Internet Index, by measuring bullishness. They found that stock messages helped to predict market volatility both at a daily base and also within the trading day. More specifically, they found that higher message postings predicted negative subsequent returns. They also found that disagreement between the posted messages was associated with increased trading volume. More recently, Bollen et al. (2011) found that Twitter mood predicted more than 80% of daily volatility of closing values of the Dow Jones Industrial Average. This would confirm Nofsinger's argument that social mood may cause an increase of decisions biased by optimism or pessimism

that can considerably influence aggregate investment and business activity, even reflecting future economic activities (Nofsinger (2005)).

Our research hypotheses were as follows. First, Borges et al. (1999) and Schindler (2007) showed that investors, even those following long-term strategies, are more influenced by negative news as they reduce the difficulty in predicting future outcomes by overestimating the impact of current information (see also Soroka (2006). This was also found in experimental and economic psychology (e.g., Shiller (2005)). Our hypothesis was that the importance of these psychological bias could dramatically increase in periods of financial turmoil as investors tend to disqualify the reliability of prices and even the well-functioning of the market and are more sensitive to other sources of information, including newspaper headlines, even if these sources should have questionable economic value.

On the one hand, the fact that the information content is subject to strategies of profit maximisation by newspapers should bring investors to cautiously consider the objective information value of these sources (Gentzkow and Shapiro (2010)). On the other hand, in a situation of radical uncertainty, it is reasonable to expect that investors overestimate their informational gap and the potential impact of a variety of news on the future outcomes of their investments. Therefore, our first hypothesis (H1) was that bad news published by financial newspapers could negatively influence the daily volatility of financial markets in the period under observation.

Secondly, although most financial crises showed an international impact also in the past, the 2008-2009 crisis had a truly global dimension as financial markets are now extremely interdependent. Indeed, modern investment technologies allow investors to execute millions of operations per time unit, every time and everywhere (e.g., Ackerman (2008)). In this situation, we expect that pessimistic messages of financial newspapers could explain not only market volatility but also the dependence between stock markets. Numerous previous studies showed that herd behaviour in financial markets tend to be highly correlated with periods of volatility (e.g., Morris and Hyun (1999); Shiller (2005)). For instance, Mondria (2006) suggested that in periods of crisis and high market volatility, covariation could even include markets that do not have much in common. Our hypothesis (H2) was that in periods of turmoil, bad news could even influence the correlation of markets and had an impact on global investment strategies. Coherently with this, we expected that in the period under observation the interplay of financial markets and press could determine a cascade of pessimism that co-influenced both information and market behaviour (H3) (e.g., Cipriani and Guarini (2008)).

3 Data

3.1 The Bad News Index

Our dataset includes one year of front page banner headlines of three financial newspapers, such as the Wall Street Journal, Financial Times and Il Sole24ore, at a daily base. We analysed any front page banner headline from 1 September 2008 to 1 September 2009 that conveyed news on the crisis (not only those expressly related to financial markets) by measuring the emphasis and the tone of the message. The emphasis was measured by counting the number of banner columns reporting an economic news compared with the total number of potentially available columns, according to the standard newspaper layout. We assumed that higher was the percentage of columns assigned to the banner headline, the stronger the emphasis of the message was. The tone was measured by counting the number of negative words on the total words used in the headline text (all included, also verbs and junctions), such as 'recession', 'fear' and alike. We assumed that the higher was the number of negative words in the text, the stronger the pessimism of the message was. For the sake of simplicity, we did not distinguish the degree of pessimism by raking the words used.

Our bad news index was based on three types of information. We considered the number of negative banner headlines on the crisis, $L_{k,t}$, the number of columns, $C_{k,t}$, used to report the news and the number of negative words reported in the text, $N_{k,t}$, at time t for each journal $k = F, W, S$. The index was build as follows. Let $T_{k,t}$ be the maximum number of available columns for a banner headline in the newspaper, then the relative importance index was

$$w_{k,t} = \frac{C_{k,t}}{L_{k,t}} \tag{1}$$

$k = F, W, S$ and $t = 1, \ldots, T$. Then the journal-specific bad news index, $B_{k,t}$, at time t for the journal k, was defined as

$$B_{k,t} = w_{k,t}(T_{k,t}(1 + N_{k,t})) \tag{2}$$

for $k = F, W, S$ and $t = 1, \ldots, T$.

3.2 Descriptive Statistics

Figure 1 shows the bad new index distinguished for newspaper. The vertical dashed lines corresponded to certain peaks of bad news. A first peak was on 16 September 2008, as the day before it was announced that Lehman Brothers filed for Chapter 11 bankruptcy protection, Merrill Lynch agreed to be sold to

Bank of America for 50 billion dollars and estimates said that up to 50.000 jobs were at risk in banks' collapse. A second peak was on 24 October 2008 after the Congressional hearing where Alan Greenspan admitted that he put too much faith in the self-correcting power of markets. A third peak was on 6 April 2009, involving especially Financial Times, when the Geithner plan to buy toxic assets was strongly criticised as a means to provide government "cash for trash" and UK analysts started to forecast that stagflation was around the corner.

Looking at the bad news dynamics, it is possible to observe that our one-year sample could be approximately divided in two sub-samples, i.e., a first period characterized by higher concentration of bad news and a second one, after spring 2009, where bad news were generally less frequent. By comparing the three newspapers, it is evident that Wall Street Journal was more cautious and Financial Times published bad news more frequently also in the second sub-sample.

Tab. 1 shows mean, standard deviation, skewness and kurtosis of the bad news index per newspaper. Looking at the mean value of the bad index, it is worth noting that Financial Times was more pessimistic than the other newspapers. On the other hand, if we consider the deviation from the mean (skewness) and the extreme values (kurtosis), Il Sole24Ore showed higher excess of pessimism. Wall Street Journal was more cautious throughout the entire sample, i.e., it showed both lower mean and volatility.

To look in more detail at data, we have distinguished two sub-samples, the first from 1 September 2008 to 30 March 2009, where the market volatility was considerably higher, the second from 31 March 2009 to 1 September 2009, with less volatility. Data showed that pessimism was generally higher in the first sub-sample. Financial Times and Wall Street Journal showed a similar level of excess of pessimism, which was lower than Il Sole24Ore. In the second sub-sample, where market volatility was lower, Financial Times showed both higher level of pessimism and excess of pessimism. Therefore, Financial Times followed a more critical stance on the crisis, by reporting bad news even in period of relatively lower market volatility.

Our database also included names and number of journalists who authored any front page leading article on the crisis. Results showed that Financial Times assigned these important articles to a few journalists. We calculated a Gini index that measured the concentration of number of articles per journalist. Not only did Financial Times concentrate more articles on a few journalists (WSJ index took 0.61, while FT took 0.66); it did so especially in the low market volatility period (WSJ index for the second sub-sample took 0.68, while FT took 0.77). This means that the stronger critical stance of Financial Times in times of lower market volatility was due to a few pessimistic journalists.

These findings can be explained considering certain differences between U.S.

and UK financial press (e.g., Parsons (1989)). Schifferes (2011) argued that higher pessimism of Financial Times in reflecting the 2008/2009 crisis should be understood as a mixture of history and contingency (see also Tambini (2010)). On the one hand, while Wall Street Journal has been historically more devoted to investigation, addressed to an investor readership and focused on domestic affairs, Financial Times has been influenced by economic theory and interpretation and mainly focused on international affairs. This could explain the stronger sensitivity of the Britain newspaper towards a general picture outlook on the crisis (e.g., the implications of the financial crisis for the real economy) and its stronger focus on commentaries and academic debate. Even the tendency to blame on U.S. market responsibility and critically discuss the U.S. political agenda against the crisis could explain the stronger sensitivity of Financial Times towards the development of the crisis (see also Doyle (2006)). This would explain why the crisis and its broader implications were covered more extensively by Financial Times. In general, from our database on press coverage of the crisis, more than 80% of Financial Times front pages in the period considered included an article or commentary on the crisis, against 67% of Wall Street Journal.

On the other hand, the stronger concern for home investors could have brought Wall Street Journal to follow a less critical stance and be more cautious in spreading bad news. In a recent story on the U.S. press coverage of the financial crisis, Goodman (2011) suggested that American journalists were extremely cautious in reporting bad news as it was clear that, in a situation of market unpredictability and turmoil, any influential opinion or streamer could have had a dramatic influence.

Secondly, after the dramatic events of September/October 2008, financial press in UK was strongly criticized for 'boosterism' and excessive embeddedness. Schifferes (2011) explained that in the autumn of 2008, a turning point was achieved in the relationship between press and markets, epitomized especially by Financial Times. He called this "media's moral compass", in that this relationship transformed from a "cozy co-dependence" to a more critical stance. This would explain why Financial Times suggested a pessimistic interpretation to economic events even in period of low market volatility, such as after March 2009.

Then, we calculated the correlation between newspapers (see Tab. 1). Results showed that pessimism of newspapers was significantly positively correlated. The more positive correlations were between Wall Street Journal and Financial Times, and between Wall Street Journal and Il Sole24ore. If we consider the difference between periods of high and low market volatility, it is worth noting that the higher correlation was between Wall Street Journal and Financial Times in period of high volatility, whereas correlations were not-significant or negative in periods of low volatility. This means that in

	Whole Sample				First Sub-Sample				Second Sub-Sample			
	Mean	St.D.	Sk.	Kurt.	Mean	St.D.	Sk.	Kurt.	Mean	St.D.	Sk.	Kurt.
W	0.82	1.07	1.69	6.41	1.09	1.22	1.30	4.74	0.42	0.61	1.47	4.64
F	1.98	2.49	2.73	15.86	2.38	2.22	1.10	3.67	1.40	2.78	4.39	26.79
S	1.17	2.31	4.12	27.41	1.60	2.76	3.56	20.33	0.55	1.19	2.84	11.85

	Whole Sample			First Sub-Sample			Second Sub-Sample		
	W	F	S	W	F	S	W	F	S
W	1.00*	0.19*	0.13*	1.00*	0.20*	0.08	1.00*	0.03	-0.06
F		1.00*	0.11*		1.00*	0.06		1.00*	0.13
S			1.00*			1.00*			1.00*

Table 1: Descriptive statistics of the bad news index. First panel: mean, standard deviation, skewness and kurtosis. Second panel: correlation between indexes. The symbol "*" indicates that the null hypothesis of zero valued Pearson's correlation was rejected at the 5% significance level.

periods of higher market volatility, differences between Wall Street Journal and Financial Times drastically diminished. Indeed, in this period, these two leading newspapers basically conformed both in terms of timing and intensity of pessimism. On the other hand, significant differences persisted for other periods, where market volatility was less considerable.

3.3 Market Volatility and Correlation

Let $X_{i,t}$ indicate the log-return at time t for FTSE ($i = UK$), DowJones ($i = US$) and MIB ($i = IT$) and calculate the volatility and correlation dynamics following a generalized autoregressive conditional heteroskedasticity (GARCH) model (see Engle (1982); Engle and Ng (1993)) with dynamic conditional correlation (see also Engle (2002)). For the sake of simplicity, we followed a non-parametric approach to estimate the volatility and correlation dynamics as follows:

$$S_{i,t} = \frac{1-\lambda}{1-\lambda^{\tau}} \sum_{k=0}^{\tau-1} \lambda^k (X_{i,t-k} - \bar{X}_{i,t})^2 \tag{3}$$

$$S_{ij,t} = \frac{1-\lambda}{1-\lambda^{\tau}} \sum_{k=0}^{\tau-1} \lambda^k (X_{i,t-k} - \bar{X}_{i,t})(X_{j,t-k} - \bar{X}_{j,t}) \tag{4}$$

$$R_{ij,t} = \frac{S_{ij,t}}{\sqrt{S_{i,t}}\sqrt{S_{j,t}}} \tag{5}$$

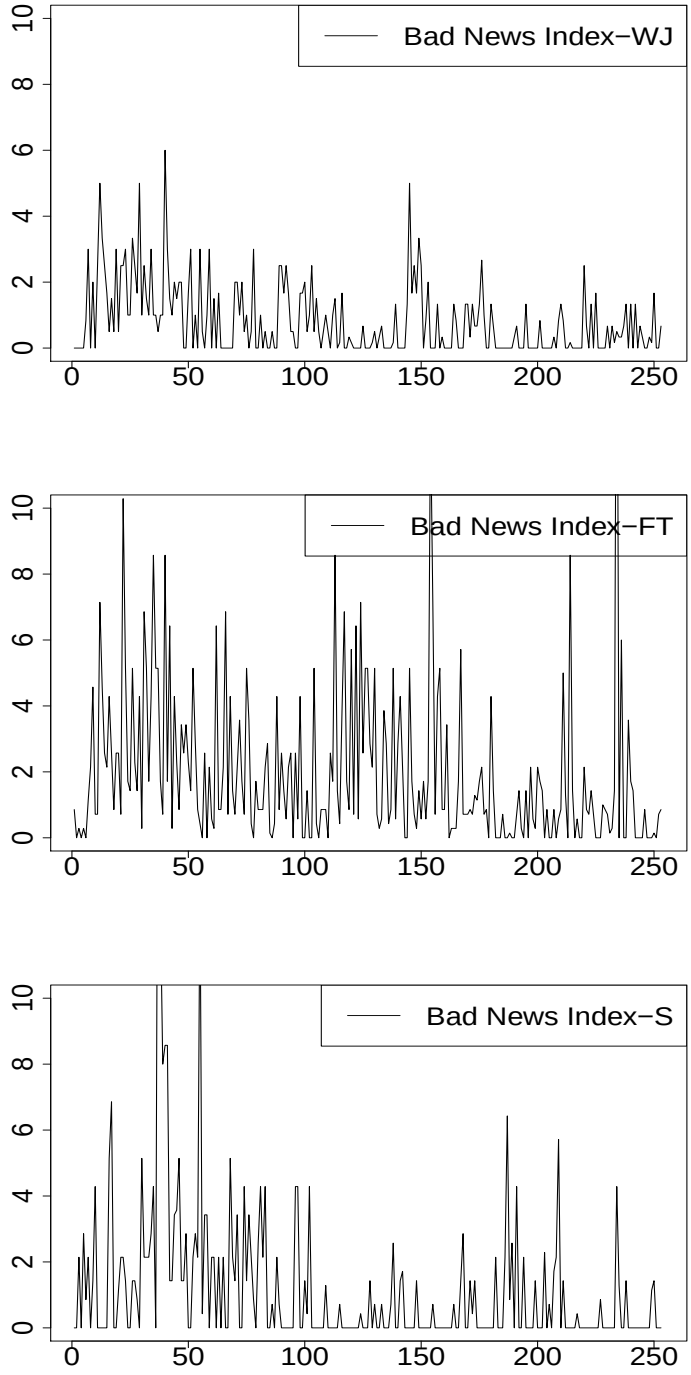

Figure 1: Bad news index per newspaper (in rows) from 01/09/2008 to 01/09/2009 at a daily base.

for $i, j = US, UK, IT$ where $\bar{X}_{i,t}$ was the empirical average over $X_{i,t-\tau+1}, \ldots, X_{i,t}$, $\lambda > 0$ was a smoothing factor and $\tau > 0$ was a forgetting factor. These measures should be seen as an approximation of the results obtained with a GARCH model with dynamic correlation.

Fig. 2 shows the results of our non-parametric estimation procedure. The first row shows the log-returns of the FTSE, DowJones and MIB market indexes at a daily base for closing values. The graphs in the second row show the level of log-volatility (i.e. $\log S_{i,t}$) for each index. Although we did not report data before 1 September 2008, it is worth noting that market volatility significantly increased after September 2008. This is evident when looking at the beginning of our sample (see the graphs in the second row of Fig. 2). It is worth clarifying that this was not due to a lack of data in the estimates at the beginning of the sample. Indeed, the first estimate of the volatility was calculated starting from a window of 60 initial observations, which were not represented in the first row of Fig. 2. This means that our sample truly reflected a period of significant market turmoil.

Results showed that market dynamics were similar. More specifically, while the level of volatility was similar at the beginning, at the end of the sample the Italian market showed higher log-volatility than the UK and U.S. stock markets. Furthermore, the level of correlation between the three market indexes increased after September 2008 and rapidly reached the level of 0.6 for DowJones and FTSE, 0.7 for MIB and DowJones and 0.9 for MIB and FTSE. Secondly, our results showed that the correlation between these three markets was positive. If we look at values before and after the beginning of the period under observation, it is worth noting that UK and Italian markets were more highly dependent than the U.S. and UK and U.S. and Italy respectively.

These results confirm certain previous empirical findings on the higher correlation between markets in period of financial crises (e.g., Forbes and Rigobon (2002); Chiang et al. (2007)), especially in periods of higher volatility of the U.S. stock markets (Longin and Solnik (2001)). Secondly, they would confirm recent evidence on the increasing interdependence of European stock markets ((Jondeau and Rockinger (2006)).

4 Model

Let $V_t = (\log S_{US,t}, \log S_{UK,t}, \log S_{IT,t})'$ be the vector of log-volatilities and $Z_t = (\varphi(S_{US,UK,t}), \varphi(S_{US,IT,t}), \varphi(S_{UK,IT,t}))'$, with $\varphi(x) = \log(1-x) - \log(1+x)$, the vector of logistic-transformed correlations. Let us define $M_t = (V_t', Z_t')'$. We examined the relationship between bad news and the variance and correlation

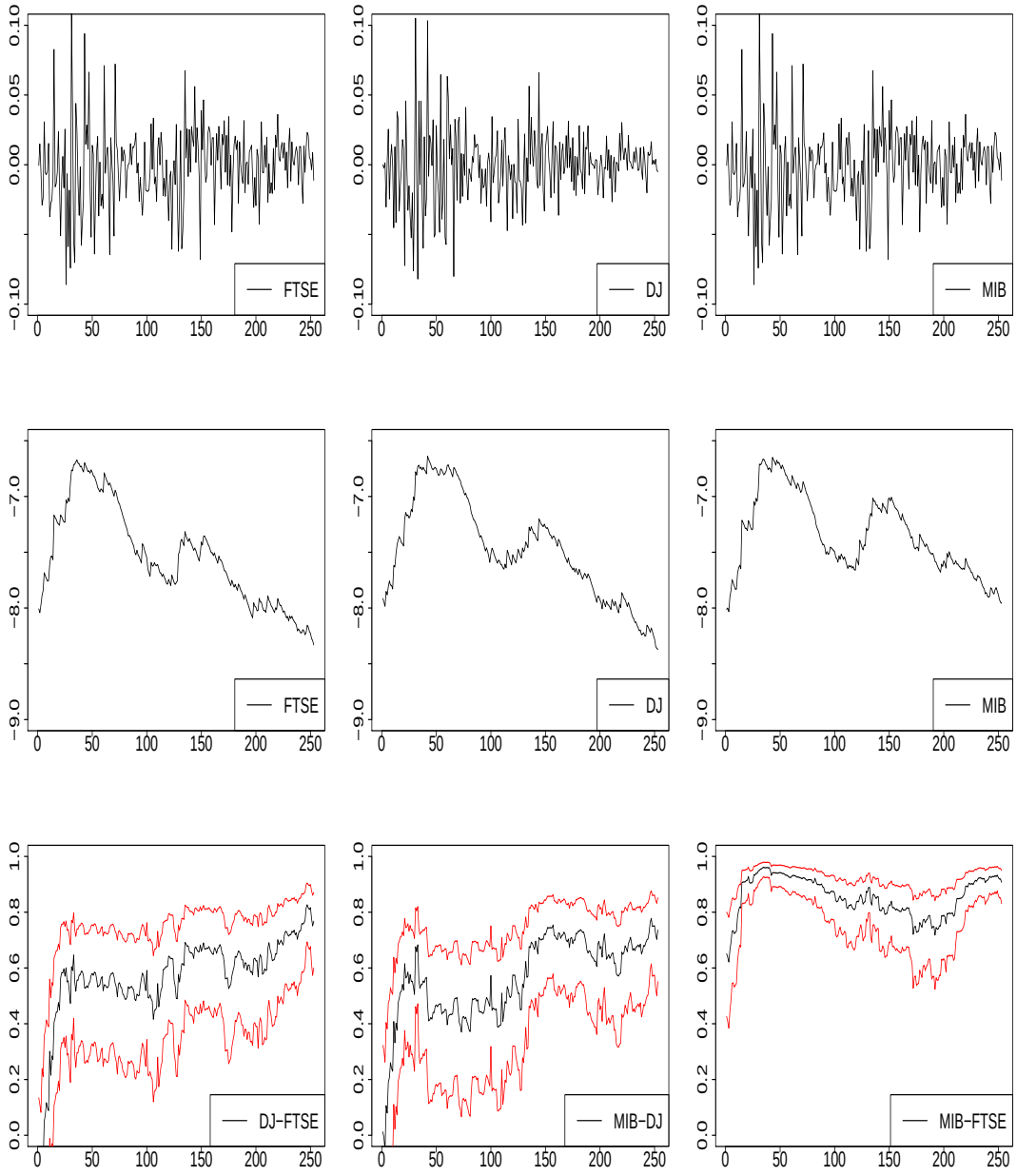

Figure 2: Daily log-returns (first row) of the FTSE, DowJones and MIB indexes from 01/09/2008 to 01/09/2009. Daily log-volatilities (second row) and correlations (third row), evaluated sequentially over time with a rolling window of $\tau = 60$ observations and a smoothing factor $\lambda = 0.99$. In the last row, the red lines indicate the 95% confidence band about the estimated correlations.

of the three financial indexes. We considered the static models as follows:

$$M_{i,t} = \nu_i + \psi_{i,F} B_{F,t} + \psi_{i,W} B_{W,t} + \psi_{i,S} B_{S,t} + \varepsilon_{i,t} \tag{6}$$

with $i = 1, \ldots, 6$, and $\varepsilon_{i,t} \sim \mathcal{N}(0, \xi_i^2)$ i.i.d. $\forall t, i$.

Table 2 shows that all bad news coefficients were positive. This means the any increase of pessimism by newspapers had a positive impact on the volatility of markets. Obviously, the impact was not the same for all newspapers and markets. Wall Street Journal had a strong impact on all markets considered. The bad news of Wall Street Journal and Financial Times had a significant impact (at the 5% significance level) on the contemporaneous level of log-volatility in all markets (see the left panel in Tab. 2). Finally, Il Sole24Ore bad news affected the volatility of the UK and Italian stock markets.

As regards to market correlation, it is worth noting that Wall Street Journal's pessimism had a significant impact on all market correlations. Vice-versa, Financial Times and Il Sole24Ore affected only the behaviour of their respective markets (see the right panel of Tab. 2). This would confirm the leadership of Wall Street Journal in influencing the stock market and its worldwide impact. On the other hand, it is interesting to note that any increase of pessimism by Wall Street Journal had a negative impact on the correlation between UK and Italian markets. This could be explained by the fact that Wall Street Journal was mainly focused on domestic affairs and negative news on the U.S. stock market could have brought investors to move their investments towards other markets or in general to explore a variety of investment strategies, which could have contributed to generate heterogeneity in stock market behaviour.

5 Causal Relations

To look at causal relationships in more detail, we performed a Granger-causality test that examined the lagged dependence structure between bad news and market correlation and volatility. This allowed us to verify whether bad news time series had predictive value for market volatility and correlation. We considered all possible dependences between markets and information, by setting $B_t = (B_{F,t}, B_{W,t}, B_{S,t})$ and considering VAR models.

Impact on volatilities					Impact on correlations				
θ	$\hat{\theta}$	t-stat	p-val		θ	$\hat{\theta}$	t-stat	p-val	
US					US-IT				
ν_1	-7.6856	-192.1191	0.0000	*	ν_4	0.5818	39.6552	0.0000	*
$\psi_{1,W}$	0.1332	4.6755	0.0001	*	$\psi_{4,W}$	-0.0161	-1.7674	0.0119	*
$\psi_{1,F}$	0.0266	2.8681	0.0044	*	$\psi_{4,F}$	-0.0011	-0.2851	0.7762	
$\psi_{1,S}$	0.0354	2.8001	0.0551		$\psi_{4,S}$	-0.0028	-0.5983	0.5502	
UK					UK-IT				
ν_2	-7.7634	-202.5992	0.0000	*	ν_5	0.8334	122.7822	0.0000	
$\psi_{2,W}$	0.1198	5.0512	0.0001	*	$\psi_{5,W}$	0.0108	2.5831	0.0104	*
$\psi_{2,F}$	0.0323	3.1772	0.0017	*	$\psi_{5,F}$	0.0037	2.0676	0.0398	*
$\psi_{2,S}$	0.0395	3.2643	0.0012	*	$\psi_{5,S}$	0.0048	2.0397	0.0225	*
IT					UK-US				
ν_3	-7.4971	-236.6942	0.0000	*	ν_6	0.5862	38.0473	0.0000	*
$\psi_{3,W}$	0.0731	3.7321	0.0002	*	$\psi_{6,W}$	-0.0206	-2.1631	0.0212	*
$\psi_{3,F}$	0.0234	2.7753	0.0059	*	$\psi_{6,F}$	0.0021	0.5152	0.6068	
$\psi_{3,S}$	0.0301	2.9962	0.0031	*	$\psi_{6,S}$	-0.0020	-0.4141	0.6790	

Table 2: Left: the effect of the bad news indexes on volatility. Right: the effect of the bad news indexes on correlations. Columns: the parameter θ (first), estimates $\hat{\theta}$ (second), value of the t-statistics (third), p-value of the t-statistics (fourth) and "*‘ indicates significance of the parameter at the 5% significance level (last).

5.1 Volatility

A joint test on the causal relationships for the volatility and the pessimism was based on the following VAR model of dimension 6 and order p:

$$V_t = \Psi_{10} + \sum_{j=1}^{p} (\Psi_{11,j} V_{t-j} + \Psi_{12,j} B_{t-j}) + \varepsilon_{1,t} \quad (7)$$

$$B_t = \Psi_{20} + \sum_{j=1}^{p} (\Psi_{21,j} V_{t-j} + \Psi_{22,j} B_{t-j}) + \varepsilon_{2,t} \quad (8)$$

with $(\varepsilon_{1,t}, \varepsilon_{2,t}) \sim \mathcal{N}_6(O_6, \Xi)$ i.i.d. $\forall t$, $\Psi'_{10} = (\psi_{US}, \psi_{UK}, \psi_{IT})$ and $\Psi'_{20} = (\psi_F, \psi_W, \psi_S)$ were the intercept and the 3-dimensional square matrices $\Psi_{11,j}$, $\Psi_{12,j}$, $\Psi_{21,j}$, $\Psi_{22,j}$, were the autoregressive coefficients of the $\text{VAR}_6(p)$ model.

In order to disentangle the relationship between volatility and press, we first looked at the statistical significance of the relationship between volatility at time

t and news at time $t-k$, which depended on the matrices $\Psi_{12,k}$, $k=1,\ldots,p$ with elements $\psi_{ij}^{12,k}$, $i=US,UK,IT$ and $j=F,W,S$. Then, we looked at the relationship between bad news at time t and volatility at time $t-k$, which depended on elements $\psi_{ij}^{12,k}$, $i=F,W,S$ and $j=US,UK,IT$ of the matrices $\Psi_{21,k}$, $k=1,\ldots,p$. For our purpose and for the sake of simplification, we have included only a subset of the VAR coefficients, i.e., the elements of $\Psi_{12,1}$ and $\Psi_{21,1}$ only for the first lag (see Table 3).

Results showed that Wall Street Journal bad news (lagged by one period) significantly increased the volatility of the three market indexes in the subsequent period of time (see the left panel in Tab. 3). This is a further confirmation of the leadership of this newspaper and its worldwide impact. The bad news of other newspapers did not have a significant impact on market volatility, with the exception of the lagged relationship between Il Sole24Ore bad news and the volatility of the U.S. market. Considering the effect of market volatility on bad news, it is worth noting that FTSE volatility had a significant and positive impact on the bad news of each newspaper (see the right panel in Tab. 3). This would confirm the recent worldwide importance of the London stock market. Finally, it is worth noting that the volatility of the Dow Jones index had a significant and negative impact on Il Sole24ore bad news.

We tested the hypothesis that volatility did not jointly cause, in the Granger sense, the bad-news indexes. To look at the causal relationship between each market-specific volatility and the three newspapers, we also tested separately the hypothesis that neither each one of the three bad-news indexes, nor all three indexes jointly considered caused, in the Granger sense, the market-specific volatility. To look at the causal relationship between each newspaper and the three markets, we tested the hypothesis that neither each one of the three log-volatility variables, nor all three log-volatilities caused, in the Granger sense, the newspaper bad news.

Tab. 4 shows the results of these joint and pairwise tests. First, if we look at the p-value of the joint test in the last column and last row, in the left panel, it is possible to observe that newspaper bad news were fully caused by market turmoil. Therefore, stock market behaviour was the essential source of bad news and newspapers did not provide unrealistically pessimistic stances. Secondly, if we look at the p-value of almost all of pairwise causality tests (see the left panel), this causality direction from markets to newspapers was true for all log-volatility and bad news indexes. On the other hand, if we look at the p-values in the last column, last row in the right panel, we should conclude that, in general, the financial press did not cause market volatility. On the one hand, looking in more detail, it is possible to observe that market volatility was unequivocally caused by Wall Street Journal bad news alone (see the first row in the right

Impact on volatilities					Impact on newspapers				
θ	$\hat{\Psi}_{12,1}$	t-stat	p-val		θ	$\hat{\Psi}_{21,1}$	t-stat	p-val	
US					W				
$\psi^{12,1}_{US,W}$	0.0093	3.1230	0.0020	*	$\psi^{21,1}_{W,US}$	-0.32445	-0.4851	0.6278	
$\psi^{12,1}_{US,F}$	0.0002	0.1692	0.8663		$\psi^{21,1}_{W,UK}$	1.70194	2.4692	0.0142	*
$\psi^{12,1}_{US,S}$	-0.0033	-2.3871	0.0177	*	$\psi^{21,1}_{W,IT}$	-0.96905	-1.8552	0.0648	
UK					F				
$\psi^{12,1}_{UK,W}$	0.0076	2.2512	0.0253	*	$\psi^{21,1}_{F,US}$	-2.0504	-1.2334	0.2188	
$\psi^{12,1}_{UK,F}$	0.0002	0.1679	0.8676		$\psi^{21,1}_{F,UK}$	3.56990	2.0822	0.0384	*
$\psi^{12,1}_{UK,S}$	-0.0019	-1.1534	0.2501		$\psi^{21,1}_{F,IT}$	0.00951	0.0072	0.9941	
IT					S				
$\psi^{12,1}_{IT,W}$	0.0073	2.1151	0.0354	*	$\psi^{21,1}_{S,US,1}$	-2.9694	-2.1252	0.03462	*
$\psi^{12,1}_{IT,F}$	0.0004	0.3061	0.7602		$\psi^{21,1}_{S,UK}$	4.58829	3.1842	0.00164	*
$\psi^{12,1}_{IT,S}$	-0.0023	-1.455 0	0.1469		$\psi^{21,1}_{S,IT}$	0.2066	0.1892	0.8501	

Table 3: Left: the effect of the bad news indexes at the first lag on volatility. Right: the effect of volatility at the first lag on the bad new indexes. Columns: the parameter θ (first), estimates $\hat{\theta}$ (second), value of the t-statistics (third), p-value of the t-statistics (fourth) and "*‘ indicates significance of the parameter at the 5% significance level (last).

panel). On the other hand, it is possible to argue that in general, we could not predict market volatility looking at information in the financial press.

5.2 Correlations

The VAR model of order q for bad-news indexes and correlations was as follows:

$$C_t = \Phi_{10} + \sum_{j=1}^{q} (\Phi_{11,j} C_{t-j} + \Phi_{12,j} B_{t-j}) + \eta_{1,t} \quad (9)$$

$$B_t = \Phi_{20} + \sum_{j=1}^{q} (\Phi_{21,j} C_{t-j} + \Phi_{22,j} B_{t-j}) + \eta_{2,t} \quad (10)$$

with $(\eta_{1,t}, \eta_{2,t}) \sim \mathcal{N}_6(O_6, \Sigma)$ i.i.d. $\forall t$, where $\Phi_{10} = (\phi_{US}, \phi_{UK}, \phi_{IT})$ and $\Phi_{20} = (\phi_F, \phi_W, \phi_S)$ were the intercept and $\Phi_{ij,k}$, $i, j = 1, 2$ $k = 1, \ldots, q$, were the autoregressive coefficients of the $VAR_6(1)$ model.

We examined the statistical significance of the relationship between correlation at time t and bad news at time $t-1$, which was given by the matrix

	H_0: $V \nrightarrow B$				H_0: $B \nrightarrow V$			
	US	UK	IT	All	US	UK	IT	All
W	0.0012*	0.0036*	0.0426	0.0011*	0.0000*	0.0248*	0.0086*	0.0100*
F	0.0042*	0.0000*	0.0010*	0.0024*	0.1289	0.9817	0.8260	0.7534
S	0.0009*	0.0001*	0.0008*	0.0010*	0.4934	0.7773	0.8918	0.7251
All	0.0000*	0.0000*	0.0000*	0.0000*	0.7442	0.7573	0.7536	0.2550

Table 4: Pairwise and joint causality test p-values. The null hypotheses (H_0) were as follows: volatility (V) did not cause (in the Granger sense) financial press pessimism (B) ($V \nrightarrow B$, left panel), financial press did not cause volatility ($B \nrightarrow V$, right panel). "All' indicates all variables included in the test and "*' indicates that the null is rejected at the 5% significance level.

$\Phi_{12,k}$ with elements $\phi_{ij}^{12,k}$, $i = US-UK, US-IT, UK-IT$ and $j = F, W, S$. Then, we also looked at the relationship between bad news at time t and correlation at time $t-1$, which was given by the elements $\phi_{ij}^{21,k}$, $i = F, W, S$ and $j = US-UK, US-IT, UK-IT$ of the matrix $\Phi_{21,k}$.

For the shortage of space, Table 5 included only the autoregressive coefficients at the first lag, not all the estimated coefficients of the VAR models. Our results (see Table 5, left column) showed that Wall Street Journal bad news (one lag) had a negative impact on the correlation between U.S. and UK stock markets. Indeed, a bad news on the Wall Street Journal, which is usually more focused on the U.S. economy, reduced the co-movement of these markets. This could be explained in terms of outflow of capital from the U.S. stock market and inflow in the UK market. On the other hand, Financial Times bad news (one lag) had no significant impact on market correlations. Il Sole24ore bad news decreased the correlation between the U.S. and Italian stock markets. Our explanation is the same as before.

Furthermore, results (see Table 5, right column) showed that Wall Street Journal bad news reflected all one lag correlations. An increase in the correlation between the U.S. and UK stock markets decreased the journal pessimism, whereas an increase in the U.S.-IT and UK-IT correlations increased it. Furthermore, higher (one lag) correlation between the UK and Italian stock markets increased the pessimism of Financial Times. Finally, all correlations had a significant impact on Il Sole24Ore, similarly to Wall Street Journal.

In order to rigorously asses the presence of causal relationships, we performed a joint and pairwise Granger causality test as we did for the log-volatilities. Tab. 6 shows the results. If we look at the last column, last row in the left panel, it is possible to observe that all correlations had a Granger causal effect on all bad

Impact on correlations					Impact on newspaper				
θ	$\hat{\Phi}_{12,1}$	t-stat	p-val		θ	$\hat{\Phi}_{21,1}$	t-stat	p-val	
US-UK					W				
$\phi^{12,1}_{US-UK,W}$	-0.0023	-2.3541	0.0193	*	$\phi^{21,1}_{W,US-UK}$	-4.6537	-3.5851	0.0004	*
$\phi^{12,1}_{US-UK,F}$	0.0004	0.4882	0.6263		$\phi^{21,1}_{W,US-IT}$	3.4669	2.8091	0.0053	*
$\phi^{12,1}_{US-UK,S}$	0.0016	0.7422	0.4589		$\phi^{21,1}_{W,UK-IT}$	5.9194	4.0342	0.0000	*
US-IT					F				
$\phi^{12,1}_{US-IT,W}$	0.0005	0.2482	0.8044		$\phi^{21,1}_{F,US-UK}$	-2.3772	-0.7242	0.4700	
$\phi^{12,1}_{US-IT,F}$	-0.0003	-0.2901	0.7718		$\phi^{21,1}_{F,US-IT}$	1.6567	0.5301	0.5962	
$\phi^{12,1}_{US-IT,S}$	-0.0029	-2.7522	0.0064	*	$\phi^{21,1}_{F,UK-IT}$	7.4877	2.0162	0.0449	*
UK-IT					S				
$\phi^{12,1}_{UK-IT,W}$	0.0001	0.1411	0.8881		$\phi^{21,1}_{S,US-UK}$	-8.0680	-2.9283	0.0037	*
$\phi^{12,1}_{UK-IT,F}$	0.0004	1.1182	0.2646		$\phi^{21,1}_{S,US-IT}$	5.1940	1.9836	0.0485	*
$\phi^{12,1}_{UK-IT,S}$	-0.0005	-1.1302	0.2598		$\phi^{21,1}_{S,UK-IT}$	12.8542	4.1272	0.0000	*

Table 5: Left: the effect of the bad news indexes at the first lag on market correlations. Right: the effect of market correlations at the first lag on the bad new indexes. Columns: the parameter θ (first), estimates $\hat{\theta}$ (second), value of the t-statistics (third), p-value of the t-statistics (fourth) and "*‘ indicates the significance of the parameter at the 5% significance level (last).

news indexes. More specifically, while U.S.-IT stock market correlation did not cause the bad news index, UK-IT and U.S.-UK correlations had a Granger causal effect on the bad news indexes of Financial Times and Il Sole24ore. Secondly, looking at the last column, last row of the right panel, it is possible to observe that the joint test did not reject the null hypothesis of absence of Granger causality between all bad news indexes and all correlation indexes. Finally, results showed that Wall Street Journal bad news determined U.S.-IT and U.S.-UK market correlation but not that of UK-IT.

Therefore, any bad news on Wall Street Journal predicted correlation between the U.S. and the other stock markets. Following certain peculiarities of Wall Street Journal as discussed in Sect 3 (see Table 2), such as its worldwide recognized leadership and strong focus on domestic affairs, this means that investors considered any bad news published on this influential newspaper as a good prediction of market behaviour and promptly reacted by drastically modifying their global investment strategies.

In conclusion, returning to our hypotheses formulated at the end of Sect 2, results corroborated our first hypothesis (H1), which argued that bad news

	H_0: $C \nrightarrow B$				H_0: $B \nrightarrow C$			
	US-IT	UK-IT	US-UK	All	US-IT	UK-IT	US-UK	All
W	0.1017	0.0295*	0.0595	0.0001*	0.0121*	0.6951	0.0451*	0.0221*
F	0.6570	0.0100*	0.0108*	0.0223*	0.4739	0.3627	0.3627	0.6034
S	0.1026	0.0029*	0.0029*	0.0001*	0.9723	0.8733	0.8733	0.4141
All	0.1455	0.0026*	0.1780	0.0066*	0.0219*	0.4631	0.0208*	0.0423*

Table 6: Pairwise and joint causality test p-values. The null hypotheses (H_0) were as follows: correlation (C) did not cause (in the Granger sense) financial press pessimism (B) ($C \nrightarrow B$, left panel), financial press did not cause correlation ($B \nrightarrow C$, right panel). "All' indicates all variables are included in the test and "*' indicates the null is rejected at the 5% significance level.

published in the newspapers' banner headlines could influence market volatility. More specifically, we found that Wall Street Journal alone contributed to market volatility. At the same time, our findings also corroborated our second hypothesis (H2), which argued that bad news could even influence the correlation of markets. More specifically, we found that Wall Street Journal had a significant impact on market correlation, although in different directions. Our third hypothesis suggested that in period of financial turmoil it was likely that press and markets co-influenced each other, possibly contributing to a cascade of pessimism. We found that market correlation and newspapers influenced each other but only in specific cases. In particular, results showed that Wall Street Journal, the leading financial newspaper worldwide, had strong predictive value for market correlation and volatility. These results would confirm that in periods of financial turmoil, complex co-determination processes involving markets and media might come into play. On the other hand, especially if we look at the stronger influence of Wall Street Journal, we can argue against the common sense belief that newspapers would have over-exaggerated the dramatic events of 2008/2009 by imposing a critical stance which contributed to a cascade and contagion of pessimism, with dramatic consequences on markets.

6 Closing Remarks

In an interesting personal account on 2008/2009 events, Peter S. Goodman, now executive business editor of the Huffington Post, past national correspondent for the New Work Times, reported that:

> "Inside our newsroom in midtown Manhattan, we understood that were were not merely passive chroniclers of external events. The sportswriter can describe what is happening on the field from a dispassionate distance, without imagining that the words he types may somehow influence the events he is witnessing. Not so for those of us writing about the financial crisis: were were effectively on the field while the game was still under way. Investors and markets and ordinary people would move their money in reaction to what we and other major media were reporting, and this would in turn affect the policy climate, the perception of need for emergency measures, the politics of the debate over those measures, and the public mood, which then reverberated back on everything else" (Goodman (2011), p. 110).

This personal view seems to be reflected in our findings, especially in case of Wall Street Journal. Indeed, our results confirmed that press and markets are linked in complex ways and indicate that, in times of financial turmoil, their relationship is probably even tighter than in periods of business as usual. Following Goodman's report, this reminds us that a competent, reliable and responsible information is crucial for a well functioning of markets. More serious investigation on the ethics and responsibility of financial press to establish new standards of conducts and better incentives and sanctions to support reliable information, would be needed (e.g., Tambini (2010)).

Secondly, our findings showed that the increasing globalization of financial markets and their correlation in times of crisis require the capability of the press to truly cover the international dimension of business and be less parochial. This challenges the actual quality of the press coverage of global market dynamics and indicates the need for improving the public understanding of the intricate mechanisms of stock markets.

Finally, it is worth clarifying that our work shows certain limitations. First, we did not study the influence of financial press on stock markets but only that of bad news. This gave us a narrow view of the link of press and markets. Secondly, we studied the relationship of financial press and stock markets in an "abnormal" market phase, where market behaviour is strongly subjected to irrational expectation and social mood. We intentionally selected this period as we expected that, in these situations, the pessimism of the financial press dramatically enters the picture and shows interesting dynamics. On the other hand, it is realistic that in "normal' market periods pessimism plays a minor role. Therefore, while our results cannot contribute to formulate a general theory of the link of press and markets, they can provide important clues to understand the 'social construction' of pessimism between press and markets. Among the limitations, it is important to note that press pessimism and market behaviour could be also conditioned by other media, such as the new social media and

the Internet (see the recent study on Twitter by Bollen et al. (2011)). Further investigation is needed to compare behaviour and impact of various media and provide a more precise analysis of the 2008/2009 crisis (e.g., see Preis et al. (2010)).

References

Ackerman, J. (2008). The suprime crisis and its consequences. *Journal of Financial Stability*, 4:329–337.

Antweiler, W. and Frank, M. Z. (2004). Is all that talk just noise? the information content of internet stock message boards. *Journal of Finance*, 49(3):1259–1269.

Balduzzi, P., Elton, E. J., and Green, T. C. (2001). Economic news and bond prices: Evidence from the u.s. treasury market. *Journal of Financial and Quantitative Analysis*, 36(4):523–543.

Barber, B. and Loeffler, D. (1993). The "dartboard" column: Second-hand information and price pressure. *Journal of Financial and Quantitative Analysis*, 28(2):273–284.

Bollen, J., Mao, H., and Zeng, X. (2011). Twitter mood predicts the stock market. *Journal of Computational Science*, 2:1–8.

Borges, B., Goldstein, D. G., Ortmann, A., and G., G. (1999). Can ignorance beat the stock market? In Gigerenzer, G., Todd, P. M., and the ABC Research Group, editors, *Simple heuristics that make us smart*, pages 59–72. Oxford University Press, New York.

Brenner, M., Pasquariello, P., and Subrahmanyam, M. (2009). On the volatility and comovement of U.S. financial markets around macroeconomic news announcements. *Journal of Financial and Quantitative Analysis*, 44(6):1265–1289.

Chiang, T. C., Chen, C. W. S., and Li, H. (2007). Dynamic correlation analysis of financial contagions: Evidence from asian markets. *Journal of Internatonal Money and Finance*, 26:1206–1228.

Cipriani, M. and Guarini, A. (2008). Herd behavior and contagion in financial markets. *The B.E. Journal of Theoretical Economics*, 8(1).

Clark, G. L., Thrift, N., and Tickell, A. (2004). Performing finance: The industry, the media and its image. *Review of International Political Economy*, 11(2):289–310.

Coval, J. and Shumway, T. (2001). Is sound just noise? *Journal of Finance*, 56(5):1887–1910.

Dougal, C., Engelberg, J., García, D., and Parsons, C. A. (2012). Journalists and the stock market. *The Review of Financial Studies*, 25 (3):639–679.

Doyle, G. (2006). Financial news journalism. *Journalism*, 7(4):433–452.

Engelberg, J. E. and Parsons, C. A. (2011). The causal impact of media in financial markets. *Journal of Empirical Finance*, LXVI (1):67–97.

Engle, R. (1982). Autoregressive conditional heteroskedasticity with estimates of the variance of u.k. inflation. *Econometrica*, 50:987–1008.

Engle, R. (2002). Dynamic conditional correlation: A simple class of multivariate generalized autoregressive conditional heteroskedasticity models. *Journal of Business & Economic Statistics*, 20(3):339–350.

Engle, R. F. and Ng, V. K. (1993). Measuring and testing the impact of news on volatility. *Journal of Finance*, 48(5):1749–1778.

Entman, R. (1996). Framing toward clarification of a fractured paradigm. *Journal of Communication*, 43(4):51–58.

Forbes, K. and Rigobon, R. (2002). No contagion, only interdependence: measuring stock market comovements. *Journal of Finance*, 57 (5):2223–2261.

Gentzkow, M. and Shapiro, J. (2010). What drives media slant? evidence from u.s. daily newspapers. *Econometrica*, 78:35–71.

Goodman, P. S. (2011). The quiet crisis. In Schiffrin, A., editor, *Bad News. How America's Business Press Missed the Story of the Century*, pages 94–121. The New Press, New York.

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37:424–439.

Griffin, J. M., Hirschey, N. H., and Kelly, P. J. (2011). How important is the financial media in global markets. *Review of Financial Studies*, 24(12):3941–3992.

Jondeau, E. and Rockinger, M. (2006). The copula-garch model of conditional dependencies: An international stockmarket application. *Journal of International Money and Finance*, 25 (5):827–853.

Kahneman, D. A. and Tversky, A. (2000). *Choices, Values, and Frames*. Cambridge University Press.

Kim, S.-J. and Sheen, J. (2001). Minute-by-minute dynamics of the Australian bond futures market in response to new macroeconomic information. *Journal of Multinational Financial Management*, 11:117–137.

Knorr Cetina, K. and Preda, A. (2005). *The Sociology of Financial Markets*. Oxford University Press, Oxford MA.

Liu, P., Smith, S. D., and Syed, A. (1990). Stock price reaction to the wall street journal's securities recommendations. *Journal of Financial and Quantitative Analysis*, 25(3):399–410.

Longin, F. and Solnik, B. (2001). Extreme correlation of international equity markets. *Journal of Finance*, 56 (2):649–676.

Mondria, J. (2006). Financial contagion and attention allocation. Working Papers 245, University of Toronto, Department of Economics.

Morris, S. and Hyun, S. S. (1999). Risk management with interdependent choice. *Oxford Review of Economic Policy*, 15(3):52–62.

Nofsinger, J. R. (2005). Social mood and financial economics. *Journal of Behavioral Finance*, 6 (3):144–160.

Parsons, W. (1989). *The Power of the Financial Press. Journalism and Economic Opinion in Britain and America*. Edward Elgar, Aldershot.

Pearce, D. K. and Roley, V. R. (1985). Stock prices and economic news. *Journal of Business*, 58(1):49–67.

Pixley, J. (2002). Finance organizations, decisions and emotions. *British Journal of Sociology*, 53:41–65.

Preis, T., Reith, D., and Stanley, H. G. (2010). Complex dynamics of our economic life on different scales: insights from search engine query data. *Philosophical Transactions of the Royal Society A*, 368:5707–5719.

Pritamani, M. and Singal, V. (2001). Return predictability following large price changes and information releases. *Journal of Banking and Finance*, 25:631–656.

Reinhart, C. M. and Rogoff, K. S. (2009). *This Time is Different. Eight Centuries of Financial Follies*. Princeton University Press, Princeton, NJ.

Schifferes, S. (2011). The financial crisis and the UK media. In Schiffrin, A., editor, *Bad News. How America's Business Press Missed the Story of the Century*, pages 148–178. The New Press, New York.

Schindler, M. (2007). *Rumors in Financial Markets. Insights into Behavioral Finance*. John Wiley & Sons, Chichester.

Shiller, R. (2002). Bubbles, human judgement, and expert opinion. *Financial Analysts Journal*, 58(3):18–23.

Shiller, R. (2005). *Irrational Exuberance*. Princeton University Press, New Jersey.

Soroka, S. (2006). Good news and bad news: Asymmetric responses to economic information. *Journal of Politics*, 68(2):372–385.

Stickel, S. E. and Verrecchia, R. E. (1994). Evidence that volume sustains price changes around earnings announcements. *Financial Analysts Journal*, November-December:57–67.

Suttles, G. D. and Jacobs, M. D. (2010). *Front Page Economics*. University of Chicago, Chicago.

Tambini, D. (2010). What are financial journalists for? *Journalism studies*, 11 (2):158–174.

Tan, S. J. and Chua, S. H. (2004). While stocks last. impact of framing on consumers' perception of sales promotions. *Journal of Consumer Marketing*, 21(4/5):343–355.

Tetlock, P. C. . (2011). All the news that's fit to reprint: Do investors react to stale information? *The Review of Financial Studies*, 24(5):1481–1512.

Tetlock, P. C. (2007). Giving content to investor sentiment: The role of media in the stock market. *Journal of Finance*, 62(2):1139–1168.

Tetlock, P. C. (2010). Does public financial news resolve asymmetric information? *The Review of Financial Studies*, 23(9):3520–3557.

Tetlock, P. C., Saar-Tsechansky, M., and Macskassy, S. (2008). More than words: Quantifying language to measure firms' fundamentals. *Journal of Finance*, 63:1438–1467.

Thaler, R. H. (1993). *Advances in Behavioral Finance*. Russell Sage Foundation, New York.

Thrift, N. J. (2001). It's the romance, not the finance, that makes the business worth pursuing: Disclosing a new market culture. *Economy and Society*, 30:412–432.

Tickell, A. (1995). Making a melodrama out of a crisis: reinterpreting the collapse of barings bank. *Environment and Planning D: Society and Space*, 14(1):5–33.

Tivegna, M. and Chiofi, G. (2004). *News and Exchange Rate Dynamics*. Ashgate, Aldershot.