Inflation News and Stock Returns: a Sectorial Analysis in the Spanish Case

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Abstract

We study the short run response of daily stock prices in the Spanish market to the announcements of inflation news on a sectorial level. We also control for the direction of the news and the state of the economy. In general, we find that a different combination for each sector of the "behavioural finance" hypothesis (BFH) (Veronesi, 1999) and the "flow-through" hypothesis (Estep and Hanson, 1980) can explain the observed behaviour relatively well. Abnormal returns of sectors with low "flow-through" capability react to the unexpected component of the inflation rate according to the BFH. In the case of sectors with a high ability to transfer inflationist shocks to prices, abnormal returns are independent of the unexpected inflation rates or even, in certain scenarios, react in the opposite direction to that expected by the BFH.

Keywords: Inflation announcement; Stock return; "Flow-through" capability, "Behavioural finance" hypothesis

JEL Classification: E31, G12, G30, L2

1. Introduction

The aim of this paper is to study the relationship between unanticipated inflation news and stock returns, focussing our analysis on the sector of activity. Using event-study methodology, we analyze the short run response of daily stock prices in the Spanish market to the announcements of inflation news on a sectorial level. We control for the state of the economy and the direction of the news in a preliminary analysis and consequently we observe that responses to positive and to negative unexpected inflation news compensate each other.

We make two contributions to the literature. The sectorial analysis is our main contribution, in contrast with previous literature focused on the global stock market response. In particular, we find that a different combination for each sector of the "behavioural finance" hypothesis (BFH) (Veronesi, 1999) and the "flow-through" hypothesis (FTH) (Estep and Hanson, 1980) can explain the observed behaviour relatively well. Abnormal returns of sectors with low "flow-through" capability react to the unexpected component of the inflation rate according to the BFH but not always in the expected direction. In the case of sectors with a high ability to transfer inflationist shocks to prices, abnormal returns are independent of the unexpected inflation rate or even, in certain scenarios, react in the opposite direction to that expected by the BFH. As stated by the BFH, an official inflation rate higher than expected in expansion states is interpreted as a "bad news" but we observe that this is "good news" for sectors with high "flow-through" capability. Second, this paper enriches the understanding of the relationship between unexpected inflation news and stock abnormal returns analyzing the Spanish market case using event-study methodology.

A large body of empirical literature documents the movement of financial asset prices in response to inflation changes, but conclusions are controversial. Meanwhile more researchers have found a significant negative relationship (Bodie, 1976, and Fama and Schwert, 1977, or more recently Hu and Willet, 2000, and Hagmann and Lenz, 2004), while others have found an insignificant relationship (for example, Pearce and Roley, 1988, and Joyce and Read, 2002). In the Spanish case, Ferrer (2000) and Pérez de Gracia and Cuñado (2001) study the relationship between Spanish inflation rate and long-term stock returns in aggregate terms using cointegration methodology. Both of them conclude that the relationship is permanent and its sign is negative.

Several explanations of the relationship between unexpected inflation and stock prices have been proposed in the literature. Fama (1981) propounded the "proxy" hypothesis arguing that the relationship is spurious (Geske and Roll, 1983, Kaul, 1987, and Zhao, 1999). Feldstein (1980) justifies a negative relationship as a result of nominal contracts. Schwert (1981) notes that unexpected inflation benefits net debtors at the expense of net creditors when the contracts are written in nominal terms; hence, the stock returns of net creditors should be negatively related to the current unexpected inflation rate. Fischer (1993) suggests the policy anticipations hypothesis which implies that current inflation outturns that are higher/lower than expected will lead the markets to anticipate that the authorities will tighten/loosen monetary policy, i.e. raise/lower (real) interest rates.

Anyway we focus our analysis on two alternative explanations. Firstly, the "behavioural finance" hypothesis (Veronesi, 1999, and Boyd et al., 2005) considers that recent direction of the market or the state of the economy may have a bearing on the extent to which investors respond to new information. Secondly, the "flow-through capability" hypothesis (Estep and Hanson, 1980) proposes that the relationship between stock returns and unexpected inflation news depends on the capability of transferring inflation shocks to prices of products and services. This topic is crucial for portfolio managers who are interested in controlling stock returns' sensitivity to inflation announcements. Asikoglu and Ercan (1992), and recently Jareño (2005) in the Spanish case, evidence that sectors have a different "flow-through capability".

Our analysis is in line with the time-series event-study methodology. A large number of recent papers use this approach to analyze the repercussion of some macroeconomic announcements on returns of different market indexes, interest rates or stocks. In general, these papers focus on examining (1) the linearity and asymmetry of the response considering macroeconomic news, (2) the path and speed of that response and (3) the stability of the latter according to the state of the economy or the direction of the news, distinguishing between good and bad news, and even the effects on trading volume.[1] Also this subject enables some assessment to be made of the efficiency of financial markets in processing information. The "efficient markets" hypothesis predicts that asset prices only respond to the unexpected component of new data, or "news".

The paper is organized as follows. Section 2 describes the database and methodology. Section 3 examines different alternatives for estimating the unexpected

[1] Some noteworthy examples are the following: McQueen and Roley (1993), Flannery and Protopapadakis (2002), Joyce and Read (2002), Andersen et al. (2003), Pearce and Solakoglu (2004), Adams et al. (2004), Ewing et al. (2003), Boyd et al. (2005), Faff et al. (2005) and Ewing et al. (2005).

component of inflation rates. Section 4 exhibits a preliminary analysis of the response of the sectorial abnormal returns to inflation announcements. Section 5 expands the analysis taking into account two factors: direction of inflation surprises and different states of the economy. Finally, the last section includes a summary of the main results and conclusions.

2. Data and methodology

The Spanish consumer price index (IPC) is obtained by "Instituto Nacional de Estadística" (INE) as a weighted average of indexes referred to several groups of consumer goods, according to the Laspeyres formula.[2] In the IPC preparation, prices are taken during the full calendar month (from the first day to the last one) and this information is announced around the middle of the following month. The monetary authorities publish the annual schedule with the exact date of each announcement. The first available annual schedule corresponds to 1995.

The monthly IPC announcements used in this paper cover the period from February 1995 through December 2004. In order to remove the seasonal component of the IPC series, we use a year-to-year inflation rate. The unseasoned monthly inflation rate (π_t) is obtained using this expression:

$$\pi_t = \frac{IPC_t - IPC_{t-12}}{IPC_{t-12}} \qquad [1]$$

where IPC_t is the consumer price index at time t.

During the sample period, we obtain daily (close-to-close) returns[3] of 127 individual companies traded in the electronic system of the Spanish Stock Exchange (SIBE). We consider all the companies which have quoted during some period in the sample, in order to avoid a possible survival bias in case of taking into account only the companies which cover the whole sample. Daily data allow us to isolate the IPC announcement effects from any other macroeconomic announcement happened during the month.[4]

We create daily equally-weighted sector-based stock portfolio returns. Table 1 depicts the name of the sectors (S1, S2, …, S6) and subsectors and also the number of companies included in each one. We use the Bolsa de Madrid sector definition scheme.

[2] More detailed information about the preparation of the price index can be found in www.ine.es.
[3] We adjust stock prices by splits.
[4] To see advantages of daily data against monthly data, see McQueen and Roley (1993), Flannery and Protopapadakis (2002) and Adams et al. (2004).

As a proxy of the market return, we calculate a daily equally-weighted total market return (M). On the other hand, a key premise of our study is that the flow-through capability of each sector can determine the impact of inflation rate news on stock returns. To control clearly for this factor, we build two special additional portfolios. The first portfolio includes companies from subsectors which we consider as liberalized (LS). We hypothesize that they should have the ability to reflect inflation rate changes on their product prices and thus "flow through" the effects of inflation to customers. The second portfolio consists of companies from price-regulated subsectors (RS). The price of their products is regulated by law and their profits have to absorb the effects of inflation changes.

[INSERT TABLE 1]

3. Estimation of the unexpected component of inflation rate

Several methodologies for measuring the unexpected component of inflation rate can be found in the literature. The most popular approximation (e.g., Schwert, 1981, Pearce and Roley, 1988, Joyce and Read, 2002, and Mestel and Gurgul, 2003) uses simple time series models (ARIMA models) in order to estimate the expected inflation component. It is assumed that this component depends on own past of the series. The unexpected component (π_t^u) is estimated as the difference between the observed total inflation rate (π_t) and expected component (π_t^e).

As an alternative methodology, Flannery and Protopapadakis (2002), Andersen et al. (2002) and Adams et al. (2004) use periodical surveys of forecasts, such as MMS (International Money Market Services) or Thomson Financial, as suitable proxies of the expected inflation rate. Similar information is not available in the Spanish case.

Also, Schwert (1981) and Asikoglu and Ercan (1992) use short-term interest rates as predictors of inflation rate, but according to Alonso et al. (2000) in Spain interest rates do not increase the explanatory capability of the own past of the prices to a great extent.

Another current of opinion relies on certain expressions which depend on multiple variables for estimating the inflation rate, such as the growth of the money supply, labour cost, crude oil price or the growth of the industrial production (Hu and Willett, 2000 and Boyd et al., 2005). Other authors use VAR models (autoregressive vectors) in order to obtain the inflation rate (e.g., Anari and Kolari, 2001, and Hagmann and Lenz, 2004), and the simple Kalman filter (Lee, 1992) or the Hodrick – Prescott filter (Pérez de Gracia and Cuñado, 2001). Some recent studies (Sack, 2000, Alonso et al., 2001 and Tessaromatis, 2003) use government inflation-indexed bonds. Unfortunately, these bonds are not issued at present by the Spanish Treasury.

Recently, Joyce and Read (2002) observe similar results using ARIMA and other alternative procedures. Thus, we start from *Box-Jenkins* identification-estimation methodology of ARIMA (autoregressive integrated moving average) time series models.

A visual inspection of the unseasoned inflation rate graph and the classical unit root tests confirm that inflation is stationary in mean. The rank-mean analysis evidences that inflation is also stationary in variance.[5] Comparing the ACF (autocorrelation function) and the PACF (partial autocorrelation function) with the theoretical patterns of known models, we observe that ARMA (1, 0) process provides the best possible results. We predict the month-to-month expected component of inflation rate using the ARMA (1, 0) process and also using a *naïve* model as a benchmark. In contrast to structural models, these models do not require additional information for forecasting, since they use lagged inflation values. This one-step-ahead forecast is repeated for each month in the sample. It is then straightforward to obtain the unexpected component of inflation rate from the following expression:

$$\pi_t^u = \pi_t - \pi_t^e \qquad [2]$$

where π_t is the total inflation rate, π_t^e is the expected component, and π_t^u is the unexpected component.

Table 2 shows some statistics of inflation series. The unexpected component of inflation rate according to ARIMA time series model is less volatile than the *naïve* model.

[INSERT TABLE 2]

A standard unbiasedness test of inflation measures involves regressing the total inflation rate (actual inflation rate in the economy) on each measure:

$$\pi_t = \alpha + \beta \cdot \pi_t^e + u_t \qquad [3]$$

If these estimations are unbiased forecasts of the actual inflation rate, then $\alpha = 0$, $\beta = 1$, and u_t is serially uncorrelated. Table 3 depicts results of this test. In the case of expected inflation rate from ARMA (1, 0) process, the joint hypothesis ($\alpha = 0$ and $\beta = 1$)

[5] We have used augmented Dickey-Fuller, Phillips-Perron and KPSS (Kwiatkowski-Phillips-Schmidt-Shin) tests, but we do not exhibit these results so as to lighten the article.

cannot be rejected. Besides, α is not significantly different from zero and β is significantly close to one. So, we state that this estimate can be considered as an unbiased estimator of *ex – post* inflation rate. Results for the *naïve* model seem to be less consistent.

[INSERT TABLE 3]

4. Response of the sectorial abnormal returns to inflation announcements

Most of the literature about announcement effect focuses the analysis on the announcement day. Nevertheless, we extend this analysis to the two previous and two following days. In concrete, we study the short run response of daily stock prices in the Spanish market to the announcements of inflation news on a sectorial level around the day when the IPC (consumer price index) is announced. We construct an "event window" that contains five days: the announcement day (t_j), two days before or "pre-announcement period" (t_j-1 and t_j-2), and two days after the announcement or "post-announcement period" (t_j+1 and t_j+2). The "pre-event window" contains the days between two consecutive event windows (t_{j-1}+3, t_j-3).

[INSERT FIGURE 1]

4.1. Abnormal returns

We analyse the performance of the sectorial returns around the IPC announcement using returns corrected by the expected return, that is, abnormal returns, in order to eliminate possible effects beyond inflation announcements.

We compute abnormal returns, $ARS_i(t)$, for each day inside the event window, from two days before (t_j-2) to two days after (t_j+2) the IPC announcement (t_j). The abnormal return of sector i in the day t_j+k, $ARS_i(t_j+k)$, (i = S1, …, S6, M, LS, RS; and k = -2, …, +2) is the difference between the observed return (*ex-post* return) in the day t_j+k, $RS_i(t_j+k)$, and the expected return of the sector in absence of inflation event, $E[RS_i(t_j)]$. This expected return is estimated as the average daily return of the sector during the pre-event window.

$$ARS_i(t_j+k) = RS_i(t_j+k) - E[RS_i(t_j)] = RS_i(t_j+k) - \frac{\sum_{\tau=t_{j-1}+3}^{t_j-3} RS_i(\tau)}{t_j - t_{j-1} - 6} \qquad [4]$$

A statistically different behaviour of the abnormal returns during previous and following days would have important implications for the market efficiency. If we assume that unexpected inflation rate means relevant information to security valuation in each sector, abnormal returns on the days before the announcement point out that private information is reflected in stock prices, i.e. market discounts news before officially published. This scenario suggests a strong form of the efficient market hypothesis. On the other hand, abnormal returns on the days after the announcement could reflect a delayed reaction of market prices or a correction of an overreaction which happened on the announcement day. This pattern corresponds to an inefficient market.

4.2. Preliminary intersectorial analysis

After calculating the abnormal returns of each sector which allows the comparison of the different sectors, we study the possible existence of different rules of behaviour according to the sector of activity.

Table 4 shows some statistics of abnormal returns in the pre-announcement period (two previous days), the announcement day and the post-announcement period (two following days), and also depicts tests of equality of means and variances between sectors.

[INSERT TABLE 4]

Average abnormal returns are negative in almost all cases. Also they are statistically significant in the pre-announcement period (Panel A) except in sector 6 (S6). In absolute value, these averages are between twice and six times as large as those on the announcement day. Panel B depicts averages not significantly different from zero on the event day. These averages are also insignificant at the 90% confidence level in the post-announcement period (Panel C), except in sectors 1 and “regulated” (S1, RS).

This negative and significant effect in the pre-announcement period can be originated by the uncertainty that the actual announcement causes in the market. After the announcement, we can interpret that agent expectations seem to be accurate and not require any adjustment. Thus agents discount the effect of the predicted inflation rate previous to the announcement. Anyway, an alternative interpretation could be that compensations between negative and positive adjustments after official inflation rate is divulged imply insignificant abnormal returns.

Parametric and also non-parametric tests of equality of means between different sectors on the event window exhibit that the null hypothesis of similar sectorial average abnormal returns cannot be rejected statistically. No different inter-sectors patterns of mean abnormal returns during the event window are observed. In the case of the null hypothesis of equality of variances for all the different sectorial returns, the values of these statistics clearly reject the hypothesis indicating a distinct volatility across sectors on the announcement day and two following days.[6] Results for our "regulated" and "liberalized" portfolios are always non significant.

4.3. Methodology in the analysis of the unexpected inflation rate

In this section, we propose three models for the analysis of different aspects of the relationship between inflation news and sectorial abnormal returns in the event window. These models distinguish between the total inflation effect and its two components: expected and unexpected inflation.

In the first model, we regress each sectorial return on the total inflation rate in each one of the sub samples inside the event window. These regressions are potentially vulnerable to a problem of omitted variables. Nevertheless, this problem should be minimized by focussing on the same-day announcement. Considering that any other relevant news on the day is orthogonal to inflation news, the parameters estimated remain unbiased.

$$ARS_i(t) = \alpha_i + \beta_i \cdot \pi_t + u_{it} \qquad [5]$$

where $ARS_i(t)$ shows the abnormal returns of sector i on each period t, π_t the total inflation rate and, finally, u_{it} the error term of sector i.

In the second model, we split up the total inflation rate in an unexpected and an expected component:

$$ARS_i(t) = \alpha_i + \beta_{1i} \cdot \pi_t^e + \beta_{2i} \cdot \pi_t^u + u_{it} \qquad [6]$$

where π_t^e is the monthly expected inflation rate, and π_t^u the unexpected component of inflation rate.

And finally, assuming the efficient market hypothesis, the third model proposed considers only the unexpected component:

$$ARS_i(t) = \alpha_i + \beta_i \cdot \pi_t^u + u_{it} \qquad [7]$$

All the models have been estimated using the "seemingly unrelated regression" technique (SUR), taking into account heteroskedasticity and the possible contemporaneous correlation in the error terms across equations.

6 This result should be taken with caution because sectors endure different risk levels.

4.4. Results

Panel A of Table 5 shows the estimated coefficient of the total inflation rate for each sector in the case of model 5.

[INSERT TABLE 5]

We stress three main results. First, coefficients of all sectors in the pre-announcement period are not statistically significant. No evidence of a significant relationship between abnormal returns and total inflation during this period is found. This result is fully consistent with an outcome of the previous section. Mean abnormal returns in the two days before the announcement are negative and statistically significant. Thus the proximity to the announcement originates uncertainty in the market but these abnormal returns are independent of the final amount of the total inflation rate. Anyway this result in certain sectors could be biased as a consequence of a possible compensation between responses of different sign depending on the direction of the news or/and the state of the economy.

Second, coefficients of three different sectors (S2, S4 and S6) and also of the full sample (M) are statistically significant on the announcement day. Moreover the coefficients of all sectors are always positive and higher than coefficients corresponding to the pre-announcement period. In contrast to literature, we observe a significant positive relationship between stock returns and inflation changes for the Spanish market as a whole and for several sectors. In terms of the “flow-through” theory, most companies seem to have a high capability to transfer the inflation to the prices of products or services. This is the case of the companies from sectors that show an insignificant relationship between abnormal returns and inflation rate, and also from sectors in which this relationship is significant and positive.

Third, the relationship between inflation rate and abnormal returns is negative in the post-announcement period, but the coefficient is statistically insignificant. There is no evidence of a possible adjustment of prices subsequent to an overreaction on the announcement day.

Panels B and C of Table 5 depict the results of the estimations of models 6 and 7 which distinguish between expected and unexpected component of inflation rate. We observe that expected inflation coefficients (model 6) show amounts and *t*-statistic values close to the estimated values of the total inflation rate in model 5. They are positive and significant in sectors 2 and 4 and in the whole market on the announcement day. Consistently the unexpected component in model 6 and 7 is never significant. Former results suggest that the market considers the announced inflation value, independently of its amount, as "good news" provided that it is close to the expected value. In any case, responses to positive and to negative unexpected inflation news could compensate each other. Thus, lack of significance in the unexpected component leads us to carry out our sectorial analysis more deeply.

5. Direction of the surprise and state of the economy

In this section, we check if the sectorial abnormal returns response to inflation rate movements depends on two relevant factors: the direction of the inflation surprises and the state of the economy.

5.1. Methodology

More previous studies document that stock returns do not respond significantly to unexpected inflation movements, but they do not distinguish between positive and negative surprises, showing an insignificant net effect. We consider positive inflation surprises ("bad news" in the literature, that is, total inflation higher than expected inflation) and negative surprises ("good news", that is, a total inflation lower than anticipated inflation) separately. Andersen et al. (2003) state that the adjustment response pattern of foreign exchange rates after macroeconomic announcements is characterized by a sign effect: "bad news" has greater impact than "good news".

For checking these asymmetric effects, we include two modifiers that are applied to the dummy variables in our analysis. They represent a positive unexpected inflation rate or "bad news" ($D^{+}_{\bullet,t}$) and a negative unexpected inflation rate or "good news" ($D^{-}_{\bullet,t}$). These variables take the following values:

$$D^{+}_{\bullet,t} = \begin{cases} 1\, if\ \pi^{u}_{t} > 0 \\ 0\, if\ \pi^{u}_{t} < 0 \end{cases} \qquad D^{-}_{\bullet,t} = \begin{cases} 1\,\text{if}\ \pi^{u}_{t} < 0 \\ 0\,\text{if}\ \pi^{u}_{t} > 0 \end{cases}$$

On the other hand, "behavioural finance" hypothesis (BFH) (Veronesi, 1999, and Docking and Koch, 2005) suggest that the interpretation of the macroeconomic announcement depends on the context in which news is received, that is, the recent direction of the market or the recent state of the economy may influence the investors response to new information. News that goes against the grain of the recent market direction increases investor uncertainty about the future course of events. During expansions, any increase in inflation rate is perceived as “bad news”, since it could result in fears of an overheating economy. Nevertheless, during recessions, the same increase could be considered as “good news” because economic agents think that economy is growing over the expectation. The positive inflation surprise could indicate the end of the depression and higher forecasts of firms’ cash flows, so stock price and return increase. The inverse explanation could be applied with negative inflation surprises.

Arguments proposed by the BFH for a general macroeconomic announcement conflict with arguments of “flow-through” hypothesis (FTH) (Estep and Hanson, 1980) for inflation rate announcements in several scenarios. Profits of companies with high flow-through capability could be hardly sensitive or even independent to the inflation rate. These companies are able to quickly transfer any inflationist shock to prices of their products and services. Even a positive inflation surprise (inflation rate higher than expected) could be interpreted as “good news” in these sectors. In addition, this “flow-through” capability depends on the economic cycle. This company ability is larger in expansion periods than in the rest of states. Thus, “bad news” about inflation rates during expansions should be perceived as “bad news” for all the sectors according the BFH, and could be interpreted as not relevant information or even as “good news” for sectors with high flow-through capability according to the FTH.

We test the hypothesis that the sectorial response of the Spanish stock market to inflation news depends on the state of the economy. In order to classify the economic activity in levels, McQueen and Roley’s (1993) methodology is widely used in the literature. This methodology consists of applying two (upper and lower) bounds around the estimated trend of the industrial production index (IPI). An arbitrary constant defines the width of the range around the trend and allows classification of the economic activity of each period on three different levels.

Firstly, we estimate the following regression model:

$$Ln(IPI_t) = \alpha_0 + \alpha_1 \cdot trend_t + u_t \qquad [8]$$

where IPI_t is the Spanish Industrial Production Index in month t.

[INSERT TABLE 6]

Secondly, we choose the constant 0.0245 so that the logarithm of IPI is above the upper bound, denoted as high economic activity, 30 % of the time. The log of IPI is below the lower bound, indicating low economic activity, about 20 % of time. Medium economic activity is represented by the remaining observations between the bounds:

[INSERT FIGURE 2]

- If $Ln(IPI_t) \geq upper_t$, then $t \in$ "high economic activity" (H)
- If $upper_t > Ln(IPI_t) \geq lower_t$, then $t \in$ "medium economic activity" (M)
- If $lower_t > Ln(IPI_t)$, then $t \in$ "low economic activity" (L)

We include three modifiers in the dummy variables to control for the state of the economy: $D^{\bullet}_{H,t}$ ("High"), $D^{\bullet}_{M,t}$ ("Medium") and $D^{\bullet}_{L,t}$ ("Low"). For each dummy, it is equal to one if economic activity in the month t belongs to the corresponding state and zero otherwise.

We modify model 7 to control for asymmetric responses of the sectorial stock abnormal returns to unexpected inflation depending on the direction of the surprise and the state of the economy. That is, six dummy variables take into account all the possible combinations between the two considered factors:

$$\begin{aligned} ARS_i(t) = \alpha_i &+ \beta_{i1} \cdot D^{+}_{H,t} \cdot \left|\pi^u_t\right| + \beta_{i2} \cdot D^{+}_{M,t} \cdot \left|\pi^u_t\right| + \beta_{i3} \cdot D^{+}_{L,t} \cdot \left|\pi^u_t\right| + \\ &+ \beta_{i4} \cdot D^{-}_{H,t} \cdot \left|\pi^u_t\right| + \beta_{i5} \cdot D^{-}_{M,t} \cdot \left|\pi^u_t\right| + \beta_{i6} \cdot D^{-}_{L,t} \cdot \left|\pi^u_t\right| + u_{it} \end{aligned} \quad [9]$$

where $\left|\pi^u_t\right|$ is the unexpected component of inflation rate expressed in absolute value. Superscript + in dummy variables ($D^{+}_{\bullet,t}$) denotes that inflation rate is higher than expected and superscript – ($D^{-}_{\bullet,t}$) that inflation rate is lower than expected, that is, positive or negative unanticipated inflation, respectively. Also, the subscript H ($D^{\bullet}_{H,t}$), M ($D^{\bullet}_{M,t}$) or L ($D^{\bullet}_{L,t}$) indicates a high, medium or low state of economic activity, respectively. Each dummy variable takes value 1 when the two conditions take place simultaneously.

According to the BFH, the expected signs of estimated coefficients for negative surprises in high and medium states and positive surprises in low states of the economy (-,*H* ; -,*M* ; +,*L*) are positive. In the rest of the cases (+,*H* ; +,*M* ; -,*L*), the expected signs are negative.

5.2. Results

Table 7 reports estimation results of model 9 for each sector using the "seemingly unrelated regression" technique (SUR). A quick examination of the Table reveals that quite a lot of estimated coefficients are statistically significant. Also, Wald tests reject the equality of the estimated coefficients in several sectors showing significant different responses according to the direction of the news and the state of the economy. This finding contrasts that obtained in Table 5. In that case, all the coefficients corresponding to the unexpected inflation component are no significant. Thus we obtain evidence that the former result is biased as a consequence of aggregating responses to unexpected inflation news of different sign in different economic scenarios.

[INSERT TABLE 7]

Panel A depicts estimation results for the sample of pre-announcement period. We observe significant responses of abnormal returns to the unexpected inflation component for many sectors and most of the scenarios. In certain scenarios, mainly in the case of negative surprises (inflation rate lower than expected), agents seem to readjust prices according to the difference between the expected inflation rate and the official one on the days previous to the official announcement day. A possible interpretation could be that inflation news leaks to the agents before its official publication, especially in the case of "good news" for the monetary authorities.

This anticipated and significant pattern is particularly evident in the case of negative surprises in medium states of the economy (-*, M*). Sectors 1, 3 and 5, the whole market sample and subsectors "liberalized" and "regulated" show positive abnormal returns when the official inflation rate is lower than expected. That is, returns increase given the close publication of the "good news". However, no significant anticipated reaction appears when positive surprises are in medium states.

In contrast to the arguments stated by the BFH, we observe that negative surprises imply positive abnormal returns in low states of the economy (-*, L*) and negative in high states (-*, H*) in all the sectors. Also positive abnormal returns appear in the case of positive surprises in high states (+*, H*). Anyway these coefficients are only significant in certain cases for sectors 3, 5 and "liberalized". Former result is partially consistent with FTH, because companies of "liberalized" subsectors can be considered high flow-through capability firms. Only the scenario of positive surprises and recessions (+*, L*) is consistent with the BFH as we observe positive abnormal returns in all sectors but only significant ones in sector 5 and the whole sample.

Significant effects of unexpected inflation component on the announcement day (Panel B) only appear in medium states of the economy. Thus sectors 1, 2 and 3, whole sample and "liberalized" and "regulated" subsectors show significant positive abnormal returns independently of the sign of the surprise. Coefficients are not significant in the rest of economic states. Another outstanding result is that homogeneity in the sign of the estimated coefficients for all the sectors in each scenario observed in the pre-announcement period is now only kept in the medium states scenarios. Although not statistically significant, the reaction in low and high states is different depending on the sector.

In the sample of the post-announcement period (Panel C) only a few significant coefficients are found. In the case of negative surprises in medium states (-, *M*) seems to remain a slow adjustment which began days before (sectors 3, 5 and whole market). On the other hand, sectors 1 and "regulated" show a negative and significant coefficient in the case of positive surprises in high states (+, *H*) consistent with the observed coefficient on the announcement day, with the BFH and with the FTH.

In general, we observe relevant differences in the stock return responses to unexpected inflation changes depending on the sector of activity. Anyway relating this different response to the flow-through capability of the sector is sometimes complicated. Bolsa de Madrid sector definition scheme was not designed to distinguish between sectors with different flow-through capabilities. Thus subsectors inside the same sector could be totally distinct in this aspect.

Sectors 1 ("Oil and Energy"), 3 ("Consumer Goods") and 5 ("Financial and Real State Services") are the more "reactive" sectors to the unexpected component of the inflation rate. Their estimated coefficients are significant in many scenarios. In terms of the FTH, they show a low ability to transfer inflationist shocks to prices, so they are the most sensitive sectors to the unexpected inflation rates. Most companies of these sectors agree with this analysis. They are companies with price inflexibility as a consequence of fierce competition or of prices regulated by law.

On the other hand, sectors 2 ("Basic Materials, Industry and Construction"), 4 ("Consumer Services") and 6 ("Technology and Telecommunications") are sectors with high price flexibility. Their estimated coefficients are insignificant in practically all the scenarios. Abnormal returns of these sectors are independent of the unexpected component of the inflation rate. In general, most companies of these sectors show a high flow-through capability.

Finally, our "regulated" and "liberalized" subsectors splitting should avoid the problem of sectors with mixed components. Companies with clearly regulated/ liberalized prices should show a low/high flow-through capability. Unfortunately results are not fully consistent with FTH, but some of them point out to the expected direction. Firstly, “liberalized” subsectors show a significant and positive coefficient in medium economic states and positive inflation surprises (+, *M*) on the announcement day, so this news seems to be “good news” for companies with a very high “flow-through” capability. Secondly, although most of the coefficients of the “regulated” subsectors are not statistically significant at the usual levels, their signs are more consistent with the BFH than that of the “liberalized” subsectors.

6. Summary and concluding remarks

This paper has explored the short run response of daily stock returns to the unanticipated inflation news in the Spanish market using event-study methodology. We document the key role of the “flow-through” capability of each sector of activity in this analysis. Also, the stock abnormal return response of each sector to the news depends on the direction of the news and the state of the economy according to the BFH.

Preliminary analysis shows that almost all the sectors show significantly negative abnormal returns only in the pre-announcement period (two days previous to the announcement). No evidence about a significant relationship between abnormal returns and expected inflation rates is found in this period, therefore abnormal returns can be originated by the uncertainty that the actual announcement causes in the market. Sectors with high “flow-through” capability are the only sectors that show a significant relationship between abnormal returns and the expected component of the inflation rates on the announcement day.

When we include the direction of the inflation surprises and state of the economy in our analysis, we observe significant responses of abnormal returns to the unexpected inflation component for many sectors in the case of negative surprises (inflation rate lower than expected) in the pre-announcement period. Agents seem to readjust prices according to the unexpected inflation rate on the days previous to the announcement date. Inflation news seems to be leaked to the agents before its official publication in the case of “good news” for the monetary authorities.

Significant effects appear only for certain sectors in medium states of the economy on the announcement day. Independently of the sign of the surprise, the abnormal return is positive. These effects are also found for some of these sectors in the post-announcement period, so a slow adjustment seems to remain.

Evidence in favour of the BFH is only found in sectors of low “flow-through” capability. Significant coefficients for these sectors appear in many scenarios. Anyway, the signs of the coefficients are not always those expected according the BFH. Results for sectors that can be considered as high “flow-through” capability are consistent with the FTH. Their abnormal returns are independent of the unexpected component of the inflation rates or, in certain scenarios, react showing that these companies are able to transfer the inflationist shocks to prices and even to improve their profits.

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Table 1.- Companies included in the analysis and the sector they belong to

Sector name	Number of firms	Subsectors
Sector 1: Oil and Energy	9	1.1.:Oil 1.2.: Electricity and Gas 1.3.: Water and Others
Sector 2: Basic Materials, Industry and Construction	33	2.1.: Minerals, Metals and Transformation 2.2.: Manufacture and assembly of capital assets 2.3.: Construction 2.4.: Construction Materials 2.5.: Chemistry Industry 2.6.: Engineering and Others 2.7.: Aerospace
Sector 3: Consumer Goods	29	3.1.: Food and Drinks 3.2.: Textile, Clothes and Footwear 3.3.: Paper and Graphic Arts 3.4.: Car 3.5.: Pharmaceutical Products and Biotechnology 3.6.: Other Consumer Goods
Sector 4: Consumer Services	19	4.1.: Tourism and Hotel and Catering Business 4.2.: Retail Trade 4.3.: Media and Advertising 4.4.: Transport and Distribution 4.5.: Motorways and Car Parks 4.6.: Other Services
Sector 5: Financial and Real State Services	27	5.1.: Bank 5.2.: Insurance 5.3.: Portfolio and Holding 5.4.: SICAV 5.5.: Real State Agencies and Others
Sector 6: Technology and Telecommunications	10	6.1.: Telecommunications and Others 6.2.: Electronics and Software
Total market	127	

Composition of the "regulated" and "liberalized" portfolios

Portfolios	Number of firms	Subsectors
"Regulated"	5	1.2: Electricity and gas
	1	1.3: Water and others
	2	4.5: Motorways and car parks
"Liberalized"	2	1.1: Oil
	6	2.3: Construction

Table 2.- Main statistics of total, expected and unexpected inflation rate

INF denotes the total inflation rate, **INFE** the expected inflation rate, and **INFNE** the unexpected component of inflation rate

		Naïve		ARMA (1, 0)	
	INF	**INFE1**	**INFNE1**	**INFE2**	**INFNE2**
Mean	0.030966	0.031034	-6.72E-05	0.030987	-2.08E-05
Std. Dev.	0.009187	0.009246	0.002364	0.008879	0.002336
Observations	119	119	119	119	119

Table 3.- Unbiasedness test

OLS regression (only announcement days, from Feb. 1995 to Dec. 2004):

$$\pi_t = \alpha + \beta \cdot \pi_t^e + u_t$$

where π_t shows the total inflation rate, π^e_t the monthly expected inflation rate and u_t the error term.

F-statistic value from *Wald* test checking the joint hypothesis: $\alpha = 0$ and $\beta = 1$

	Intercept	**Beta**	**Adj R^2**	***Wald* test #**
***Naïve* Model**	0.001144 (1.512866)	0.960970 [c] (41.13651)	0.934778	1.444593
ARMA (1, 0)	-4.09E-05 (-0.052161)	1.000648 [c] (41.13651)	0.934778	0.005040

[a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$ (*t*-statistics in parentheses)

Table 4.- Abnormal returns analysis

Main statistics of sectorial abnormal returns in the event window (panels A, B and C) and test of intersectorial equality of means, medians and variances. **ARS1,** …, **ARS6** denote abnormal returns of the sector 1, 2 … 6. **ARM**, **ARLS** and **ARRS** show abnormal returns of the total market, and the "liberalized" and "regulated" subsectors portfolio respectively.

PANEL A: Two days before the announcement day

	ARS1	ARS2	ARS3	ARS4
Mean	-0.001550 [b]	-0.001557 [b]	-0.001123 [a]	-0.002030 [b]
Std. Dev.	0.010251	0.010625	0.008892	0.013027
Observations	238	238	238	238
ARS5	**ARS6**	**ARM**	**ARLS**	**ARRS**
-0.001644 [c]	-0.001341	-0.001492 [c]	-0.001536 [b]	-0.001384 [b]
0.008175	0.019300	0.008775	0.011001	0.010220
238	238	238	238	238

PANEL B: Announcement day

	ARS1	ARS2	ARS3	ARS4
Mean	-0.000478	-0.000905	-0.000290	-0.000322
Std. Dev.	0.010788	0.009262	0.007805	0.011248
Observations	119	119	119	119
ARS5	**ARS6**	**ARM**	**ARLS**	**ARRS**
-0.000499	0.001760	-0.000461	-0.000808	-0.000487
0.007381	0.020058	0.007604	0.010621	0.009864
119	119	119	119	119

PANEL C: Two days after the announcement day

	ARS1	ARS2	ARS3	ARS4
Mean	-0.001498 [b]	-8.99E-05	-0.000404	-0.000820
Std. Dev.	0.010658	0.010446	0.008651	0.014011
Observations	238	238	238	238
ARS5	**ARS6**	**ARM**	**ARLS**	**ARRS**
-0.000312	0.000784	-0.000357	-0.000518	-0.001588 [b]
0.008186	0.020452	0.008926	0.011619	0.010590
238	238	238	238	238

PANEL D: Intersectorial tests within sectors 1 and 6

TEST	Previous days	Announc. days	Following days	INTERPRETATION
Anova-F	0.131915	0.704784	0.757415	Equality of means: Not rejected
K-W	1.750945	0.647454	5.875465	
van der Waerden	1.198067	1.123747	4.763122	Equality of medians: Not rejected
Levene	25.46959[c]	25.72417[c]	35.45548[c]	
B-F	25.15572[c]	24.31862[c]	34.93386[c]	Equality of variances: Rejected

PANEL E: Intersectorial tests between LS and RS

TEST	Previous days	Announc. days	Following days	INTERPRETATION
Anova-F	0.024338	0.058302	1.103070	Equality of means: Not rejected
K-W	0.125227	0.000965	1.666358	
van der Waerden	0.065086	0.021354	1.410291	Equality of medians: Not rejected
Levene	0.261357	0.789199	1.559879	
B-F	0.273515	0.824408	1.556671	Equality of variances: Not rejected

[a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$

K-W: Kruskal-Wallis Test, B-F: Brown-Forsythe Test

Table 5.- Sectorial response to inflation announcements

INF total inflation rate, **INFE** expected inflation rate (ARIMA), **INFNE** unanticipated inflation rate, **ARS** abnormal return of each sector, the total market and both subsectorial portfolios ("liberalized" and "regulated"). Sample: from Feb. 1995 to Dec. 2004 (SUR estimation). In the expressions: $ARS_i(t)$ denote the sectorial abnormal return on the announcement day t, π_t the total inflation rate, π_t^e the monthly expected inflation rate, π_t^u the unexpected component of the inflation rate and u_{it} represents the error term of sector i.

t-statistics in parentheses. [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$

PANEL A: Total inflation effect

$$ARS_i(t) = \alpha_i + \beta_i \cdot \pi_t + u_{it}$$

	2 days before		Announcement days		2 days later	
	INF	R^2	INF	R^2	INF	R^2
ARS1	0.0701 (0.9695)	0.0039	0.1457 (1.3640)	0.0154	0.0078 (0.1038)	0.0000
ARS2	-0.0043 (-0.0577)	0.0000	0.1562 [a] (1.7111)	0.0240	-0.0789 (-1.0708)	0.0048
ARS3	0.0009 (0.0150)	0.0000	0.1135 (1.4709)	0.0179	-0.0901 (-1.4790)	0.0091
ARS4	0.0004 (0.0044)	0.0000	0.2193 [b] (1.9862)	0.0321	-0.1487 (-1.5080)	0.0095
ARS5	0.0834 (1.4491)	0.0087	0.0947 (1.2952)	0.0139	-0.0273 (-0.4716)	0.0009
ARS6	0.1650 (1.2127)	0.0061	0.3261 [a] (1.6480)	0.0223	-0.1042 (-0.7217)	0.0022
ARM	0.0337 (0.5442)	0.0012	0.1532 [b] (2.0542)	0.0342	-0.0619 (-0.9824)	0.0040
ARLS	0.0205 (0.2631)	0.0003	0.1420 (1.3500)	0.0151	-0.1249 (-1.5279)	0.0097
ARRS	0.0523 (0.7252)	0.0022	0.1207 (1.2346)	0.0126	-0.0056 (-0.0749)	0.0000

PANEL B: Expected and unexpected inflation effect

$$ARS_i(t) = \alpha_i + \beta_{1i} \cdot \pi_t^e + \beta_{2i} \cdot \pi_t^u + u_{it}$$

	2 days before			Announcement days			2 days later		
	INFE	INFNE	R^2	INFE	INFNE	R^2	INFE	INFNE	R^2
ARS1	0.0785 (1.0487)	-0.0491 (-0.1728)	0.0047	0.1415 (1.2804)	0.2059 (0.4903)	0.0156	0.0271 (0.3486)	-0.2686 (-0.9083)	0.0040
ARS2	0.0006 (0.0078)	-0.0751 (-0.2541)	0.0003	0.1554 (1.6449)	0.1682 (0.4686)	0.0240	-0.0523 (-0.6886)	-0.4600 (-1.5938)	0.0125
ARS3	-0.0045 (-0.0699)	0.0796 (0.3219)	0.0005	0.1094 (1.3702)	0.1726 (0.5687)	0.0182	-0.0752 (-1.1952)	-0.3033 (-1.2691)	0.0126
ARS4	-0.0032 (-0.0332)	0.0515 (0.1423)	0.0001	0.2384 [b] (2.0902)	-0.0536 (-0.1237)	0.0355	-0.1386 (-1.3595)	-0.2924 (-0.7545)	0.0101
ARS5	0.0909 (1.5272)	-0.0240 (-0.1060)	0.0097	0.1094 (1.4496)	-0.1159 (-0.4039)	0.0187	-0.0174 (-0.2907)	-0.1690 (-0.7435)	0.0027
ARS6	0.1668 (1.1851)	0.1387 (0.2592)	0.0062	0.3659 [a] (1.7912)	-0.2428 (-0.3127)	0.0270	-0.0711 (-0.4763)	-0.5792 (-1.0213)	0.0053
ARM	0.0358 (0.5583)	0.0041 (0.0166)	0.0013	0.1605 [b] (2.0821)	0.0477 (0.1629)	0.0354	-0.0428 (-0.6590)	-0.3346 (-1.3548)	0.0095
ARLS	0.0384 (0.4776)	-0.2360 (-0.7729)	0.0034	0.1570 (1.4446)	-0.0733 (-0.1774)	0.0175	-0.1074 (-1.2713)	-0.3758 (-1.1706)	0.0124
ARRS	0.0637 (0.8541)	-0.1107 (-0.3904)	0.0037	0.1453 (1.4414)	-0.2311 (-0.6031)	0.0201	0.0208 (0.2701)	-0.3845 (-1.3107)	0.0075

Table 5.- Sectorial response to inflation announcements (cont.)

PANEL C: Unanticipated inflation effect

$ARS_i(t) = \alpha_i + \beta_i \cdot \pi_t^u + u_{it}$

	2 days before		**Announcement days**		**2 days later**	
	INFNE	R^2	**INFNE**	R^2	**INFNE**	R^2
ARS1	-0.0484 (-0.1698)	0.0001	0.2072 (0.4901)	0.0020	-0.2684 (-0.9072)	0.0034
ARS2	-0.0751 (-0.2541)	0.0003	0.1697 (0.4673)	0.0018	-0.4605 (-1.5939)	0.0106
ARS3	0.0795 (0.3217)	0.0004	0.1736 (0.5676)	0.0027	-0.3040 (-1.2683)	0.0067
ARS4	0.0515 (0.1422)	0.0001	-0.0514 (-0.1164)	0.0001	-0.2937 (-0.7549)	0.0024
ARS5	-0.0231 (-0.1017)	0.0000	-0.1148 (-0.3968)	0.0013	-0.1692 (-0.7441)	0.0023
ARS6	0.1402 (0.2613)	0.0003	-0.2393 (-0.3042)	0.0008	-0.5798 (-1.0220)	0.0044
ARM	0.0044 (0.0180)	0.0000	0.0492 (0.1650)	0.0002	-0.3350 (-1.3552)	0.0077
ARLS	-0.2356 (-0.7714)	0.0025	-0.0718 (-0.1723)	0.0002	-0.3768 (-1.1698)	0.0057
ARRS	-0.1101 (-0.3877)	0.0006	-0.2297 (-0.5944)	0.0030	-0.3843 (-1.3099)	0.0072

Table 6.- Regression for classifying the "state of the economy"

Regression model estimated by OLS from monthly data of the industrial production index (IPI) from Feb. 1995 to Dec. 2004:

$$Ln(IPI_t) = \alpha_0 + \alpha_1 \cdot trend_t + u_t$$

Variable	Coefficient
C	4.415419^c (871.1953)
TREND	0.002047^c (27.92647)
Adjusted R-squared	0.868434

[c] p < 1% *t*-statistics in parentheses

Table 7.- State of the economy and direction of the inflation surprise

Dummy variables distinguish between higher (+) and lower (-) inflation than expected and between high (*H*), medium (*M*) and low (*L*) states of the economy. Sample: Feb. 1995-Dec. 2004 (SUR estimation):

$$ARS_i(t) = \alpha_i + \beta_{i1} \cdot D^+_{H,t} \cdot |\pi^u_t| + \beta_{i2} \cdot D^+_{M,t} \cdot |\pi^u_t| + \beta_{i3} \cdot D^+_{L,t} \cdot |\pi^u_t| +$$
$$+ \beta_{i4} \cdot D^-_{H,t} \cdot |\pi^u_t| + \beta_{i5} \cdot D^-_{M,t} \cdot |\pi^u_t| + \beta_{i6} \cdot D^-_{L,t} \cdot |\pi^u_t| + u_{it}$$

Test of equality between inflation coefficients in different states of the economy.

t-statistics in parentheses: [a] $p < 0.10$, [b] $p < 0.05$, [c] $p < 0.01$

PANEL A

2 days before	***+, H***	***+, M***	***+, L***	***-, H***	***-, M***	***-, L***	R^2	***Wald* Test#**
ARS1	0.5061 (0.5204)	0.9164 (1.5166)	1.1398 (1.2155)	-1.1073 (-0.7718)	1.4054 [b] (2.2374)	0.7865 (1.0375)	0.0351	8.616
ARS2	1.2121 (1.1956)	0.1716 (0.2724)	0.9677 (0.9898)	-1.3875 (-0.9275)	0.8344 (1.2741)	1.0829 (1.3703)	0.0238	5.741
ARS3	1.3496 (1.6187)	0.4441 (0.8572)	1.2328 (1.5333)	-2.5424 [b] (-2.0666)	1.1256 [b] (2.0899)	0.6940 (1.0678)	0.0572	14.32 [b]
ARS4	1.0372 (0.8294)	0.3090 (0.3977)	1.0462 (0.8676)	-0.8063 (-0.4370)	0.3097 (0.3834)	1.2196 (1.2512)	0.0119	2.834
ARS5	1.4026 [a] (1.8515)	0.7674 (1.6301)	1.5305 [b] (2.0951)	-1.7057 (-1.5260)	1.5582 [c] (3.1841)	1.1235 [a] (1.9025)	0.0793	20.49 [c]
ARS6	0.4049 (0.2203)	0.6490 (0.5682)	2.2171 (1.2508)	-4.2762 (-1.5766)	1.5551 (1.3096)	0.3297 (0.2301)	0.0273	6.613
ARM	1.1996 (1.4514)	0.4942 (0.9622)	1.3170 [a] (1.6525)	-1.8117 (-1.4855)	1.1177 [b] (2.0934)	0.9934 (1.5420)	0.0487	12.18 [b]
ARLS	0.9631 (0.9258)	0.9248 (1.4306)	1.3984 (1.3940)	0.0735 (0.0479)	1.3949 [b] (2.0757)	2.0767 [b] (2.5608)	0.0411	1.767
ARRS	0.2147 (0.2213)	0.8529 (1.4151)	0.8717 (0.9320)	-1.2005 (-0.8389)	1.4081 [b] (2.2475)	0.7051 (0.9327)	0.0343	0.448

PANEL B

Announc. Days	***+, H***	***+, M***	***+, L***	***-, H***	***-, M***	***-, L***	R^2	***Wald* Test#**
ARS1	-0.8094 (-0.5783)	1.5367 [a] (1.7669)	1.4992 (1.1108)	0.6490 (0.3143)	1.7905 [b] (1.9804)	-1.4229 (-1.3042)	0.0938	12.05 [b]
ARS2	0.6787 (0.5606)	1.0717 (1.4246)	0.8888 (0.7614)	-1.8575 (-1.0398)	1.7639 [b] (2.2555)	-0.6530 (-0.6920)	0.0801	10.12 [a]
ARS3	0.4662 (0.4552)	1.4329 [b] (2.2515)	0.7651 (0.7748)	-0.8027 (-0.5312)	1.3761 [b] (2.0800)	0.0895 (0.1121)	0.0731	9.034
ARS4	-0.4240 (-0.2775)	0.2697 (0.2841)	-0.3252 (-0.2207)	0.8549 (0.3793)	0.3427 (0.3473)	-0.5000 (-0.4199)	0.0069	0.811
ARS5	0.0253 (0.0255)	0.5168 (0.8380)	0.0376 (0.0393)	0.3923 (0.2679)	0.9918 (1.5472)	-0.1518 (-0.1962)	0.0268	3.122
ARS6	-1.1985 (-0.4473)	0.5105 (0.3066)	-0.0455 (-0.0176)	-4.1152 (-1.0410)	2.3572 (1.3620)	-1.4451 (-0.6919)	0.0394	4.785
ARM	0.1793 (0.1785)	0.9379 (1.5032)	0.4757 (0.4913)	-0.5203 (-0.3512)	1.3598 [b] (2.0964)	-0.4221 (-0.5392)	0.0613	7.745
ARLS	0.8182 (0.5877)	1.5952 [a] (1.8438)	1.8263 (1.3604)	2.2704 (1.1052)	2.3243 [c] (2.5844)	0.3213 (0.2961)	0.0749	3.087
ARRS	-1.7889 (-1.4057)	0.8745 (1.1058)	0.3702 (0.3017)	0.8296 (0.4418)	1.8075 [b] (2.1986)	-1.3785 (-1.3896)	0.1038	6.445 [a]

Table 7.- Test taking into account the state of the economy and the direction of the inflation surprise (cont.)

PANEL C

2 days later	*+, H*	*+, M*	*+, L*	*-, H*	*-, M*	*-, L*	R^2	*Wald* Test[#]
ARS1	-2.6792 [c] (-2.6673)	-0.0864 (-0.1384)	-0.2923 (-0.3018)	-1.5124 (-1.0204)	0.5410 (0.8338)	-1.0922 (-1.3949)	0.0476	11.04 [a]
ARS2	0.0164 (0.0164)	-0.2646 (-0.4250)	-0.5565 (-0.5760)	0.5489 (0.3713)	0.8901 (2.2555)	0.3317 (0.4247)	0.0137	0.767
ARS3	0.0351 (0.0427)	0.0008 (0.0015)	-0.9076 (-1.1434)	-0.5392 (-0.4439)	1.0323 [a] (1.9411)	-0.2873 (-0.4476)	0.0290	5.450
ARS4	-0.4295 (-0.3196)	-0.0898 (-0.1076)	-1.1121 (-0.8581)	-1.0955 (-0.5524)	0.9035 (1.0407)	-0.5845 (-0.5579)	0.0133	2.642
ARS5	-0.1864 (-0.2389)	0.2076 (0.4281)	-0.2642 (-0.3510)	0.1356 (0.1177)	0.9471 [a] (1.8783)	-0.5350 (-0.8793)	0.0251	5.558
ARS6	0.4839 (0.2474)	-0.0767 (-0.0631)	-0.9938 (-0.5270)	3.0297 (1.0498)	1.8956 (1.5004)	-0.8577 (-0.5626)	0.0194	3.642
ARM	-0.4032 (-0.4737)	-0.0418 (-0.0791)	-0.7256 (-0.8840)	-0.2382 (-0.1897)	0.9799 [a] (1.7821)	-0.3613 (-0.5446)	0.0250	4.234
ARLS	-1.4897 (-1.3421)	-0.2364 (-0.3427)	-0.6158 (-0.5753)	2.3921 (1.4605)	-0.1833 (-0.2556)	0.1353 (0.1564)	0.0215	1.994
ARRS	-2.2056 [b] (-2.2078)	-0.0208 (-0.0336)	-0.8384 (-0.8703)	-1.7313 (-1.1746)	0.8474 (1.3131)	-0.7463 (-0.9584)	0.0458	4.592

Figure 1.- "Windows" defined in a real announcement

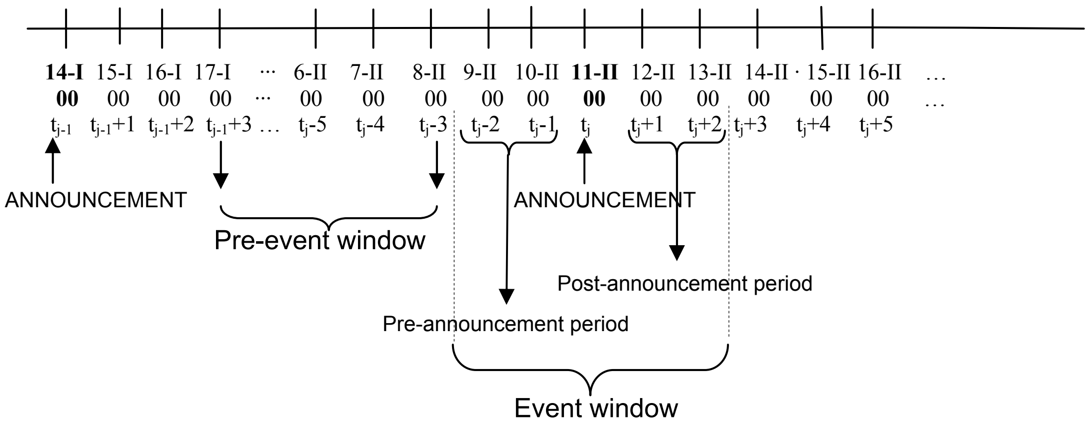

Figure 2.- Natural log. of the IPI (industrial production index) and bounds (trend ±0.0245)