Does Mood Impact on Acquirers' Announcement Abnormal Returns?

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ABSTRACT

We argue that mood influences investors' perceptions of potential merger synergies and risks, thus significantly affecting acquirer announcement abnormal returns. We proxy daily mood based on Facebook's status updates across nineteen markets and show that there is a significant positive relation between mood and bidder announcement stock market reaction. We find that bids announced during periods of good mood generate significantly higher announcement abnormal returns than those announced during bad mood periods. This relationship is more pronounced in acquisitions with a low percentage of blockholder ownership, acquisitions of public targets, and acquisitions of large targets relative to the size of the bidders. Overall, the results support behavioral extensions of neoclassical theory.

Keywords: Mergers and acquisitions, mood, short-term wealth effect.

JEL classification: G1, G34

1. Introduction

According to the neoclassical theory of mergers and acquisitions (Mitchell and Mulherin, 1996), stock price movements reflect rational expectations of merger synergies. Due to the limitations of this theory in explaining empirical findings, an increasing number of studies (Shleifer and Vishny, 2003) have employed behavioral aspects to refine it. The theoretical behavioral model closest to this study is that by Shleifer and Vishny (2003), according to which firms are valued inefficiently. Empirical studies (Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf et al., 2005; Bouwman et al., 2009) show that there are periods when investors are overoptimistic. During these periods, there is high merger activity and acquirers enjoy higher short-run abnormal returns. Rosen (2006) claims that this is driven by investor over-optimism. We contribute to this literature by empirically examining a human behavioral trait, namely mood. We empirically test whether investor mood has an impact on the market reaction to bidder merger announcements.

A number of psychological studies have shown that emotions have an impact on judgment. Investors who are in a good mood tend to make more optimistic decisions (Wright and Bower, 1992; Bless et al., 1996). According to Johnson and Tversky (1983) and Loewenstein et al. (2001), mood also influences the judgment of favorable future prospects and the assessment of risk. We therefore hypothesize that mood influences the share price reaction of bidders. For example, when investor mood is high, investors are more likely to overestimate synergies and/or underestimate risks. Therefore, high (good) mood is expected to be positively related with abnormal firm bidder performance in mergers and acquisitions.

The lack, until recently, of daily mood data may explain the limited attention given to the potential impact of mood on acquisition returns in the existing empirical literature. We use daily mood data available from Facebook across nineteen international markets to capture

the mood on the days of the merger announcements. Siganos et al. (2013) and Karabulut (2013) show that Facebook mood is positively related with market returns, in line with other commonly used monthly sentiment indexes.[1] Our study is the first that uses Facebook's mood data within the M&A field.

We empirically support the significance of behavioral aspects affecting share returns in mergers and acquisitions. We show that there is a positive relation between the level of country mood and bidder abnormal returns. Note that we focus on acquirer returns since bidders bear most of the risk related to the true value of merger synergies and thus face higher levels of uncertainty regarding the potential share price reaction to the bid announcement than do the counterpart target firms.[2] In univariate analysis, we construct quartile portfolios and find that the cumulative abnormal returns within a five-day period from two days before to two days after the day of the bid announcement (-2,+2) of bidders are 1.9 (1.2) percent in the highest (lowest) mood quartile. The difference in returns between the high and low mood portfolios of 0.7 percentage points is economically large and statistically significant at the one percent level. We further undertake multivariate analysis to control for a number of variables that have previously been found to have a significant impact on bidder returns, and find that prior results hold, indicating that mood has a positive relation with returns on acquirers' announcements.

We then explore subsamples of deals for which mood is expected to have a more pronounced effect on bidder abnormal returns. We first explore whether the percentage of blockholder ownership in a firm has an impact on results. Since small investors are more

[1] Other commonly used sentiment indexes include the University of Michigan Consumer Sentiment Index and the Consumer Confidence Index. In US studies using annual data, Baker and Wurlger's (2006) composite measure of investor sentiment is commonly used.

[2] In unreported results, we empirically find that there is no relation between mood and target returns on their announcements. Target firms experience a strong upward share price reaction upon the bid announcement (e.g., King, 2009), and there is little uncertainty on the outcome.

heavily influenced by mood (e.g., DeLong et al., 1990), we hypothesize and empirically support that the relationship between mood and bidder returns is more prominent in firms with low levels of blockholder ownership. We further separate the merger deals into two groups: acquisitions of public versus private target firms, and explore the magnitude of the relationship between mood and bidder abnormal returns for each group separately. Not only have prior studies found returns to bidders to vary significantly with the listing status of the target (Chang, 1998; Draper and Paudyal, 2006), but media coverage is expected to be higher in public than in counterpart private deals (e.g., Fang and Peress, 2009). Public acquisitions tend also to be larger transactions and attract more attention. However, according to Barber and Odean (2008), retail investors are heavily influenced by media attention when selecting firms in which to invest, and retail investors are those more heavily influenced by mood (e.g., DeLong et al., 1990). We therefore hypothesize that mood has a stronger relationship with acquirers' announcement returns within public acquisitions.

Empirical results support our hypotheses. When estimating univariate results, we find, for example, that the difference in acquirer announcement returns between high and low mood portfolios is a highly significant 2.1 percentage points for public target acquisitions and only 0.5 percentage points, and statistically insignificant, for private target acquisitions. We further show that the relation between mood and returns is stronger within high relative size merger transactions. Larger deals have a larger impact on the acquirer, and therefore the mood and return relationship should be more pronounced in large relative size deals.

In line with Garcia (2013) and evidence in psychological literature, we find that the impact of mood is more pronounced during recession periods. We further provide evidence to suggest that the impact of mood on announcement returns is a short-term market

overreaction. We show that the positive relation between mood and bidder returns tends to reverse over the next few days following the merger announcement.

This paper contributes in several ways: This is the first paper that examines the impact of investor mood on acquirers' announcement abnormal returns. We contribute to the M&A literature by showing that this human, behavioural trait, of mood has a significant impact on the perceived level of risk and synergies from a merger. More specifically, we find that, after controlling for other factors, a one percentage point increase in mood is related with a modest, but highly significant, 0.11 percentage point increase in acquirers' cumulative returns in the interval period two days before to two days after the announcement (-2,+2). Secondly, our study is the first that uses Facebook's mood data within the M&A field. Thirdly, we show that mood mainly affects individual investors and is more pronounced for acquiring firms that have low levels of blockholder ownership. Finally, behavioral finance literature (e.g., Edmans et al., 2007, Hirshleifer and Shumway, 2003, Siganos et al. 2013) show that mood is positively related with the aggregate stock market performance. We contribute to the behavioral finance literature by showing that mood significantly impact the excess returns of firms on the announcement of acquisitions.

The remainder of the paper is structured as follows: Section 2 describes our data. Section 3 discusses the empirical results on the relation between mood and the short-term wealth effect of bidders upon their merger announcements. Section 4 concludes.

2. Data description

We use daily mood (GNH) data from Facebook for nineteen international markets between September 2007 and March 2012.[3] The countries included are Argentina, Australia, Austria, Belgium, Canada, Chile, Colombia, Germany, India, Ireland, Italy, Mexico, the Netherlands, New Zealand, Singapore, South Africa, Spain, the UK, and the US. The mood coverage available from Facebook determines the countries selected and the sample period of the study. We did not use common sentiment indexes such as the University of Michigan Consumer Sentiment index or the Baker and Wurgler index, since these are normally available on a monthly or yearly basis and generally restricted to the US market (e.g., Schmeling, 2009). Siganos et al. (2013) and Karabulut (2013) validate Facebook's mood index, and its daily frequency allows us to capture mood on specific merger announcement days.

GNH is estimated by Facebook's Data Team based on the status updates of millions of Facebook users. GNH is a standardized index and estimated by Facebook's Data Team by measuring the percentage of 'positive' and 'negative' terms used. It is estimated as follows:

$$GNH_{i,j} = \frac{x_{p,i} - x_{p,all}}{\sigma_{p,all}} - \frac{x_{n,i} - x_{n,all}}{\sigma_{n,all}} \quad (1)$$

where $GNH_{i,j}$ is the mood index of a country j at day i, $x_{p,i}$ and $x_{n,i}$ show the average positive (p) and negative (n) words used respectively on day i for the country, and $x_{p,all}$, $x_{n,all}$ $\sigma_{p,all}$, $\sigma_{n,all}$ are the average (x) positive and negative words used over the duration of the index and the standard deviation (σ) of those variables. Extreme high and low 10 percent of the days are excluded by Facebook when estimating $x_{p,all}$, $x_{n,all}$ $\sigma_{p,all}$, $\sigma_{n,all}$ to

[3] GNH stands for Gross National Happiness Index.

minimize the impact of extreme values.[4] In line with Siganos et al. (2013), we exclude observations above the 99th percentile, since these normally relate to messages like "Happy Mother's Day", which do not necessarily reflect mood.

We also download from Thomson OneBanker information on acquisitions by bidding firms in corresponding countries/data periods available. For a deal to be included in the sample, the bidder needs to acquire at least 50 percent of the target's shares. Eligible firms are those with available Datastream codes and with available returns from Datastream for the interval period from two days prior to two days after the day of their bid announcements.[5] Based on the literature, we download the following merger characteristics that are related with bidder returns: public vs. private deals (e.g., Bradley et al., 1988), the method of payment (e.g., Travlos, 1987), and cross-border vs. domestic acquisitions (e.g, Danbolt and Maciver, 2012). We also download from Datastream firm returns and firm characteristics related with bidder returns: the relative deal value of the target to the market value of the acquirer (e.g., Asquith et al., 1983), the book-to-market ratio (e.g., Rau and Vermaelen, 1998; Sudarsanam and Mahate, 2003), the percentage of strategic, blockholding, ownership[6], and whether the acquisition is diversifying or not.

Table 1 shows summary statistics of mood and the share price reaction of bidders around their merger announcements. We use a five-day event window from two days before to two days after (-2,+2) each merger announcement to measure the short-term wealth effects (Fuller et al., 2002).[7] The two-day lag period is selected for potential leaks prior to merger announcements and the two-day lead is to fully capture the share price reaction by investors. We find that almost half of the acquisitions took place in the US (4,332 out of a total of 9,726

[4] See Kramer (2010) for further details on the construction of Facebook's mood index.
[5] We use the RI datatype to measure returns that incorporate dividend payments. Log estimations are calculated.
[6] This indicates the percentage of shareholders with strategic share holdings of 5 percent or more.
[7] Results are similar when a shorter three-day event window between one day before and after merger announcements is used (-1,+1).

acquisitions in our sample). Due to the small number of acquisitions available in some countries, we present results below for all countries combined and in a later section for US acquisitions only.

[please insert Table 1 here]

In line with prior literature (e.g., Travlos, 1987; Chang, 1998; Draper and Paudyal, 2006), we find that the short-term wealth effect tends to be abnormally positive for bidders in acquisitions of private firms and negative in acquisitions of publically listed targets.[8] For example, the five-day cumulative abnormal returns are -0.5 and 1.9 percent for the sample as a whole for public and private target acquisitions, respectively. We also estimate the mean and median mood level for the equivalent interval period from -2 to +2 days around each merger announcement. The mood, based on the Facebook data, tends to be slightly negative around the acquisition announcements in most countries, with India experiencing the lowest average mood (-0.56) and Italy the highest (0.14). Regression standard errors are clustered per country (Petersen, 2009), to control for such national differences in mood levels.

Table 2 offers Spearman and Pearson correlations of the variables used in the study. Interestingly, mood is positively associated with abnormal returns at the one percent level, showing the first sign that there is a strong link between the key variables under study. In line with the literature (e.g., Sudarsanam and Mahate, 2003), abnormal returns are also related with the control variables used. There are some relatively strong correlations among our control variables. The significant correlations among the control variables are, however, acceptable for the purpose of the study, since we are not interested in the relation of each control variable with abnormal returns, but rather with whether mood is related to bidder announcement returns after controlling for these variables.

[8] Abnormal returns are estimated as the difference between share returns and the contemporaneous market performance. Datastream's TOTMK country indexes are used to measure market performance.

[please insert Table 2 here]

The following section explores whether mood has an impact on acquirers' announcement returns.

3. Empirical results

3.1 Mood and acquirer returns

We first undertake univariate analysis to explore the relation between mood and acquirers' announcement returns. Note that mood and returns are measured over the same interval period between day -2 and +2 around each merger announcement day. We rank mergers based on the mood level and then split acquisitions into quartiles. The use of quartiles is used, rather than e.g., deciles, to ensure that portfolio returns do not arrive from a small number of observations.

Table 3 shows the cumulative portfolio returns around the merger announcements across different levels of mood portfolios. We find that mood significantly influences acquirers' returns. For example, acquirer returns are 1.9 and 1.2 percent for high and low mood portfolios, respectively, when analyzing the full sample of countries. The difference is economically large and statistically significant at the one percent level. Besides the top and bottom mood portfolios, a monotonically positive relation across all four portfolios is present. Moving from high to lower mood portfolios, mean abnormal returns for bidders for the overall sample of all countries are as follows: 1.9, 1.8, 1.4, and 1.2 percent. These results support our hypothesis that mood impacts on the share price reaction of bidders on their merger announcements.

[please insert Table 3 here]

We further undertake multivariate analysis to control for variables that may explain the results above. We estimate OLS regressions with robust standard errors clustered by country. The dependent variable is the five-day cumulative abnormal returns per firm (-2,+2). Independent variables are the mood (GNH) in the contemporaneous period with that used for returns, and the following control variables are employed: the book-to-market ratio, a domestic acquisition dummy, a stock payment dummy, a diversification dummy based on whether the bidder and target firms operate within the same two-digit SIC code industries, and a public acquisition dummy.

Table 4 shows the results of the multivariate analysis. We find that the signs and the statistical significance of control variables are in broad terms in line with the extant literature (e.g., Travlos, 1987). More importantly, mood is positively related with acquirer returns. The coefficient on mood (GNH) is 0.110 and significant at the one percent level, indicating that after controlling for other factors, a one percentage point increase in mood is associated with a 0.11 percentage point increase in acquirers' cumulative abnormal returns.

[please insert Table 4 here]

Overall, these results support the developed hypothesis that mood influences the share price reaction of bidders. When mood is high, investors are more likely to overestimate synergies or underestimate risks and therefore attribute a more favorable present valuation for the announced takeover deal, resulting in observing, on average, higher cumulative abnormal returns around the announcement date.

3.2 What drives the relation between mood and bidder abnormal returns?

This section explores characteristics that may drive the relation between mood and bidder abnormal returns. First, we explore whether the percentage of blockholder ownership in a firm has an impact on results. Since small investors are more heavily influenced by mood

(e.g., DeLong et al., 1990), we hypothesize that the relation between mood and bidder returns is more prominent in firms with a low percentage of shares owned by large, strategic, blockholders. Second, we explore the significance of public versus private deals on the results above. We hypothesize that the relation between mood and acquirer returns is stronger within public deals. There is a higher likelihood for the merger announcement to attract more attention in public deals. Third, we test whether the first two factors interact. If mood affects predominately private investors and deals with significant publicity, we would expect the impact of mood to be particularly high in acquisitions of public targets by bidders with low levels of blockholder ownership. Fourth, we explore the impact of relative size on the mood and return relation. Larger deals have a larger impact on the acquirer, and therefore the mood and return relationship should be more pronounced within large size deals.

Table 5 shows the univariate results. We use quartiles to split groups into low and high strategic blockholder ownership, and high and low relative size groups. We first identify the top and bottom quartile for each characteristic and then rank them based on the level of mood. Results support the developed hypotheses. The relation between mood and bidders' abnormal returns is stronger in companies with low rather than high strategic blockholder ownership.[9] In acquisitions with predominately small investors (low strategic blockholder ownership), the difference in returns between high and low mood is 0.9 percentage points and significant at the ten percent level, compared to an insignificant 0.3 percentage points in acquisitions by bidders with high levels of blockholder ownership.

[please insert Table 5 here]

[9] We have checked the trading volume around the announcement of the deals and find that both the high and low strategic ownership groups generate positive and significant abnormal trading activity around the time of the bid announcement. The difference in the impact of mood on abnormal returns between the two groups is therefore unlikely to be driven by thin trading.

The phenomenon is also expected to be more prominent for bidders acquiring public target firms rather than private targets. Acquisitions of public firms usually attract more attention from small investors, whose decisions are more likely to be affected by mood swings. The difference in returns between high and low mood is 2.1 percentage points and significant at the one percent level for public deals, and 0.5 percent and insignificant for private deals. We further split portfolios by taking into consideration both the targets' public status and the strategic blockholder ownership dimension. As we would expect, the impact of mood on bidder returns is particularly strong in acquisitions for which the bidders' investor base consists of predominately individual shareholders and the acquisition is of a public target firm. The difference between high and low mood is a significant 2.2 percentage points, while we find no impact of mood on bidder returns in acquisitions of private targets.

We further split our sample into high and low relative size deals. The impact of an acquisition is expected to be stronger if the size of the target is large relative to the size of the bidder. The differential of good versus bad mood is expected to be more pronounced for high relative size deals. The good minus bad mood difference in returns is 1.60 percent for high relative size transactions and 0.60 percent for low relative size transactions, both significant at the five percent level.

Table 6 shows the multivariate results after adjusting for variables that may influence univariate findings. We construct dummy variables for each group of interest and interact it with the mood (GNH) index. The interactive variable will capture the impact of mood in the group of interest and the difference between the two groups. In regression (1), cumulative abnormal returns are regressed against a number of control variables, on a mood variable (GNH), on a dummy variable (LowBlock) that takes the value of 1 if the deal belongs to the bottom quartile of the sample based on the strategic blockholder ownership dimension and on

the interactive variable between mood and the ownership dummy (LowBlock*GNH). The positive coefficient (0.081) of the interactive variable indicates that the impact of mood is more pronounced for the group of bidders where strategic blockholders own a smaller fraction of shares. Thus, as hypothesized, mood seems to have a higher effect for deals followed by a larger number of smaller, retail investors. Similarly, we argue that the impact of mood on bidder's abnormal returns should be more evident for acquisitions of public target firms, which are more likely to attract small, individual investors' attention. The positive and significant coefficient (0.289) of the interactive variable (Public*GNH) in regression (2) provides support for the above hypothesis.

[please insert Table 6 here]

In regression (3), we combine the two aforementioned deal characteristics into one subsample. We create a dummy variable (LowBlockPublic) that takes into account both the ownership dimension and the target's public status. Within the low blockholder ownership portfolio, where individual investors are more prevalent, we examine the impact on public acquisitions, which are usually larger deals and more likely to attract attention. The interactive variable is the most positive and significant (0.513), indicating that the impact of mood is most detectable for the group of deals that are followed by small retail investors when acquirers announce takeovers of public target firms.

Finally, in regression (4), we split deals into acquisitions for which the target is large versus small relative to the size of the acquiring firm. The relative size is expected to have a multiplier effect. The impact of a takeover on bidder announcement abnormal returns is positively related with the relative size of the target. If mood has an impact on bidders' short-run abnormal performance, positive and negative mood should be more prominent in large relative size deals and therefore their differential would be more pronounced. There is,

however, only limited support for this in our results. The coefficient of the interactive variable (RSHigh*GNH) is large and positive (0.354) though not statistically significant.

Overall, we identify three characteristics that influence the prominence of the relation between mood and returns: the percentage of a firm's shares held by strategic blockholders, the target status, and the relative size of the transaction between a target and a bidder.

3.3 Is the relation between mood and bidder abnormal returns irrational?

We undertake a further test to explore whether the relationship between mood and abnormal bidders' returns is an irrational, short-term, market overreaction. We explore the impact of mood on bidders' returns over the next few days after the merger announcement. If the relation between mood and bidder returns is driven by a simple market overreaction, the relation should reverse over the following days. We therefore explore the relation between mood, as estimated previously in the interval period between -2 and +2 days, and the impact on acquirers' abnormal returns over the following 3 to 6 days after each merger announcement.

Figure 1 depicts the coefficients of GNH when abnormal returns on each of the days 3 to 6 are regressed against the average GNH during the five days window. The first column of the figure shows that the coefficient of GNH on the 5 days cumulative abnormal returns is 0.121, positive and statistically significant. The relationship between mood and abnormal returns on day 3 is shown on the second column of the graph for which the coefficient of mood goes down 0.023 and further down to -0.017 on day 4. For days 5 and 6, the respective coefficient are 0.017 and -0.020. In unreported results, we find similar results or other subgroup portfolios: low strategic ownership, public target deals, and high relative size deals. Overall, our results suggest that the impact of mood on bidder announcement returns is a

short-term market overreaction. The relation tends to reverse in the days following the merger announcement.

[please insert Figure 1 here]

3.4 US results

Results above are estimated for the pooled sample of all nineteen countries. We have no *a priori* expectation of the relation between mood and abnormal returns to vary between countries[10], but due to the importance of the US market in global M&A activity and the availability of alternative proxy of mood for this market, we re-estimate prior multivariate results for the sub-sample of US acquisitions.[11]

Table 7 shows the results for the relation between mood and bidders' abnormal returns as well as the results for characteristics found earlier to be related with the strength of the relationship between key variables under study. This table shows results when Facebook's US GNH index is employed. We find that US results are very similar to those found for the full sample. Mood is positively related with abnormal share returns, as shown in regression (1), and the relation between mood and returns is stronger within firms with a low percentage of strategic blockholder ownership (regression 2), in acquisitions of public targets (regression 3), when the two characteristics are interacted (regression 4) and in high relative size acquisitions (regression 5). For example, the coefficient on mood is 0.135 and significant at the five percent level after adjusting for the control variables (as shown in Column 1). In

[10] The limited number of observations in several countries also restricts the extent to which detailed cross country comparisons can be undertaken.

[11] In unreported results, we find that univariate results show the same trends in line with multivariate analysis. We also find that the positive relation between mood and bidder returns is qualitatively similar in other high merger activity markets.

unreported results, we further find evidence of reversal in abnormal returns after the acquisition announcement in the US sample as previously reported for the overall sample.

[please insert Table 7 here]

Another advantage exploring the US results is that within the US market, other daily sentiment indexes have been developed recently. The Gross National Happiness Index produced by Facebook is arguably a good proxy for capturing a country's mood, with millions of Facebook users daily updating their status on how they feel, and with an international coverage. However, for robustness purposes, we also use an alternative sentiment index: The Gallup US Economic Confidence Index. This index is also available on a daily basis, but is only available for the US market.[12] The Gallup Index is calculated based on phone interviews of 1,500 Americans aged 18 or over. In short, interviewees are asked to rate the economic condition of the US today as well as their expectations for the future. In unreported results, we find that the Pearson correlation between Gallup Index and Facebook GNH Index is 0.39 and significant at the one percent level, showing the first indication that similar results may be obtained for both indexes.

Table 8 shows results for multivariate regression in the same framework as shown in Table 7, using the Gallup rather than the Facebook sentiment index. We find that the Gallup sentiment index arrives at qualitatively similar conclusions to those obtained using Facebook's mood index. In particular, we find that there is a positive and significant relation between mood and acquirer abnormal announcement returns. The coefficient on the Gallup mood index is 0.329 and significant at the one percent level. The relation between mood and acquirer returns is also more prominent for bidders with low blockholder ownership (regression 2), in acquisitions of public targets (regression 3), in the interaction of low

[12] Note that Gallup's Index data commence on January 2008.

ownership and acquisition of public target firms (regression 4) and in high relative target size deals (regression 5). These results suggest our findings are not driven by Facebook's proxy of mood. When we employ an alternative daily mood proxy, our results remain qualitatively similar. In unreported results, we further control for the GNH Facebook Index and the Gallup Confidence Index in the same regression. We find that Facebook GNH Index exhibits a higher explanatory power as it remains positive and significant, while the Gallup remains positive but becomes marginally insignificant when including both variables. Facebook's international coverage and its higher explanatory power motivate the use of GNH as the main mood indicator throughout the study.

[please insert Table 8 here]

Within the US market, we further explore the impact of mood in acquirer abnormal returns during recession and expansion periods. We perform this test only for the US takeover deals for two reasons: first to obtain results comparable with the literature and second the recession/expansion period data from NBER website are provided for the US market. Empirical literature (Garcia, 2013) suggests that the impact of investor sentiment is concentrated during periods of economic recession. Akerlof and Shiller (2009) argue that the link between investor confidence and economic decisions are especially large and critical during recession periods. Psychological literature (Smith and Ellsworth, 1985; Orthony at al., 1988, Gino et al., 2009) shows that not only emotions, but also the feelings of anxiety and fear affect decision making. Such feelings are more likely to occur during periods of economic recession, leading to higher impact of mood during recessions.[13]

To identify recession and expansion periods, we use NBER classification in line with Garcia (2013). Table 9 shows regression results during the recession period (Regression 1)

[13] We find the average level of mood during recessions to be significantly lower than during expansion periods.

and the expansion period (Regression 2). In line with the literature (Garcia, 2013), our results show that the impact of mood is more evident during recession period. While the coefficient of GNH for the overall US sample (as reported in Table 7) is 0.135 and statistically significant at 5% level, during recessions this goes up to 0.420 and statistically significant at the 1% level. During the expansion period the relation between mood and acquirer abnormal returns is insignificant.

[please insert Table 9 here]

Overall, we find that results are qualitatively similar within the US market and the overall sample of nineteen countries. The use of Facebook's index to proxy mood does not drive the results. With the use of Gallup's index, we find qualitatively similar findings on the importance of mood for acquirer returns. Finally, mood has a more pronounced impact on investors' decisions during recession.

4. Conclusion

Theoretical behavioral models have been developed to extend the neoclassical theory of mergers and acquisitions (Mitchell and Mulherin, 1996), such as the model developed by Shleifer and Vishny (2003). However, relatively little empirical analysis has been undertaken. Even though a number of factors have been previously put forth to explain acquirer returns, little empirical investigation has been undertaken of the significance of mood. This may be attributed to the lack of daily mood data available, since commonly used mood indexes are available only on a monthly or annual basis. We use daily mood data, as developed by Facebook, across nineteen international markets, to capture in a timelier manner the mood on the days surrounding a merger, and explore the impact of mood on acquirers' announcement returns.

We find that mood has a significant positive impact on the magnitude of acquirer announcement abnormal returns. Results hold within univariate and multivariate analyses, as well as within a number of robustness tests. When mood is high, investors appear to be more likely to overestimate synergies or underestimate risks, resulting in higher bidder announcement abnormal returns. A number of psychological studies (e.g., Wright and Bower, 1992) support the theoretical impact that mood may have on decision processes.

We further find that results are stronger for bidders with low strategic blockholder ownership, for acquirers of public targets, and in larger relative size transactions, since public target acquisitions have more media coverage, which affects small investors' investment decisions. The impact of mood on bidder abnormal returns appears to be stronger during recessions than during expansionary economic periods. This is consistent with the arguments of Akerlof and Shiller that the link between investor confidence and economic conditions are especially large and critical during recessions. However, the relation between mood and bidder returns tends to reverse in the days following the merger announcement, suggesting the impact of mood on bidder abnormal returns may be an irrational overreaction. Results remain qualitatively similar within US acquisitions and when using US Gallup's Economic Confidence Index. The relation between mood and bidder announcement returns is more prominent during a recession.

Overall, we support behavioral extensions of the neoclassical theory indicating the significance of mood on the share price reaction of acquirer returns. Our results suggest that mergers are considered more positively in the short term by investors when the merger announcements occur on a day that investors are optimistic. Our results further suggest that mood is a variable that affects the wealth effects of mergers. Future research may explore whether mood influences the price reaction of other released information by firms.

Acknowledgements: We are grateful to Marc Goergen, Alan Goodacre, Dimitris Petmezas, Bill Rees, Yannis Tsalavoutas and Betty Wu, as well as seminar participants at the Universities of Einburgh, Glasgow and Stirling for helpful comments on previous versions of this paper.

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Figure 1. The Impact of GNH on lead Abnormal Returns

The figure depicts the coefficient on GNH (the average GNH over days -2,+2) on the abnormal returns over the five day event window (-2,+2 days) as well as on each of the days +3 to +6 after the acquisition announcement.

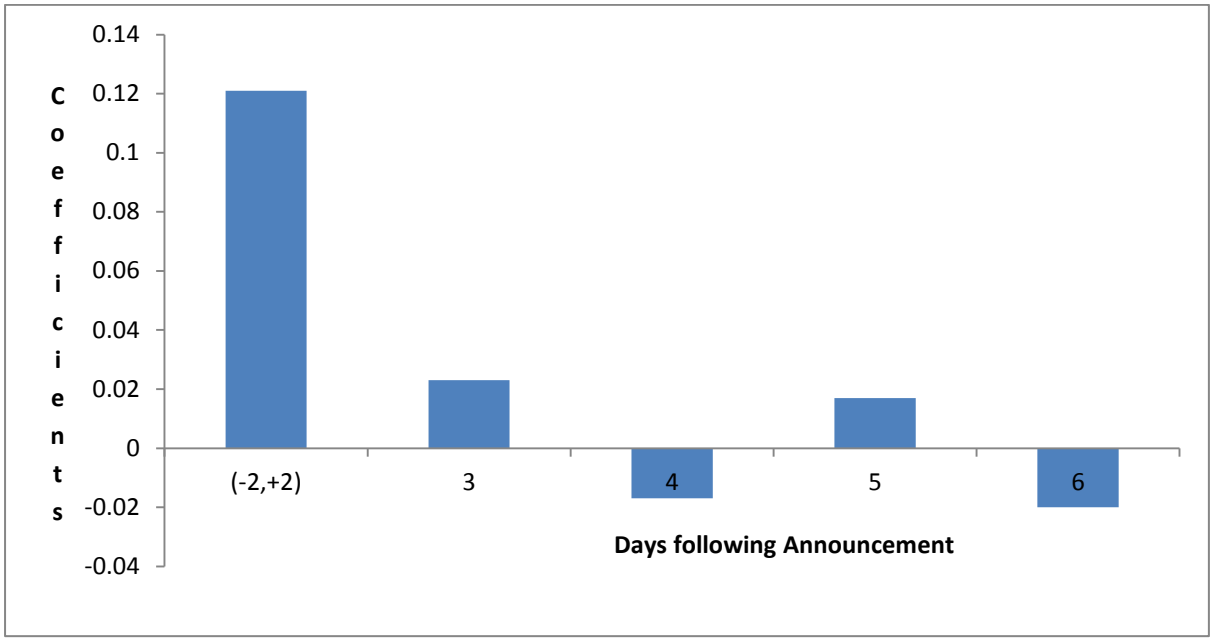

Table 1. Descriptive statistics

This table shows the descriptive statistics of the number of mergers, the mood level (GNH), and the percentage abnormal cumulative returns (CAR) per country in the sample. Mood and cumulative returns are estimated over the five-day period from two days before to two days after the day of each merger announcement (-2,+2). N indicates the number of merger transactions analyzed. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	All				Public targets		Private targets	
	GNH Mean	GNH Median	CAR Mean	N	CAR Mean	N	CAR Mean	N
All	-0.012	-0.011	0.016***	9726	-0.005*	1223	0.019***	8503
Argentina	-0.007	-0.007	0.021	31	0.056	3	0.017	28
Australia	-0.006	-0.007	0.034***	901	-0.002	108	0.039***	793
Austria	-0.011	-0.007	0.002	36	0.005	3	0.001	33
Belgium	-0.001	-0.007	0.024***	72	0.028	6	0.023***	66
Canada	-0.009	-0.008	0.023***	1699	-0.004	312	0.029***	1387
Chile	-0.015	-0.011	0.015**	38	0.040**	6	0.010	32
Colombia	-0.002	-0.009	0.010	24	0.029	3	0.008	21
Germany	-0.001	0.002	0.012*	147	0.000	23	0.014**	124
India	-0.056	-0.061	0.003	219	-0.002	31	0.003	188
Ireland-Rep	-0.021	-0.021	0.018*	69	0.008	4	0.019*	65
Italy	0.014	0.004	0.007	153	-0.009	11	0.008*	142
Mexico	-0.010	-0.008	0.017*	38	0.013	6	0.017**	32
Netherlands	-0.012	-0.016	0.005	119	-0.017	19	0.009*	100
New Zealand	-0.012	-0.010	0.020	37	-0.034	3	0.025*	34
Singapore	-0.008	-0.009	0.008	152	0.009	6	0.008	146
South Africa	-0.012	-0.010	0.018**	102	0.016	16	0.018**	86
Spain	-0.010	-0.012	0.004	101	-0.021	10	0.007	91
UK	-0.010	-0.012	0.012***	1456	-0.007	108	0.014***	1348
US	-0.014	-0.013	0.012***	4332	-0.008**	545	0.015***	3787

Table 2. Spearman and Pearson correlations

This table shows the Spearman (bottom left) and Pearson (top right) correlations of the variables used in the study. Results shown are for the pooled sample of all countries. CAR and GNH are the percentage cumulative abnormal returns and the mood in the interval period between two days before and after (-2,+2) each merger announcement. BTMV is the book-to-market-ratio, Domestic is a dummy variable taking the value of one for domestic deals, Stock is a dummy variable equal to one for stock payments, Diversified is a dummy variable equal to one for targets and bidders with the same first two SIC code digits, Public is a dummy variable equal to one for public target deals, and RSHigh is a dummy variable taking the value of one for the top quartile relative size between acquirer and target firms. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	CAR	GNH	BTMV	Domestic	Stock	Diversified	Public	RSHigh
CAR	1	0.026***	0.036***	-0.015	0.042***	-0.018*	-0.086***	0.146***
GNH	0.026**	1	0.024**	-0.019*	0.017*	0.007	-0.005	0.051***
BTMV	0.014	0.155***	1	-0.008	0.134***	0.022**	0.006	0.189***
Domestic	-0.037***	-0.018*	0.088***	1	0.069***	0.008	0.075***	0.057***
Stock	-0.026**	0.041***	0.114***	0.068***	1	-0.051***	0.290***	0.279***
Diversified	-0.027**	0.003	0.036***	0.006	-0.073***	1	-0.117***	-0.031***
Public	-0.094***	0.010	0.044***	0.077***	0.324***	-0.114***	1	0.112***
RSHigh	0.057***	0.064***	0.293***	0.054***	0.257***	-0.053***	0.135***	1

Table 3. Univariate analysis

This table shows the univariate results regarding the impact of mood (GNH) on the percentage cumulative abnormal returns of bidders estimated over the five-day period from two days before to two days after the day of each merger announcement (-2,+2). We first rank mergers on mood level and then generate quartile portfolios. High (low) mood is the top (bottom) quartile. N indicates the number of mergers available. Results shown are for the pooled sample of all countries. P-values are shown in parentheses. *** indicates significance at the 1 percent level.

	All
High GNH	0.019***
	(0.000)
N	2431
2 GNH	0.018***
	(0.000)
3 GNH	0.014***
	(0.000)
Low GNH	0.012***
	(0.000)
N	2426
High-Low	0.007***
	(0.008)

Table 4. Multivariate analysis

This table explores whether the impact of mood on acquirers' returns holds after adjusting for a number of control variables. The dependent variable is the percentage cumulative abnormal returns estimated over the five-day period from two days before to two days after the day of each merger announcement (-2,+2). The following independent variables are used: BTMV is the book-to-market-ratio, Domestic is a dummy variable taking the value of one for domestic deals, Stock is a dummy variable equal to one for stock payments, Diversified is a dummy variable taking the value of one for targets and bidders with the same first two SIC code digits, and Public is a dummy variable taking the value of one for public target deals. The main independent variable under consideration is mood (GNH), which is estimated in the interval period between -2 and +2 days around merger announcements. Results shown are when all countries are employed. Standard errors are clustered by country. P-values are shown in parentheses. N indicates the number of observations. **, and *** indicate significance at the 5, and 1 percent levels, respectively.

	All
GNH	0.110***
	(0.004)
BTMV	0.001**
	(0.048)
Domestic	-0.004
	(0.253)
Stock	0.016**
	(0.018)
Diversified	-0.006***
	(0.001)
Public	-0.028***
	(0.000)
Constant	0.022***
	(0.000)
N	8896
adj. R-sq	0.014

Table 5. Univariate analysis: Subgroup results

This table shows the univariate results regarding the impact of mood (GNH) on the percentage cumulative abnormal returns of bidders for a number of subgroups: the percentage of blockholder ownership in a firm, the target status, and the relative size between acquirer and target firms. Blockholder ownership indicates the percentage of shares held by strategic shareholders owning 5 percent or more each. Targets may be private or public firms. We first identify the top and bottom quartile per country for each characteristic and then rank them based on the level of mood. GNH and returns are estimated over the five-day period from two days before to two days after the day of each merger announcement (-2,+2). N indicates the number of mergers available. Results shown are when all countries are employed. P-values are shown in parentheses. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	Blockholder Ownership		Target Status		Low Blockholder Ownership		Relative Size	
	Low	High	Public	Private	Public	Private	High	Low
High GNH	0.014***	0.019***	0.004	0.021***	-0.001	0.015***	0.048***	0.005***
	(0.000)	(0.000)	(0.391)	(0.000)	(0.942)	(0.006)	(0.000)	(0.003)
N	525	527	304	1274	86	236	605	605
Low GNH	0.005	0.016***	-0.017***	0.016***	-0.023**	0.016**	0.032***	-0.001
	(0.194)	(0.000)	(0.002)	(0.000)	(0.019)	(0.021)	(0.000)	(0.671)
N	525	527	305	1274	86	236	605	605
High-Low	0.009*	0.003	0.021***	0.005	0.022*	-0.001	0.016**	0.006**
	(0.093)	(0.633)	(0.004)	(0.165)	(0.065)	(0.884)	(0.042)	(0.043)

Table 6. Multivariate analysis: Subgroup results

This table explores within a multivariate analysis the impact of mood on acquirers' cumulative abnormal returns within alternative subgroups. Regression (1) explores the difference in the impact of mood on bidders with low versus high levels of strategic blockholder ownership, regression (2) the difference between public and private targets, regression (3) the combined effect of public versus private and low strategic blockholder ownership, and regression (4) the impact of mood on high versus low relative size of target to bidder mergers. The dependent variable is the percentage cumulative abnormal returns estimated over the five-day period from two days before to two days after the day of each merger announcement (-2,+2). The following independent variables are used: BTMV is the book-to-market-ratio, Domestic is a dummy variable taking the value of one for domestic deals, Stock is a dummy variable equal to one for stock payments, Diversified is a dummy variable taking the value of one for targets and bidders with the same first two SIC code digits, Public is a dummy variable taking the value of one for public target deals, and LowBlock is a dummy variable taking the value 1 for deals belonging to the bottom quartile of the sample based on the level of strategic blockholder ownership. The main independent variable under consideration is mood (GNH), which is estimated in the interval period between -2 and +2 days around merger announcements. Results shown are when all countries are employed. Cluster adjusted per-country standard errors are estimated. P-values are shown in parentheses. N indicates the number of observations. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)
GNH	0.052	0.077**	0.051	0.028
	(0.191)	(0.032)	(0.144)	(0.221)
BTMV	0.001	0.001**	0.001	0.000
	(0.138)	(0.049)	(0.139)	(0.483)
Domestic	-0.002	-0.004	-0.002	-0.005
	(0.469)	(0.258)	(0.480)	(0.172)
Stock	0.017**	0.016**	0.017**	0.008
	(0.022)	(0.018)	(0.021)	(0.133)
Diversified	-0.004**	-0.006***	-0.005**	-0.005***
	(0.028)	(0.001)	(0.026)	(0.004)
Public	-0.025***	-0.024***	-0.025***	-0.030***
	(0.000)	(0.000)	(0.000)	(0.000)
LowBlock	-0.002*			
	(0.078)			
LowBlock*GNH	0.081			
	(0.521)			
Public*GNH		0.289*		
		(0.064)		
LowBlockPublic			0.003	
			(0.469)	
LowBlockPublic*GNH			0.513*	
			(0.055)	
RSHigh				0.032***
				(0.000)
RSHigh*GNH				0.354
				(0.145)
Constant	0.017***	0.022***	0.017***	0.017***
	(0.000)	(0.000)	(0.000)	(0.000)
N	7961	8896	7961	8896
adj. R-sq	0.014	0.014	0.015	0.032

Table 7. US results

This table explores within a multivariate framework whether the impact of mood on acquirers' returns holds within the sample of US mergers. The regression is estimated for the whole US sample as well as for subgroups in relation to strategic blockholder ownership, target status, the interaction between low ownership and the target status, and the relative size between targets and bidders mergers. The dependent variable is the percentage cumulative abnormal returns estimated over the five-day period from two days before to two days after the day of each merger announcement (-2,+2). The following independent variables are used: BTMV is the book-to-market-ratio, Domestic is a dummy variable taking the value of one for domestic deals, Stock is a dummy variable equal to one for stock payments, Diversified is a dummy variable taking the value of one for targets and bidders with the same first two SIC code digits, Public is a dummy variable taking the value of one for public target deals, and LowBlock is a dummy variable taking the value 1 for deals belonging to the bottom quartile of the sample based on the level of strategic blockholder ownership. The main independent variable under consideration is mood (GNH), which is estimated in the interval period between -2 and +2 days around merger announcements. P-values are shown in parentheses. N indicates the number of observations. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)
GNH	0.135**	0.026	0.066	0.053	0.023
	(0.037)	(0.718)	(0.335)	(0.417)	(0.694)
BTMV	0.001	0.012***	0.001	0.012***	0.001
	(0.181)	(0.000)	(0.169)	(0.000)	(0.387)
Domestic	0.002	0.002	0.003	0.002	0.001
	(0.391)	(0.405)	(0.385)	(0.428)	(0.76)
Stock	0.011	0.004	0.011	0.004	0.005
	(0.145)	(0.575)	(0.163)	(0.561)	(0.519)
Diversified	-0.007***	-0.008***	-0.007***	-0.008***	-0.006**
	(0.003)	(0.002)	(0.003)	(0.001)	(0.015)
Public	-0.024***	-0.024***	-0.017***	-0.024***	-0.028***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LowBlock		0.002			
		(0.559)			
LowBlock*GNH		0.293*			
		(0.071)			
Public*GNH			0.551***		
			(0.007)		
LowBlockPublic				0.011	
				(0.157)	
LowBlockPublic*GNH				0.743**	
				(0.033)	
RSHigh					0.032***
					(0.000)
RSHigh*GNH					0.542**
					(0.012)
Constant	0.014***	0.007**	0.013***	0.007**	0.009***
	(0.000)	(0.047)	(0.000)	(0.035)	(0.001)
N	3966	3878	3966	3878	3966
adj. R-sq	0.012	0.029	0.014	0.03	0.03

Table 8. US results with the use of the Gallup Economic Confidence Index

This table explores within a multivariate framework the impact of mood, as proxied by the Gallup US Economic Confidence Index, on acquirers' returns within the sample of US mergers. The regression is estimated for the whole US sample as well as for subgroups in relation to strategic blockholder ownership, target status, the interaction between low ownership and the target status, and the relative size between targets and bidders mergers. The dependent variable is the percentage cumulative abnormal returns estimated over the five-day period from two days before to two days after the day of each merger announcement (-2,+2). The following independent variables are used: BTMV is the book-to-market-ratio, Domestic is a dummy variable taking the value of one for domestic deals, Stock is a dummy variable equal to one for stock payments, Diversified is a dummy variable taking the value of one for targets and bidders with the same first two SIC code digits, Public is a dummy variable taking the value of one for public target deals, and LowBlock is a dummy variable taking the value 1 for deals belonging to the bottom quartile of the sample based on the level of strategic blockholder ownership. The main independent variable under consideration is the Gallup (mood) index scaled by one thousand. P-values are shown in parentheses. N indicates the number of observations. Gallup's data commence on January 2008. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Gallup	0.329***	0.183	0.178	0.253*	0.19
	(0.010)	(0.229)	(0.185)	(0.051)	(0.114)
BTMV	0.001	0.012***	0.001	0.012***	0.001
	(0.180)	(0.000)	(0.166)	(0.000)	(0.372)
Domestic	0.003	0.002	0.003	0.002	0.001
	(0.423)	(0.441)	(0.380)	(0.437)	(0.728)
Stock	0.013	0.003	0.012	0.003	0.007
	(0.144)	(0.672)	(0.152)	(0.673)	(0.399)
Diversified	-0.008***	-0.009***	-0.008***	-0.009***	-0.007**
	(0.004)	(0.001)	(0.004)	(0.001)	(0.014)
Public	-0.025***	-0.024***	0.016	-0.025***	-0.028***
	(0.000)	(0.000)	(0.251)	(0.000)	(0.000)
LowBlock		0.014			
		(0.156)			
LowBlock*Gallup		0.417			
		(0.111)			
Public*Gallup			1.143***		
			(0.004)		
LowBlockPublic				0.027	
				(0.209)	
LowBlockPublic*Gallup				0.69	
				(0.246)	
RSHigh					0.049***
					(0.001)
RSHigh*Gallup					0.699*
					(0.079)
Constant	0.024***	0.012*	0.018***	0.014**	0.015***
	(0.000)	(0.058)	(0.002)	(0.011)	(0.003)
N	3455	3387	3455	3387	3455
adj. R-sq	0.014	0.033	0.017	0.033	0.029

Table 9. US Recession and Expansion

This table explores the impact of economic conditions on the effect of mood on bidder cumulative abnormal returns for the sample of US mergers. Following Garcia (2012), we split the sample into recession and expansion periods based on data obtained from the NBER. The dependent variable is the percentage cumulative abnormal returns estimated over the five-day period from two days before to two days after the day of each merger announcement (-2,+2). The following independent variables are used: BTMV is the book-to-market-ratio, Domestic is a dummy variable taking the value of one for domestic deals, Stock is a dummy variable equal to one for stock payments, Diversified is a dummy variable taking the value of one for targets and bidders with the same first two SIC code digits, and Public is a dummy variable taking the value of one for public target deals. The main independent variable under consideration is the GNH (mood) index. P-values are shown in parentheses. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	Recession	Expansion
GNH	0.420***	0.011
	(0.004)	(0.895)
BTMV	0.000	0.004
	(0.112)	(0.259)
Domestic	0.005	0.001
	(0.358)	(0.772)
Stock	0.018	0.003
	(0.132)	(0.786)
Diversified	-0.008*	-0.006**
	(0.085)	(0.030)
Public	-0.042***	-0.011**
	(0.000)	(0.021)
Constant	0.025***	0.010**
	(0.000)	(0.012)
N	1601	2364
adj. R-sq	0.028	0.009