

## Accepted Manuscript

Title: How Does News Impact on the Stock Prices of Green Firms in Emerging Markets?

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PII: S0275-5319(16)30484-6  
DOI: <http://dx.doi.org/doi:10.1016/j.ribaf.2017.07.176>  
Reference: RIBAF 866

To appear in: *Research in International Business and Finance*

Received date: 21-10-2016  
Accepted date: 3-7-2017

Please cite this article as: Robinson, Justin, Glean, Adrian, Moore, Winston, How Does News Impact on the Stock Prices of Green Firms in Emerging Markets?. *Research in International Business and Finance* <http://dx.doi.org/10.1016/j.ribaf.2017.07.176>

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## **How Does News Impact on the Stock Prices of Green Firms Emerging Markets?**

## **How Does News Impact on the Stock Prices of Green Firms in Emerging Markets?**

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Firms around the globe have enhanced their green credentials as a means of increasing competitiveness and improving firm performance. The literature on firms and news suggests that stock prices of most firms tends to be very responsive to news items in the short-term. However, many green companies make investments or are working in industries where the payoffs are likely to be obtained more in the medium-term. There is therefore good reason to believe that the stock prices of these firms would be less responsive to daily news items. Using a database of green firms in emerging markets, the study finds that news can impact on daily returns of green companies. However, the effects of this news does not seem to be long-lasting and was not observed across the majority of firms considered.

Keywords: Greening; news; stock price returns; environment

Subject classification codes: G1; Q55; C5

## **1 Introduction**

Many companies around the world have been greening their operations in recent years (Zhu, Cordeiro, & Sarkis, 2012). While some of this has been driven by government regulations, many companies have also been greening their operations as a means of increasing and/or diversifying their market share and reducing their costs (Saha & Darnton, 2005). Through greening their supply chains, companies can enhance their competitiveness as well improve their overall economic performance (Rao & Holt, 2005).

Given the improved performance obtained by firms investing in greening their operations, it is likely that more firms will try to incorporate such practices in their operations in the medium-term. From a financial perspective, King and Lenox (2001)

have also noted that that there exists a relationship between pollution and financial valuation. Similarly, Konar and Cohen (2006) relates the market value of firms on the S&P 500 to various measures of environmental performance. The authors estimate that bad environmental performance is equivalent to an intangible liability of approximately 9% of the replacement value of tangible assets. More specifically, a 10% reduction in emissions of chemicals was associated with a \$34 increase in the firm's market value.

As investors shift more of their portfolio to green or greening companies, it will be become important to understand whether or not traditional stock market characteristics apply these green companies. One of these established characteristics is the link between news and stock price returns as well as volatility (Brooks & Mun, 2012). In particular, negative shocks tend to have a greater impact on volatility than native shocks (Engle & Ng, 1993).

Building on the developments highlighted earlier, this paper attempts to make three main contributions to the literature. First, it evaluates the potential impact of news on the returns on green firms. Second, an assessment of the lag effects of these news items is provided for firms in various industries in emerging markets. Third and finally, the authors also outline an approach that can be used to assess the effects of news in markets with thin trading.

The remainder of the paper is structured as follows. Following the introduction, a review of the literature of green firms and performance is provided, the next section outlines the methodological approach used in the paper. In Section 4 a summary of the key empirical results is provided as well as a discussion of the implications of these

findings for firms and investors. Section 5, provides a summary of the results and a description of the policy implications emanating from the paper.

## **2 Literature Review**

### ***2.1 Performance of Green Companies***

One of the simplest things a company can do to embed green principles and achieve cost savings is by greening its supply chain. Greening the supply chain attempts to close the loop of the usual forward supply chain and therefore considers issues in relation to reuse, remanufacturing and recycling (Hervani, Helms, & Sarkis, 2005). Using a sample of ISO14001 certified companies in South East Asia and structural equation modelling, Rao and Holt (2005) finds that greening different elements of the supply chain does enhance both firm performance and competitiveness. Similar results were obtained for companies in China (Zhu & Sarkis, 2004), the UK (Holt & Ghobadian, 2009), Italy (Perotti, Zorzini, Cagno, & Micheli, 2012) and across a wider cross section of companies (Carter, Kale, & Grimm, 2000).

In addition to greening the supply chain, the broader green innovations pursued by a company seems to be also positively correlated with improved performance. Chen, Lai and Wen (2006), for example, consider how green innovations, such as energy saving, pollution-prevention, waste recycling, green product designs and corporate environmental management, impact on company performance. The ability of the company to achieve some corporate competitive advantage (e.g. low cost inputs, quality of products, ability to engage in R&D, profitability, to name a few) based on its green

performance was then assessed using the paired t-test. The results suggest that there was a significant difference in the performance of green companies and allowed these companies to achieve a corporate competitive advantage: investment in green credentials resulted in improved firm performance. The study was limited to six information and electronics industries in Taiwan, so caution should be taken in applying the findings to corporate performance in other industries.

The timeframe within which these innovations can impact on corporate performance is also fairly short. Hart and Ahuja (1996) not only examine the impact of corporate greening (through pollution reduction) on firm performance, but also the likely speed at which such innovations can impact on a company's performance. Using a sample of firms drawn from Standard and Poor's 500 list of corporations, the authors investigate five main hypotheses. These largely relate to the lagged effects in relation to material, compliance, disposal, and liability costs, as well as the efficient use of assets. Hart and Ahuja report that reducing carbon emissions had a positive effect on operating and financial performance, even after controlling for intervening variables and various changes in model specifications but only after about two years. These findings imply that lags in the potential impact should be taken into account when evaluating the potential benefits from going green. For cash strapped organisations, in particular, such lagged gains may potentially reduce the viability of some initiatives.

Given that green innovations tend to enhance corporate performance, the market should price or incorporate the green credentials of a business. Another means to evaluate the effects of greening on a company is therefore to evaluate the market valuation changes that might have come about from enhancing the companies' green credentials (Konar &

Cohen, 2001). The authors report that poor environmental performance reduces the intangible liability of most firms by 9 percent of assets, particularly in traditional polluting industries. Such losses can be critical to the future viability of the firm, as the lower the asset value, the smaller the potential borrowing capacity of the firm.

## **2.2 *News and Stock Prices***

Stock exchanges are, by definition, barometers of investor and public sentiment. Reports of significant events like terrorism, natural disasters, elections, quarterly financial reports, change in financial reporting standards or a misconstrued celebrity tweet will almost always be followed by a commensurate reaction in the capital markets. Increasingly, the value of securities in the international stock market is less determined by the fundamentals of the underlying assets, but rather by the collective value-perception of the investing public.

Capital market enthusiasts rely on financial news to influence their perception of the market, and in turn, their trading and investment decisions. Gillam, et al, (2002) explained that stories may contain a report of how the market performed, in which case the market affects the news, or it may contain elements predicting the expected performance of a specific company in which case the market is affected by the news. In either situation, the market will reflect a correlation with the news. Going beyond market prices, Leuz and Shrand (2009) researched the effect of corporate disclosure on firms' cost of capital; they showed that firms' 10-K disclosure responses have significant subsequent market reactions (e.g., abnormal volume) and are effective in reducing the cost of capital shocks.

Previous literature has examined the impact of macroeconomic news on stock prices. Pearce and Roley (1984) examined the daily response of stock prices to announcements on a range of macroeconomic factors. Their research revealed that new information related to monetary supply has a significant impact on stock prices; however, the anticipated components of economic announcements do not significantly affect stock price movements. They also found little evidence to support the view that inflation or real economic activity surprises affect stock prices. Furthermore, the state of the economy plays a role in the response of investors news of higher-than-expected real activity when the economy is already strong results in lower stock prices, whereas the same surprise in a weak economy is associated with higher stock prices (Roley, McQueen 1993). The degree to which news impact the value of stock prices, also depends on the economic region. Nikkinen et al (2006) found that the general importance of the news releases varies across the world's regions.

Market-influencing events goes beyond monetary and economic activities and location; terrorism also impacts the stock prices on international markets (Nechi & Mnasri, 2016). The terrorist attacks on the US in 2001 impacted the global capital markets. Also, the terrorist train bombing in Madrid on March 11<sup>th</sup> 2004 swayed the stock value in several industries. The integrated oil and gas industries, insurance and airline industries showed negative abnormal returns upon the announcement of the bombing while the aerospace and defence industries, the courier and airfreight and the retailing and the transportation industries exhibited positive abnormal returns on the event date (Kalivis, Lyroudi 2006). Nikkinen and Vahamaa (2006) also examined the effects of terrorism on stock sentiment and found that terrorism has a strong adverse impact on stock market sentiment, resulting in a significant fall in the expected value of the



FTSE100 index. Douch and Essaddam (2011) however noted how some firms can benefit from news of terrorism, and how the market differentiated between defence firms in the aftermath of 9/11.

Having attempted to examine the long-term impact of tragedies such as the September 11 attacks on 33 international markets, Richman et al. (2005) presented evidence that suggests the absence of a permanent long-term impact of the 9/11 shock. Their study concludes that the US and most capital markets around the world are not riskier after the terrorist incident of 9/11, with evidence pointing in the direction of resilience, flexibility, and robustness exhibited by the international financial markets.

From examining the London Stock Exchange and the Athens Stock Exchange, Kollias et al, (2010) concluded that the political significance of the targets, and/or the victims of the terrorist attacks, is the factor that triggers the greatest reaction. They found that the smaller of the two markets, i.e. ASE, was the one that exhibited a greater reaction, whenever affected, to terrorist events, buttressing previous studies that size and maturity appear to emerge as two possible determinants of markets' reaction to terrorist attacks.

Likewise, in examining the reaction of European markets to firms' adoption of International Financial Reporting Standards, Armstrong, et al (2010), observed that market participants reacted more positively to IFRS adoption for firms with lower quality pre-adoption information, consistent with investors in these firms expecting greater improvements in information quality.

With heightened concerns about the worsening state of the environment, there are many more 'Green companies'. This has led to an increase in literature on 'Green companies'.

Weir (2010) suggested that the stock market reacts somewhat negatively to corporate environmental news, which implies that investors do not believe that environmental friendly behaviour do not add value to the firm and even may impact the value of the firm negatively.

### 3 Methodology

#### 3.1 *Econometric Model*

The paper employs an event study approach to evaluate the impact of news on stock market returns in emerging markets. Stock markets in these emerging market economies are likely to be characterised by non-linearity in the return generating process, thin trading and informational asymmetries (Harrison & Moore, 2012). In order to account for the presence of autocorrelation occurring due to relatively thin trading, the authors follow Miller, Muthswamy and Whaley (1994) and fit an autoregressive model to obtain a non-trading adjustment:

$$r_t = \alpha + \beta r_{t-1} + u_t \quad (1)$$

where  $R_t$  is the stock market return calculated in period  $t$ , while  $u_t$  is an independent white noise process that is assumed to have mean zero and constant variance. The residuals from Equation (1) are employed to estimate the adjusted return series  $R_t^A$ :

$$r_t^A = \frac{u_t}{1 - \beta} \quad (2)$$

The model is estimated using daily observations on green firms in emerging markets.

This adjusted return variable is then used to estimate a traditional market return model of the form:

$$r_{jt}^A = \alpha_j + \beta_j r_{mt} + \varepsilon_t \quad (3)$$

where  $r_{mt}$  is the daily stock market return. The market model in Equation (3) is estimated for each trading year in the sample as well as for each green firm and the residuals from these models employed to estimate abnormal returns.

The cumulative abnormal returns (CAR) are calculated for various event windows around the news item and employed in the regression of the following form:

$$\begin{aligned} CAR_{it} = & \alpha_i + \beta_1 PN_{it} + \beta_2 AOIL_{it} + \beta_3 POIL_{it} + \beta_4 TECH_{it} \\ & + \beta_5 TAX_{it} + \beta_6 EXTR_{it} + \beta_7 OPR_{it} + \beta_8 OPC_{it} \\ & + \beta_9 LEV_{it} + \beta_{10} ROE_{it} + \beta_{11} D_1 + \beta_{12} D_2 + \beta_{13} D_3 \\ & + \beta_{14} D_4 + e_{it} \end{aligned} \quad (4)$$

where  $PN_{it}$  is the degree to which news is positive or negative regarding the green economy ambitions of the country,  $POIL_{it}$  captures the occurrence of positive or negative news with respect to the price of oil,  $TAX_{it}$  is the ratio of firm's net profit and pre-tax profits,  $LEV_{it}$  is the ratio between total assets and total equity,  $ROE_{it}$  is the company's return on equity,  $D_i$  are year dummies and  $e_{it}$  is an error term which is assumed to have normal properties.

Equation (4) is estimated using a Random Effects Panel regression as well as a single equation approach for each green company estimated using Ordinary Least Squares (OLS). The panel regression model provides a multidimensional assessment of the link between news and stock market returns in emerging markets. The analysis obtained

using such an approach provides an assessment of the impact of news across the broad spectrum of firms. It is, however, possible that the impact of news on stock market returns can vary by market as well as the type of green business. As a result, the study also utilised firm-specific regressions for each of the green companies to capture these potential heterogeneities.

### **3.2 Data**

This paper explores the impact of news on the performance of green companies in emerging markets by investigating stock price reaction to a plethora of news events on the top ten companies, by market capitalisation, listed on the Dow Jones Sustainability Emerging Markets Index as at December 31 2015. The impact of news on the company's performance was investigated using data for the period January 1 2010 to December 31 2015. The companies are selected using a best-in class approach, therefore only the most sustainable companies, in industries that meet certain minimum sustainability requirements, are selected for index membership. A Total Sustainability Score is calculated for each company based on an annual sustainability assessment conducted by RobecoSAM (specialist in sustainability investing). The assessment includes listed companies from different parts of the world, with green companies determined by 80-120 industry-specific questions focusing on economic, environmental and social factors which are important to the companies' success. Some of the criteria evaluated includes climate change strategies, energy consumption, human resources development, knowledge management, stakeholder relations and corporate governance.

The database comprises of companies in Emerging Market countries such as China, Taiwan, Brazil, South Africa and India. The companies operate in a litany of industries including Financial, Telecommunication, Technology and Consumer Services. News items for the analysis were obtained from a variety of sources including yahoo news using the statistical software R, google news, the Financial Times, Bloomberg Terminal, and the companies' websites.

The performance of the identified green companies was mixed. Out of the 10 green companies considered, 7 had positive average monthly stock market returns (Table 2). The volatility of these market returns was quite similar. However, financial companies had the lowest average levels of monthly return volatility. Given the small sample of companies from each market, it was not possible to identify any significant differences in the performance of green companies by country.

For a typical sample of firms, the risk-return trade-off or profile should be positive, i.e. as the risk associated with firms rise, so should the returns. The risk-return profile for the sample of green companies used in this study, however, appears to be non-linear. Walmart de Mexico, for example, had one of the lowest levels of risk but also one of the highest levels of return as well. Similarly, Tata Consultancy had the second highest risk profile among all the countries considered but was only in the middle of the pack in relation to monthly stock price returns.

#### 4 Empirical Results

For the sample of green firms considered in this study, news seems to have a statistically significant, although not immediate impact, on the returns for green companies. Table 2 provides the results of the random effects regression examining the link between news and stock market returns for green companies with and without the control variables. Only in the model with the control variables discussed in the methodology section were any of the news variables significant. In the model with control variables, news reported three days before was significant in the regression, with a coefficient of -0.002. None of the other lagged news terms were statistically significant at normal levels of testing.

These results are in line with studies conducted by Antoniou et al (2002) and Watson (2009), which suggest that emerging markets tended to be characterized by non-linear behaviour and inefficient pricing. If the markets were efficient then the news items would have been statistically insignificant, as this information would have already been priced into firms' stock price. Some previous studies conducted on developing markets, Watson (2009) and Robinson (2005), also concluded that developing markets are inefficient. Therefore, while many green companies tend to have medium- to long-term growth targets/objectives, the findings reported in this study suggest that market sentiment can shift investors away from these companies.

The lagged impact of news for these green companies are also similar to those reported by Hranaiova (1999), who argue that news tends to have lagged effects on stock market returns. Unlike Hranaiova (1999), however, the effect of news only occurs after 3 days, with none of the other news terms being significant. It should be noted that Hranaiova

(1999) conducted his analysis for emerging markets in Poland and Slovakia. Bhattacharya et al., on the other hand, found that shares trading in the Bolsa Mexicana de Valores did not react to corporate news announcement. They suggested that these findings were the result of insider trading, which caused prices to fully incorporate private information.

Markets in emerging countries are likely to be characterised by thin trading (Harrison & Moore, 2012). This occurs mainly because opportunities for participation and information on how to participate is limited. Table 3 therefore shows the regression results with adjustment made for thin trading. The results in this instance are quite similar to those reported earlier with many of the lagged news terms being statistically insignificant. However, rather than the impact of news occurring after 3 days, news items on the firm now impact on firm performance one day afterwards.

It is quite possible that the results reported earlier would differ by country and firm. As a result, Table 4 displays the regression results (adjusting for thin trading) for each company with the contemporaneous and lagged news indicators. News reported on China Overseas Land & Investment Ltd, Banco Bradesco Prf had a significant impact on these companies' returns one day later, with coefficients of .009 and .003 respectively. It is interesting to note that both companies are in the financial industry. These results seem to suggest that market fluctuations of green financial firms have a faster feed-through as these firms tend to have only adopted green practices or are supporting green firms. This could suggest that market participants might

The only firm not in the financial industry where news impacted on daily returns was Taiwan Semiconductor Manufacturing Co Ltd had a significant impact on its returns both three and four days later. Finally, news reported on Itau Unibanco had an impact on its returns six days later with a co-efficient of -0.005. Therefore, even though delayed, news affects green companies primarily in the financial industry.

The impact of news, however, on stock market returns for green firms does not seem to be important for the majority of companies. Of the 10 green firms considered, in only 4 cases was the news term significant. In addition, many of the lagged effects were also insignificant. These results could be interpreted to indicate that greening makes firms less susceptible to the impact of short-run fluctuations. This could occur if investors see these investments as a means of enhancing the long run prospects for the firm.

Even though the sample of green firms is limited, there does not appear to be any region-specific findings in relation to the impact of news on stock price returns of green firms. Firms from China, Taiwan, South Africa, Brazil, India and Mexico were considered in the analysis. The only companies where the news items were significant were Banco Bradesco and Itau Unibanco, two Brazilian companies, as well as China Overseas and Taiwan Semiconductor Manufacturing Company Ltd. A broader sample of companies would be needed, however, to provide firm conclusions in this regard.

## **5 Conclusion and Discussion**

Green firms are likely to become an important part of the portfolio of investors in many emerging markets. This is likely to be the case as countries attempt to reduce their impact on global CO<sub>2</sub> emissions and firms attempt to reduce cost. The results provided



in this study suggest that similar to other firms, stock market returns of green firms also tend to be quite reactive to news. However, green firms in the financial industry tend to be more responsive than firms in other areas of greening. One of the reasons this might be the case is that the business model of non-financial green firms might be driven more long-term factors rather than short-term news.

Over the medium- to long-run, these green businesses could therefore become a fairly important component of the portfolio of most investors as countries reduce their environmental impact and firms attempt to boost their market share and reduce cost. The results provided in this paper does suggest that news can impact on daily returns of green companies. However, the effects of this news does not seem to be long-lasting and was not observed across the majority of firms considered. These results could indicate that the returns associated with green firms are more driven by long-run factors.

Given that the returns associated with green firms are less likely to be driven by daily news, they can reduce the volatility of investment portfolios without sacrificing the objective of higher returns. These results are in contrast to those obtained by Brammer, Brooks and Pavelin (2006) who notes that less socially responsible firms are likely to provide lower returns. It should be noted that our results did not specifically attempt to assess the returns of green firms relatively to less green firms, but the findings do indicate that the returns from green firms in emerging markets is less likely to be affected by daily news.

The impact of daily news on the returns for stocks is indicative of the extent to which information is not fully reflected in the stock price. Given that news does not seem to

be important for these green firms, it could suggest that these green firms might be somewhat more transparent than other firms. To obtain some certification of greening, firms usually need to submit information to some external third party. Vaccaro and Echeverri (2010), for example, note that transparency helps with the pro-environmental stance of firms.

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Figure 1: Companies' risk and return

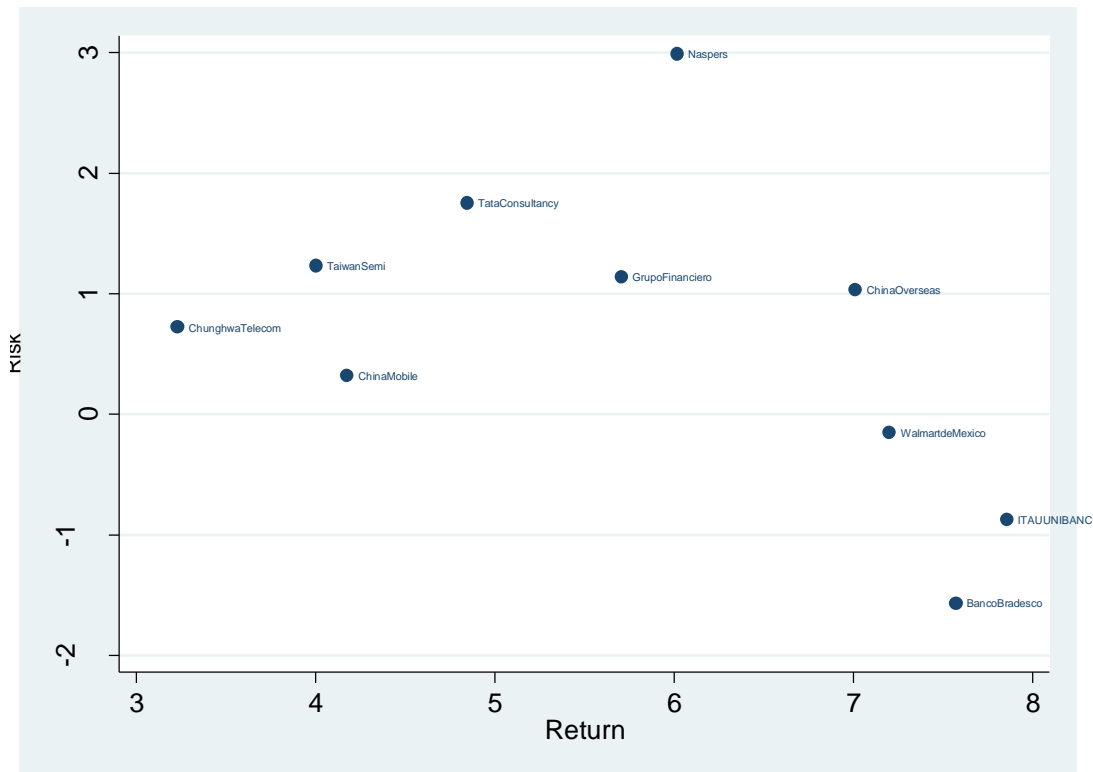


Table 2: Top green companies in emerging markets by market capitalization (2010-2015)

Company	Country	Industry	Stock return	Standard deviation
China Mobile Ltd	China	Telecommunications	-1.569	7.572
Taiwan Semiconductor Manufacturing Co Ltd	Taiwan	Technology	0.322	4.177
Naspers Ltd N	South Africa	Consumer services	1.030	7.014
Itau Unibanco Holding SA Prf	Brazil	Financial	0.724	3.231
Banco Bradesco Prf	Brazil	Financial	1.139	5.708
Tata Consultancy Services Ltd	India	Technology	-0.876	7.857
Grupo Financiero Banorte O	Mexico	Financial	2.989	6.018
China Overseas Land & Investment Ltd	China	Financial	1.233	4.003
Chunghwa Telecom Co Ltd	Taiwan	Telecommunications	1.755	4.847
Walmart de Mexico SAB de CV	Mexico	Consumer services	-0.150	7.203

Table 2: Baseline Random Effects Regression Results

Variables	Coefficient estimates	
	without controls	with controls
news(t)	-0.000 (0.002)	-0.000 (0.001)
news(t-1)	0.002 (0.002)	0.002 (0.001)
news(t-2)	0.001 (0.002)	0.000 (0.001)
news(t-3)	-0.002 (0.002)	-0.002 (0.001)**
news(t-4)	-0.000 (0.002)	-0.000 (0.001)
news(t-5)	0.000 (0.002)	0.001 (0.001)
news(t-6)	-0.001 (0.002)	-0.001 (0.001)
news(t-7)	-0.000 (0.002)	0.000 (0.001)
constant	0.000 (0.000)	-0.004 (0.003)
Observations	14966	14583
$\sigma$	0.037	0.019

Notes: (1) standard errors are provided in parentheses

(2) \*\* indicates significance at the 5 percent level of testing.



Table 3: Baseline Random Effects Regression Adjusting for Thin Trading Results

Variables	Coefficient estimates	
	without controls	with controls
news	-0.001 (0.001)	-0.009 (0.001)
news(t-1)	0.003 (0.001)**	0.003 (0.001)**
news(t-2)	0.002 (0.001)	0.001 (0.001)
news(t-3)	-0.001 (0.001)	-0.001 (0.001)
news(t-4)	-0.001 (0.001)	-0.000 (0.001)
news(t-5)	0.000 (0.001)	0.000 (0.001)
news(t-6)	-0.000 (0.001)	-0.000 (0.001)
news(t-7)	-0.001 (0.001)	-0.001 (0.001)
constant	0.000 (0.000)	-0.002 (0.003)
Observations	14163	13789
$\sigma$	0.021	0.021

Notes: (1) standard errors are provided in parentheses

(2) \*\* indicates significance at the 5 percent level of testing.

Table 4: Baseline Random Effects Regression Adjusting for Thin Trading Results

Variables	Coefficient estimates									
	Tata Consultancy	Grupo Financiero	Walmart de Mexico	China Overseas	Banco Bradesco	Chungwa Telecom	Taiwan Semi	China Mobile	Itau Unibanco	Naspers
news	-0.001 (0.002)	0.003 (0.003)	0.003 (0.005)	0.001 (0.005)	-0.009 (0.001)	0.001 (0.002)	-0.011 (0.009)	0.002 (0.002)	-0.002 (0.003)	- 0.002 (0.003)
news(t-1)	0.003 (0.002)	-0.002 (0.002)	0.006 (0.005)	0.009 (0.005)**	0.003 (0.001)**	-0.000 (0.002)	0.015 (0.008)*	- 0.000 (0.002)	0.003 (0.003)	0.002 (0.002)
news(t-2)	-0.000 (0.002)	0.002 (0.002)	0.000 (0.005)	-0.002 (0.005)	0.001 (0.001)	-0.001 (0.002)	0.016 (0.008)*	- 0.000 (0.002)	0.001 (0.003)	- 0.002 (0.003)
news(t-3)	-0.002 (0.002)	-0.001 (0.003)	- 0.002 (0.00)	0.006 (0.005)	-0.001 (0.001)	0.001 (0.002)	-0.003 (0.009)	0.001 (0.002)	-0.004 (0.003)	- 0.001 (0.00)

			5)							3)
news(t-4)	-0.001 (0.002)	0.002 (0.003)	- 0.003 (0.005)	-0.003 (0.005)	-0.000 (0.001)	0.002 (0.003)	0.002 (0.009)	0.001 (0.002)	-0.002 (0.003)	- 0.004 (0.003)
news(t-5)	0.000 (0.002)	-0.002 (0.003)	0.001 (0.005)	0.002 (0.005)	0.000 (0.001)	0.000 (0.002)	-0.000 (0.008)	- 0.001 (0.002)	0.000 (0.003)	0.002 (0.003)
news(t-6)	-0.001 (0.002)	-0.002 (0.003)	0.003 (0.005)	0.007 (0.005)	-0.000 (0.001)	-0.000 (0.002)	-0.001 (0.009)	- 0.001 (0.002)	-0.005 (0.003)*	- 0.002 (0.003)
news(t-7)	-0.001 (0.002)	-0.001 (0.001)	- 0.004 (0.005)	-0.000 (0.005)	-0.001 (0.001)	0.002 (0.002)	-0.001 (0.009)	- 0.001 (0.002)	0.002 (0.003)	- 0.001 (0.003)
constant	0.009 (0.036)	-0.005 (0.003) **	- 0.002 (0.003)	0.056 (0.029) *	-0.002 (0.003)	0.000 (0.060)	-0.157 (0.568)	- 0.000 (0.131)	-0.020 (0.023)	0.026 (0.023)
Observations	1381	1403	1403	1365	1369	1372	1372	1365	1369	1390
$\sigma$	0.007	0.009	0.006	0.011	0.012	0.001	0.008	0.004	0.007	0.008

Notes: (1) standard errors are provided in parentheses

(2) \*\*, \* indicates significance at the 5 and 10 percent level of testing.

