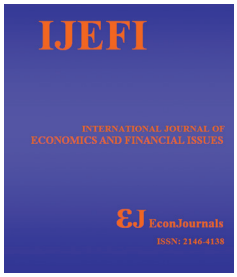


**International Journal of Economics and Financial Issues**

ISSN: 2146-4138

available at http: www.econjournals.com

**International Journal of Economics and Financial Issues, 2018, 8(2), 113-127.**

# The Relevance of the Market and News Direction When Analyzing the Inflation News Impact on the US Stock Market

**Francisco Jareño[1]*, Marta Tolentino[2], Mª del Camino Torrecillas[3]**

[1]Department of Economics and Finance, University of Castilla−La Mancha, Faculty of Economic and Business Sciences, Plaza de la Universidad, 1, 02071, Albacete, Spain, [2]Department of Economics and Finance, University of Castilla−La Mancha, School of Law and Social Sciences, Ronda de Toledo, s/n, 13071, Ciudad Real, Spain, [3]Department of Economics and Finance, University of Castilla−La Mancha, Faculty of Economic and Business Sciences, Plaza de la Universidad, 1, 02071, Albacete, Spain.
*Email: Francisco.Jareno@uclm.es

**ABSTRACT**

This study aims to measure the inflation news impact on common sector stock returns. Using consumer price index (CPI) and producer price index (PPI) announcements and daily returns of Standard & Poor's 500 index, an Event Study Methodology analysis of a sample period from January 1990 to April 2013 is conducted. Taking into account the direction of the inflation news and the state of the economy, sector returns seem to react strong to CPI announcements and do not react to PPI announcements. In addition, the majority of the significant responses occur 2 days after that the inflation announcement takes place, so investors may react later to the arrival of new information. Finally, inflation announcements appear to have an impact when the state of the economy is low and when the direction of news is negative. Therefore, the state of the economy and direction of surprises are central variables to analyses of inflation news effects on abnormal returns.

**Keywords:** Inflation Announcement, Flow−through Ability, Stock Return, Market Efficiency
**JEL Classifications:** E31, G12, G3, L2

## 1. INTRODUCTION AND LITERATURE REVIEW

Our analysis focuses on analyzing the inflation news impact (consumer price index [CPI] and producer price index (PPI)) on common stock returns Standard & Poor's 500 (S&P500 index). Thus, in this section, we carry out a brief compilation of some previous studies about this topic.

There is large literature which tries to explain the relationship between expected inflation, unexpected inflation and changes in inflation rate and stock returns, and the authors have obtained results very controversial.[1] Firstly, the Classical Fisher model (1930) notes that the nominal interest rate can be separated in the sum of two components: The expected real rate and the expected inflation rate. He argues that the expected real return is determined by real factors and, therefore, both rates have to be statistically uncorrelated. The following researches show a negative relationship between expected inflation rate and common stock returns. These studies question the Fisher hypothesis in which nominal asset returns move one−for−one with inflation rate. Fama and Schwert (1977) find a negative relationship between common stock returns and expected and unexpected inflation rate and thereby, they conclude that common stock returns are not a good hedge against inflation. Later, Fama (1981) and Geske and Roll (1983) argue that this negative relationship is due to a positive relationship between stock returns and future economic activity. In this manner, inflation acts as a "proxy" for expected real activity.[2]

1 For a more detailed explanation, please see Torrecillas and Jareño (2013).

2 This theory is known such as the "Proxy Hypothesis" is based in two stylized facts. Firstly, a rise of inflation rate anticipates a low growth rate of real economic activity, and secondly, high stock returns anticipate a high growth rate of real economic activity. In conclusion, the inflation and the common stock returns move in opposite directions.

Other studies analyze the relationship between common stock returns and inflation rate for a much longer period. For example, Jaffe and Mandelker (1976) find a negative relationship between common stock returns and inflation rate over short sample periods, but this relationship becomes positive when the authors consider a long period 1875–1970. This positive long−run inflation effect is corroborated by Boudoukh and Richardson (1993) and Anari and Kolari (2001).[3]

Other authors attempt to explain the relationship between unexpected inflation and common stock returns from two different points of view. Firstly, Estep and Hanson (1980) propose that this relationship could be neutral because the companies can transfer the increases of inflation to the prices of their products.[4] This theory is known as "Flow – Through" hypothesis (Asikoglu and Ercan, 1992; Jareño, 2005; and Jareño and Navarro, 2010). Secondly, another alternative explanation is the theoretical "Rational Expectations Equilibrium Model" of assets prices of Veronesi (1999). He concludes that stock prices overreact to bad news when the state of the economy is good and underreact to good news when the state of the economy is bad. It occurs because when the announcements go against the market tendency, the investor's uncertainty increases and, therefore, the volatility of the market also increase. Recently, Díaz and Jareño (2009; 2013) deal to explain the impact of inflation news on stock prices taking into account, on one hand, the Veronesi's hypothesis and, on the other hand, the Estep and Hanson's "flow - through hypothesis."

To conclude, we can highlight that the majority of the authors find a negative relationship between stock returns and inflation in the short term, but this relationship becomes positive in the long term. On the other hand and following the models described by Estep and Hanson and Veronesi, we can conclude that the mentioned relationship can be explained taking into account indicators such as the flow–through ability of the companies, the state of the economy and the direction of inflation surprises.

Our study is in the context of "Event Study" methodology.[5] The aim of this methodology is to analyze the market response to the arrival of macroeconomics news (in our case, unexpected inflation news) through the observation of abnormal returns around the event day (Pearce and Roley, 1985; and Nikkinen et al., 2006). This methodology is related with the market efficiency.

In the last years, there are a wide number of papers related with this theory.[6] For example, Joyce and Read (1999) examine the same - day reaction of a variety of UK asset prices to monthly retail price index announcements over a sample period extending from the early 1980s until April 1997. They confirm that markets are efficient in the sense that asset prices do not respond to the expected component of these announcements. Jones et al. (1998) examine the reaction of daily bond returns to the release of macroeconomic news (in particular, PPI and unemployment announcements). They conclude that these announcements do affect the market; nonetheless, the public information is incorporated quickly into prices.

To sum it up, we can deduce two general conclusions. The first conclusion is about how the returns adjust to the arrival of new information. The authors conclude that the fitting of returns depends on the state of the economy (expansion or recession) and the direction of the news (positive or negative news). The second conclusion is related with market efficiency. In the bulk of the cases, the results obtained by the authors are consistent with this theory.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 explains the methodology used to calculate the unexpected component of inflation rate, the state of the economy and the abnormal returns. Section 4 shows the model specification and the results. Finally, the last section includes a summary and concluding remarks.

## 2. DATA AND METHODOLOGY

We examine the inflation news impact on U.S. stock market between January 1990 and April 2013. We work with monthly announcements of CPI (U.S. CPI, all items)[7] and PPI (U.S. PPI, all finished goods) seasonally−adjusted data and the exact date of each announcement. The value of both variables is announced by U.S. Bureau of Labor Statistics each month. In all, we have 280 monthly announcements.

We remove the seasonal component of the CPI and PPI series, so we compute a year−to−year inflation rate through the following equation:

$$\pi_t = \frac{CPI_t - CPI_{t-12}}{CPI_{t-12}} \quad (1)$$

$$\pi_t = \frac{PPI_t - PPI_{t-12}}{PPI_{t-12}} \quad (2)$$

Where, $CPI_t$ is the CPI at time t and $PPI_t$ is the PPI at time t.

3 Anari and Kolari (2001) analyze the stock prices response to changes in inflation rate in six different countries. They find a negative response at short horizons, but a positive and permanent relationship at long horizons in all cases. They believe that common stock returns are a good hedge against inflation over a large period because stock prices have a long memory for inflation shocks.

4 Asikoglu and Ercan (1992) investigate the relationship between inflation and stock prices in US industry using the Estep and Hanson's "flow – through" hypothesis. They observe that each sector reacts in a different way to changes in unexpected inflation.

5 An explanation of Event Study methodology can be found in papers written by Peterson (1989), Kritzman (1994) and Mackinlay (1997).

6 Other papers related with "Market Efficient" hypothesis are Dimson and Mussavian (1998) and Jareño (2009).

7 The U.S. consumer price index (CPI) is a measure of the average change in prices over time of goods and services purchased by households, according to the Laspeyres formula. More detailed information about CPI can be found in www.bls.gov.

Additionally, we get daily close−to−close continuously compounded returns of ten sectors and the S&P 500 index:

$$R_{i,t}=\log\left(P_{i,t}/P_{i,t-1}\right) \quad (3)$$

Where, $P_{i,t}$ represents the price level on sector i at time t.[8]

In appendix, Table A.1. shows "The Global Industry Classification Standard," developed by Morgan Stanley Capital International and S&P.[9]

In order to estimate the expected inflation component, we use the *naïve* model (Leiser and Drori, 2005; Jareño, 2006; 2008 and 2009; Ariño and Canela, 2002; and Díaz and Jareño, 2009). Thus, the unexpected inflation component $\left(\pi_t^u\right)$ is considered as the difference between the observed total inflation rate $\left(\pi_t\right)$ and the expected inflation component $\left(\pi_t^e\right)$:

$$\pi_t^u = \pi_t - \pi_t^e \quad (4)$$

Table 1 exhibits the main statistics of daily returns of all the US sector indices, S&P500 Index, inflation rate and its (expected and unexpected) components. Mean and median returns for all sectors, the market and total and expected inflation rate are positive, but almost zero (not for unexpected inflation rate). The test of hypothesis that mean is equal to zero only can be rejected for consumer discretionary, consumer staples, health care and S&P500 index. However, the same test for the median shows that we have to reject the null hypothesis in all sectors, except in Telecommunication Services. As far as standard deviation is concerned, the most volatile sectors are Financials and Information Technology. PPI volatilities are higher than CPI and sector and market return volatilities. All the sectors (except Information Technology and Telecommunication Services) and inflation rates (except PPI and PPIE) show negative skewness, and excess of kurtosis.

We do a previous analysis of the stationarity of the series. Classical unit root and stationarity test (Augmented Dickey−Fuller (DF), DF, Phillips−Perron and Kwiatkowski–Phillips–Schmidt–Shin) confirm that all the series are stationary in variance.[10] The series of expected and unexpected component of CPI and PPI are not stationary in mean, I (1), but they are stationary in variance; nevertheless, the unexpected component of CPI and PPI (CPIU and PPIU) are stationary. Also, to validate the *naïve* model, we estimate an unbiased test (Díaz and Jareño, 2013) and we conclude that CPIE and PPIE also are unbiased estimators for expected component of CPI and PPI respectively.[11]

## 2.1. State of the Economy

Following the papers of authors such as Veronesi (1999), Knif et al. (2008), Díaz and Jareño (2009; 2013) and Jareño and Navarro (2016), between others, we want to test the hypothesis that the stock market response to unexpected inflation rate depends on the business cycle. To do so, we need to classify the state of the economy. We use the National Bureau of Economic Research (NBER's) classification, but this is only available until June 2009. Therefore, we also apply McQueen and Roley's (1993) methodology to identify expansion and recession months. In this way, we can corroborate the robustness of our analysis with two different classifications.

McQueen and Roley's methodology,[12] widely used in literature, uses the seasonally adjusted monthly industrial production index

8 We work with daily data because they make able us to differentiate the CPI and PPI announcements from others macroeconomics news. Working with daily data instead of monthly data has more advantages: McQueen and Roley (1993) and Flannery and Protopapadakis (2002).

9 This classification aims to enhance the investment research and asset management process for financial professionals worldwide. They are the result of numerous discussions with asset owners, portfolio managers and investment analysts and are designed to respond to the global financial community's need for an accurate, complete and standard industry definition.

10 These results are removed in the interest of brevity.

11 This test is available upon request.

12 McQueen and Roley (1993), Adams et al. (1999), Díaz and Jareño (2009; 2013).

**Table 1: Summary statistics of daily returns S&P500**

| US sector | Mean | Median | Maximum | Minimum | Sd. | Sk. | Kt. | N. |
|---|---|---|---|---|---|---|---|---|
| S5ENRS | 0.000313 | 0.000436[c] | 0.169604 | −0.168836 | 0.015226 | −0.269530 | 14.42801 | 5878 |
| S5MATR | 0.000193 | 0.000376[b] | 0.124730 | −0.129339 | 0.014480 | −0.230226 | 10.01571 | 5878 |
| S5INDU | 0.000262 | 0.000464[c] | 0.09516 | −0.095987 | 0.012786 | −0.319494 | 8.942829 | 5878 |
| S5COND | 0.000302[a] | 0.000597[c] | 0.123131 | −0.103269 | 0.013369 | −0.091337 | 9.828812 | 5878 |
| S5CONS | 0.000324[b] | 0.000470[c] | 0.088353 | −0.092961 | 0.009771 | −0.092953 | 10.40693 | 5878 |
| S5HLTH | 0.000342[b] | 0.000552[c] | 0.117131 | −0.091733 | 0.012101 | −0.111985 | 8.420584 | 5878 |
| S5FINL | 0.000201 | 0.000382 | 0.172013 | −0.186390 | 0.018404 | −0.084645 | 18.66075 | 5878 |
| S5INFT | 0.000337 | 0.000987[c] | 0.160769 | −0.100077 | 0.017794 | 0.139888 | 7.597963 | 5878 |
| S5TELS | 0.000086 | 0.000160 | 0.129261 | −0.103203 | 0.013794 | 0.060425 | 9.637573 | 5878 |
| S5UTIL | 0.000119 | 0.000450[c] | 0.126840 | −0.089962 | 0.011073 | −0.011728 | 14.17923 | 5878 |
| S&P500 | 0.000254[a] | 0.000533[c] | 0.109572 | −0.094695 | 0.011669 | −0.231326 | 11.51191 | 5878 |
| CPI | 0.026990 | 0.027575 | 0.063796 | −0.019615 | 0.012524 | −0.218658 | 4.988841 | 280 |
| CPIE | 0.027136 | 0.027640 | 0.063796 | −0.019615 | 0.012577 | −0.215401 | 4.962611 | 280 |
| CPIU | −0.000147 | −0.000082 | 0.021186 | −0.026311 | 0.004172 | −0.641378 | 11.62673 | 280 |
| PPI | 0.019972 | 0.006783 | 0.332673 | −0.110459 | 0.070307 | 1.445961 | 6.144408 | 280 |
| PPIE | 0.020288 | 0.006783 | 0.332673 | −0.110459 | 0.070589 | 1.427723 | 6.040004 | 280 |
| PPIU | −0.000316 | −0.001088 | 0.076483 | −0.107914 | 0.018104 | −0.547094 | 8.861886 | 280 |

This table reports summary statistics for daily returns on the sectors, S&P500 index and inflation rate and its components. CPIE and PPIE are the expected component of CPI and PPI respectively, and CPIU and PPIU are the un expected component of CPI and PPI. Sd is the standard deviation, Sk is the skewness and Kt is the kurtosis. [a]P<0.1, [b]P<0.05, [c]P<0.01

(IPI) in order to define economic states. Firstly, we estimate a trend in the log of the IPI. Then, we regress the log of the IPI on a constant and a time trend.[13] Secondly, we choose the constant λ so that while the log of IPI is above the upper bond, the economic activity is high, and when the log of IPI is below the lower bond, the economic activity is low. Medium activity is represented when the log of IPI is between bounds (Figure 1).[14]

Table 2 shows the results of McQueen and Roley's methodology (Panel A) and the business cycle timing which is announced by NBER (Panel B). This NBER classification divides the state of the economy in expansion or contraction months. During the 233 months period from January 1990 to June 2009, US Economy is in expansion during 199 months and in contraction during 34 months.[15] There were three contractions and three expansions. On average, the contractions last 11 months and the expansions last 66 months.

13 These results are available upon request, and the value of λ=0.0285 in our research.

14 The annual rate of GDP confirms the robustness of this analysis, because we can observe the existence of an important parallelism between IPI and GDP.

**Table 2: State of the economy**

| Period | State of the economy - number of months |
|---|---|
| Panel A: McQueen and Roley's methodology | |
| January 1990 - April 1995 | Low state−52 months |
| May 1995 - June 1997 | Medium state−26 months |
| July 1997 - September 2008 | High state−135 months |
| October 2008 - February 2009 | Medium state−5 months |
| March 2009 - April 2013 | Low state−38 months |
| Total high state | 135 months |
| Total medium state | 31 months |
| Total low state | 90 months |
| Panel B: NBER'S classification state of the economy | |
| January 1990 - June 1990 | Expansion−6 months |
| July 1990 - February 1991 | Contraction−8 months |
| March 1991 - March 2001 | Expansion−120 months |
| April 2001 - November 2001 | Contraction−8 months |
| December 2001 - December 2007 | Expansion−73 months |
| January 2008 - June 2009 | Contraction−18 months |
| Total expansion months | 199 months |
| Total contraction months | 34 months |

Table 3 collects a summary of the most relevant test of the main statistics about daily returns of S&P500 sectors and index on CPI and PPI announcements days. Moreover, our results are conditional to the business cycle.[16]

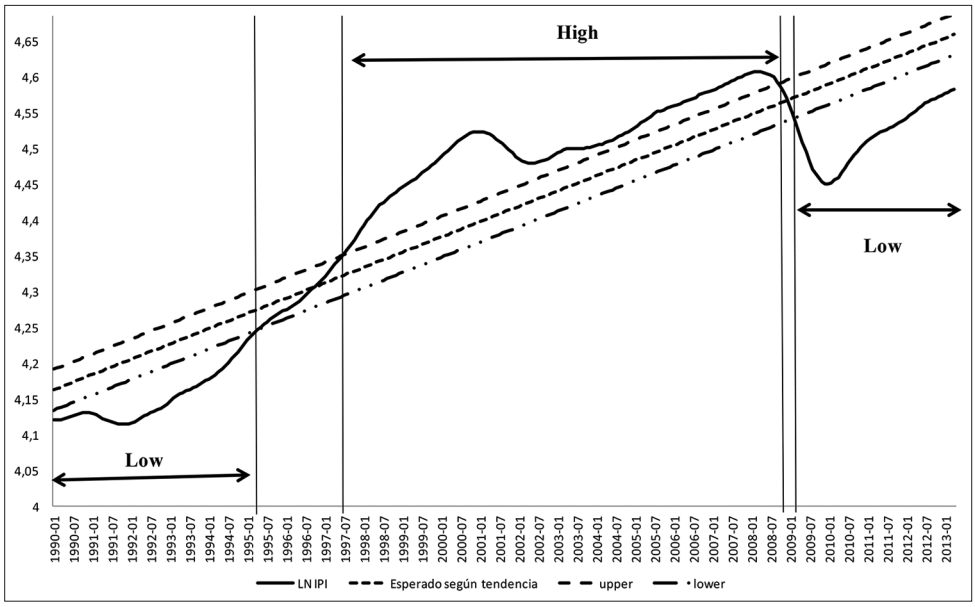
We define each announcement month as a recession or expansion month according to the NBER business cycle dating methodology and McQueen and Roley's methodology. In CPI case, when the economy is in expansion following both classifications, the null hypothesis that mean and median are equal to zero cannot be rejected in any sector. However, the results for PPI are different. Following McQueen and Roley's methodology and NBER's classification we cannot reject the null hypothesis of the mean is equal to zero in any case, except Health Care for NBER's classification. Instead, the median hypothesis is rejected for Materials, Industrials, Consumer Discretionary, Consumer Staples and Health Care in NBER's classification, and only we can rejected the null hypothesis for Consumer Discretionary and Health Care in McQueen and Roley's methodology.

When the economy is in contraction, we only can reject the null hypothesis of mean is equal to zero for Energy and Utilities sectors on CPI announcements days, following NBER's classification. With McQueen and Roley's methodology, only we can reject the null hypothesis of median is equal to zero for Materials and Consumer Discretionary sectors on PPI announcements days.

15 NBER'S classification only is available until June 2009. In our analysis, we can suppose that from June 2009 until April 2013 the state of the economy is in recession due to the actual economic crisis. McQueen and Roley's methodology corroborate this assumption.

16 Our detailed results are available upon request.

**Figure 1:** Economic states using McQueen and Roley's methodology



Finally, we want to confirm if there are significant differences between the mean of a same sector in recession and in expansion periods. We apply the Anova F−test and the Welch F−test. If we can suppose that there are not significant differences, then it is justified to make the analysis with abnormal returns, taking into account only the unexpected component of returns. Table 4 shows the results for CPI and PPI with NBER and McQueen and Roley's classification. We can observe that the null hypothesis only can be rejected in a few cases. Therefore, we can conclude that our analysis is justified.

## 2.2. Abnormal Returns

We want to measure the existence of abnormal returns on the day which CPI and PPI are announced. To do so, we focus our analysis not only on the announcement day; we also analyze the market returns 2 days before the announcement takes place and 2 days later. This procedure is related to market efficiency. In this way, we can know if the market reacts to the arrival of new information before it occurs or, even, later. Therefore, we create an "event window" which is composed of 5 days: The announcement day ($t_j$), 2 days before or 'pre−announcement period' ($t_j$–1 and $t_j$–2) and 2 days after the announcement or 'post−announcement period' ($t_j$+1 and $t_j$+2).

In order to test the robustness of the model, we estimate abnormal returns in two different ways.[17] On one hand, we apply the approach so called "Mean−adjusted return model" (MAR). Thus, we calculate expected returns of each sector in the absence of inflation event, as the average daily return of each sector during the estimation period.[18] The abnormal returns obtained with this method are not conditioned by pricing models:

$$AR_i\left(t_j+k\right)=RS_i\left(t_j+k\right)-E\left[RS_i\left(t_j\right)\right]=RS_i\left(t_j+k\right)-\frac{1}{223}\sum_{\tau=t_{j23\,in}}^{t_{j23}}RS_i\left(\tau\right) \quad (5)$$

17 MacKinlay (1997) explains the estimation of abnormal returns by different approaches. He concludes that the use of multifactor models for event study is limited. This is due to the explanatory power of additional factors the market factor is small and, therefore; the reduction in the variance is little.

18 Each estimation period contains 223 days.

**Table 3: Test of hypothesis: Mean=0 and median=0**

| State of the economy | CPI Test of hypothesis: Mean=0 | PPI Median=0 |
|---|---|---|
| Expansion NBER | Mean: Not rejected | Mean: Rejected for S5HLTH |
| | Median: Not rejected | Median: Rejected for S5MATR, S5INDU, S5COND, S5 CONS, S5HLTH |
| Contraction NBER | Mean: Rejected for S5ENRS and S5UTIL | Mean: Not rejected |
| | Median: No rejected | Median: Not rejected |
| Expansion MQR | Mean: Not rejected | Mean: Not rejected |
| | Median: Not rejected | Median: Rejected for S5COND and S5HLTH |
| Contraction MQR | Mean: Not rejected | Mean: Not rejected |
| | Median: Not rejected | Median: Rejected for S5MATR |

CPI: Consumer price index, PPI: Producer price index

**Table 4: Tests of equality of means in the same sector in expansion and recession periods**

| US sector | CPI | | PPI | |
|---|---|---|---|---|
| | NBER | McQueen and Roley | NBER | McQueen and Roley |
| S5ENRS | 7.581505[c] | 0.438906 | 1.027902 | 0.273199 |
| | 5.313557[b] | 0.512699 | 0.644787 | 0.301982 |
| S5MATR | 3.700477[a] | 1.268818 | 3.854270[b] | 0.171024 |
| | 2.383250 | 1.412933 | 2.638326 | 0.187283 |
| S5 INDU | 3.254978[a] | 0.037898 | 4.478722[b] | 0.000991 |
| | 2.099630 | 0.041459 | 3.084094[a] | 0.001075 |
| S5COND | 0.089635 | 0.041634 | 1.750316 | 0.134863 |
| | 0.056991 | 0.044904 | 1.296453 | 0.147143 |
| S5CONS | 1.569941 | 0.804597 | 1.184920 | 0.187576 |
| | 1.217301 | 0.817197 | 1.180195 | 0.212566 |
| S5HLTH | 1.095507 | 0.866429 | 2.230987 | 0.623355 |
| | 0.936398 | 0.898036 | 2.304414 | 0.650427 |
| S5FINL | 3.607658[a] | 0.131133 | 0.827983 | 0.236623 |
| | 1.861764 | 0.148610 | 0.464152 | 0.257746 |
| S5INFT | 0.885577 | 0.317133 | 0.551949 | 0.144542 |
| | 0.839390 | 0.383793 | 0.550162 | 0.170236 |
| S5TELS | 1.353768 | 0.715344 | 2.356382 | 0.714920 |
| | 1.494237 | 0.870610 | 2.246878 | 0.856535 |
| S5UTIL | 4.312591[b] | 1.596557 | 0.933835 | 0.069778 |
| | 3.259877[a] | 1.864147 | 0.711834 | 0.080790 |
| S&P500 | 0.830758 | 0.060382 | 0.475435 | 0.105174 |
| | 0.582247 | 0.068303 | 0.338886 | 0.121514 |

This table depicts the tests of equality of means for the same sector in expansion and recession periods. The first line is the ANOVA F-test and the second line is the Welch F-test. [a]P<0.1, [b]P<0.05, [c]P<0.01

On the other hand, we compute the abnormal returns by the "market model" (MM), which relates the return of each sector to the return of the market portfolio (S&P500 index):

$$AR_i = R_i\left(t_j + k\right) - E\left[R_i\left(t_j\right) \mid R_M\left(t_j\right)\right] = R_i\left(t_j + k\right) - \hat{\alpha} - \hat{\beta}_i\left(R_M\left(t_j + k\right)\right) \quad (6)$$

(4) Where, $\hat{\alpha}$ and $\hat{\beta}$ are the parameters estimated by OLS.

Table 5 shows the main statistics of abnormal returns by sector, distinguishing between abnormal returns calculated by MAR (panel A) and MM (Panel B).[19]

In the case of abnormal returns calculated by MAR, the test of hypothesis that mean and median are equal to zero cannot be rejected in the bulk of the sectors. Although, when we calculate the abnormal returns by MM, we have to reject these hypotheses in some sectors.

19 Results for PPI are not shown in the interest of brevity, because the majority of results are not significant. Anyway, these results are available upon request.

**Table 5: Summary statistics of abnormal returns by sector on the event window**

| | | | | |
|---|---|---|---|---|
| Panel A: Abnormal returns calculate by MAR (CPI) | | | | |
| S5ENRS | −0.000653 | −0.000053 | 0.016048 | 546 |
| | −0.000729 | 0.000804 | 0.016019 | 273 |
| | 0.001199[a] | −0.000409 | 0.016604 | 546 |
| S5MATR | −0.000073 | 0.000059 | 0.016152 | 546 |
| | −0.000828 | −0.000025 | 0.015542 | 273 |
| | −0.000078 | 0.000062 | 0.014952 | 546 |
| S5INDU | 0.000118 | 0.000439 | 0.013810 | 546 |
| | −0.000026 | 0.000810 | 0.013799 | 273 |
| | 0.000046 | 0.000122 | 0.012974 | 546 |
| S5COND | 0.000038 | 0.000477 | 0.014763 | 546 |
| | −0.000667 | −0.000662 | 0.014307 | 273 |
| | 0.000034 | −0.000017 | 0.013205 | 546 |
| S5CONS | 0.000246 | 0.000653 | 0.010273 | 546 |
| | 0.000044 | 0.000208 | 0.009932 | 273 |
| | −0.000177 | −0.000198 | 0.009303 | 546 |
| S5HLTH | 0.000242 | 0.000451 | 0.012139 | 546 |
| | −0.001031 | 0.000020 | 0.011871 | 273 |
| | 0.000442 | 0.000594[a] | 0.011559 | 546 |
| S5FINL | −0.000238 | −0.000423 | 0.020224 | 546 |
| | −0.002218[a] | −0.000496 | 0.021221 | 273 |
| | 0.000562 | −0.000668 | 0.021087 | 546 |
| S5INFT | −0.000241 | 0.001094[b] | 0.017881 | 546 |
| | 0.000284 | 0.000500 | 0.021085 | 273 |
| | −0.000362 | −0.000046 | 0.017824 | 546 |
| S5TELS | −0.000599 | −0.000458 | 0.013994 | 546 |
| | −0.000579 | 0.000222 | 0.014872 | 273 |
| | 0.000513 | 0.000172 | 0.014149 | 546 |
| S5UTIL | −0.000339 | −0.000028 | 0.010934 | 546 |
| | −0.000567 | 0.000062 | 0.011153 | 273 |
| | 0.000862 | 0.000928[b] | 0.012645 | 546 |
| **Test of equality among sectors** | | | | |
| **Method** | **2 days later** | **Announce day** | **2 days later** | **Interpretation** |
| Anova F-test | 0.237744 | 0.565673 | 0.575895 | Equality of means: |
| Welch F-test | 0.289355 | 0.454108 | 0.591177 | Not rejected |
| Kruskal−Wallis | 5.507588 | 3.468626 | 7.256628 | Equality of medians |
| van der Waerden | 5.569243 | 3.569007 | 7.211754 | Not rejected |
| Levene | 18.20689 | 11.48034 | 15.76547 | Equality of variances |
| Brown−Forsythe | 17.93545 | 11.2447 | 15.42745 | Rejected |
| Bartlett | 502.7732 | 324.3878 | 556.5558 | |
| Panel B. Abnormal returns calculate by MM (CPI) | | | | |
| | **Mean** | **Median** | **SD** | **n** |
| S5ENRS | −0.000463 | −0.000099 | 0.015861 | 550 |
| | −0.000673 | 0.001288 | 0.016264 | 273 |
| | 0.001441[b] | 0.000011 | 0.016408 | 550 |
| S5MATR | −0.000111 | 0.000114 | 0.015922 | 550 |
| | −0.000917 | 0.000010 | 0.015508 | 273 |
| | −0.000058 | 0.000076 | 0.014793 | 550 |
| S5INDU | 0.000068 | 0.000311 | 0.013575 | 550 |
| | −0.000024 | 0.000597 | 0.013884 | 273 |
| | 0.000098 | 0.000031 | 0.012762 | 550 |

*(Contd...)*

**Table 5: (*Continued*)**

| | Mean | Median | SD | n |
|---|---|---|---|---|
| S5COND | 0.002466[c] | 0.001930[b] | 0.018407 | 550 |
| | 0.001847[a] | 0.002807[b] | 0.018459 | 273 |
| | 0.002350[c] | 0.001698[c] | 0.016707 | 550 |
| S5CONS | 0.001113 | 0.000630[b] | 0.013099 | 550 |
| | 0.000806 | 0.000793 | 0.012992 | 273 |
| | 0.000773 | 0.000622 | 0.011879 | 550 |
| S5HLTH | 0.001410[b] | 0.001589[b] | 0.015875 | 550 |
| | 0.000045 | 0.001202 | 0.015978 | 273 |
| | 0.001635[b] | 0.001947[c] | 0.015243 | 550 |
| S5FINL | 0.002440[b] | 0.002471[c] | 0.026906 | 550 |
| | 0.000504 | 0.001698 | 0.026631 | 273 |
| | 0.003269[c] | 0.002109[b] | 0.024853 | 550 |
| S5INFT | 0.002153[b] | 0.000884 | 0.023875 | 550 |
| | 0.002643 | 0.003446 | 0.027019 | 273 |
| | 0.002099[b] | 0.000865 | 0.022431 | 550 |
| S5TELS | 0.000312 | 0.000762 | 0.017490 | 550 |
| | 0.000216 | 0.001361 | 0.019005 | 273 |
| | 0.001478[b] | 0.001817[b] | 0.017265 | 550 |
| S5UTIL | 0.000485 | 0.000510 | 0.015168 | 550 |
| | 0.000215 | 0.000767 | 0.016519 | 273 |
| | 0.001798[c] | 0.001062[a] | 0.016027 | 550 |
| **Test of equality among sectors** | | | | |
| **Method** | **2 days later** | **Announc. Day** | **2 days later** | **Interpretation** |
| Anova F-test | 1.983458 | 0.905473 | 1.896013 | Equality of means |
| Welch F-test | 1.865894 | 0.808431 | 1.947390 | Rejected 2 days later and 2 days before |
| Kruskal−Wallis | 16.41682 | 8.399411 | 16.15160 | Equality of medians |
| van der Waerden | 18.34822 | 9.282573 | 13.96362 | Rejected 2 days later and 2 days before |
| Levene | 29.31993 | 14.45556 | 25.29328 | Equality of variances |
| Brown−Forsythe | 29.16582 | 14.34947 | 24.92589 | Rejected |
| Bartlett | 583.5598 | 327.5601 | 531.9119 | |

This table shows the main statistics of sector abnormal returns in the event window for CPI. The first line is 2 days before the announcement day, the second line is the announcement day and the third line is 2 days after the announcement day. [a]P<0.10, [b]P<0.05, [c]P<0.01

Moreover, we have calculated the test for equality of means, medians and variances between sectors. In the case of abnormal returns calculated by MAR, the equality of means and medians cannot be rejected in any case. The equality of variances is rejected in all cases. Contrarily, in the case of using MM, the equality of means and medians is rejected 2 days later the announcement and 2 days before. These differences validate an extension of our analysis, incorporating the state of the economy and the direction of the surprises.

## 3. MODEL SPECIFICATION AND RESULTS

In order to check if the impact of inflation news (CPI and PPI news) on the sectors of S&P500 is significantly different from zero (or not), we propose the following analysis, only taking into account the unexpected component of CPI and PPI rates:

$$ARS_i(t) = \alpha_i + \beta_i \pi_t^u + u_{it} \quad (7)$$

Where, $ARS_{it}$ are the abnormal returns of sector i in period t, $\pi_t^u$ are the monthly unexpected component of CPI and PPI, and $u_{it}$ is the error term.

We estimate Equation (6) which does not take into account the business cycle. After, we repeat the mentioned equation taking into account the business cycle with NBER's classification and McQueen and Roley's methodology. In this way, we can confirm the traditional hypothesis which affirms that the impact of inflation news depends on the business cycle.[20] Finally, we also introduce in our model the direction of the inflation surprise.

We estimate the response of common stock returns to inflation news 2 days before the announcement it is occurs (pre−event), the day in which the CPI and PPI are announced (announcement day) and 2 days later (Post−Event). We estimate Equation (6) using "seemingly unrelated regression" technique.[21] Thus, we avoid error terms across different sectors to be correlated and allow us to bear in mind heteroskedasticity situations.[22]

20 Veronesi (1999), Díaz and Jareño (2009; 2013), Boyd et al. (2005), Andersen et al. (2007) and Cenesizoglu (2011), between others.

21 SUR methodology has been utilized by a lot authors such as Díaz and Jareño (2009; 2013) and Cenesizoglu (2011).

22 We have also estimated the models by OLS with White heteroskedasticity consistent standard errors and covariance. The estimated coefficients are the same, the difference between both methods are the standard deviations.

### 3.1. Model Non Conditional to the Business Cycle

Our preliminary model analyses the effect of the unexpected component of inflation rate on abnormal returns non conditional to the business cycle (Torrecillas and Jareño, 2014).

Table 6 (Panels A and B) show the results for the unexpected component of CPI with MAR and MM methods. In general, we evidence that CPI news have stronger responses than PPI news.[23]

Concretely, the first important aspect to consider is that the estimated coefficients are negative and statistically significant in post−event period, particularly in the case of MAR. Instead, in pre−event period, the coefficients are positive and statistically significant in the case of MM. On announcement day, a little number of sectors responds to the arrival of new information, again. Only there is a significant response in the case of MAR (S5UTIL), and there are three sectors in the case of MM (S5 HLTH, S5FINL and S5UTIL).

These results lead us to think that it is necessary to include in our analysis the state of the economy and the direction of the inflation surprises. In this way, we can corroborate the stability of our results (Torrecillas and Jareño, 2014).

23 We do not show PPI results in order to lighten our paper.

**Table 6: Unexpected inflation impact on abnormal stock returns by sector**

| US | Pre - event | | Announcement day | | Post - event | |
|---|---|---|---|---|---|---|
| sector | CPIU | $R^2$. Adj | CPIU | $R^2$. Adj | CPIU | $R^2$. Adj |
| Panel A: MAR method | | | | | | |
| S5ENRS | 0.113243 | −0.0010 | 0.283106 | 0.0018 | −0.377591[b] | 0.0073 |
| | (0.693502) | | (1.228547) | | (−2.244659) | |
| S5MATR | 0.361894[b] | 0.0070 | 0.161164 | −0.0018 | −0.423034[c] | 0.0123 |
| | (2.210081) | | (0.719530) | | (−2.799336) | |
| S5INDU | 0.243702[a] | 0.0037 | 0.096948 | −0.0028 | −0.487851[c] | 0.0231 |
| | (1.737411) | | (0.487233) | | (−3.739952) | |
| S5COND | 0.286742[a] | 0.0048 | 0.033993 | −0.0036 | −0.588609[c] | 0.0332 |
| | (1.912202) | | (0.164712) | | (−4.452939) | |
| S5CONS | 0.153316 | 0.0021 | −0.022839 | −0.0036 | −0.369089[c] | 0.0259 |
| | (1.466615) | | (−0.159413) | | (−3.951066) | |
| S5HLTH | 0.208115 | 0.0032 | 0.177736 | −0.0036 | −0.440133[c] | 0.0237 |
| | (1.669472) | | (1.039956) | | (−3.786090) | |
| S5FINL | 0.500770[b] | 0.0090 | 0.309644 | 0.0001 | −0.839172[c] | 0.0261 |
| | (2.443731) | | (1.013397) | | (−3.964916) | |
| S5INFT | 0.330638 | 0.0042 | −0.139307 | −0.0029 | −0.211832 | 0.0007 |
| | (1.820836) | | (−0.458182) | | (−1.168184) | |
| S5TELS | 0.423152[c] | 0.0143 | −0.079440 | −0.0032 | −0.579290[c] | 0.0082 |
| | (2.993148) | | (−0.037380) | | (−4.082833) | |
| S5UTIL | 0.051633 | −0.0014 | 0.279004[a] | 0.0074 | −0.297628[b] | 0.0014 |
| | (0.463686) | | (1.743781) | | (−2.323798) | |
| Panel B: MM method | | | | | | |
| S5ENRS | 0.151386 | −0.0002 | 0.308956 | 0.0027 | −0.401079[b] | 0.0086 |
| | (0.934231) | | (1.320705) | | (−2.403271) | |
| S5MATR | 0.383098[b] | 0.0083 | 0.165922 | −0.0017 | −0.429155[c] | 0.0129 |
| | (2.365016) | | (0.741839) | | (−2.857992) | |
| S5INDU | 0.26305[3a] | 0.0047 | 0.111660 | −0.0025 | −0.495068[c] | 0.0244 |
| | (1.901203) | | (0.558471) | | (−3.845016) | |
| S5COND | 0.637256[c] | 0.0191 | 0.373280 | 0.0035 | −0.241361 | 0.0018 |
| | (3.423098) | | (1.404566) | | (−1.416971) | |
| S5CONS | 0.409845[c] | 0.0153 | 0.235323 | 0.0021 | −0.168868 | 0.0017 |
| | (3.086349) | | (1.259327) | | (−1.394748) | |
| S5HLTH | 0.457648[c] | 0.0127 | 0.446335[a] | 0.0101 | −0.200420 | 0.0012 |
| | (2.839751) | | (1.948264) | | (−1.288355) | |
| S5FINL | 1.0420689[c] | 0.0244 | 0.864780[b] | 0.0149 | −0.319260 | 0.0011 |
| | (3.841006) | | (2.269282) | | (−1.258169) | |
| S5INFT | 0.663878[c] | 0.0117 | 0.217136 | −0.0026 | 0.109555 | −0.0014 |
| | (2.737836) | | (0.556590) | | (0.477798) | |
| S5TELS | 0.610492[c] | 0.0195 | 0.101852 | −0.0032 | −0.429034[b] | 0.0091 |
| | (3.454040) | | (0.371508) | | (−2.443602) | |
| S5UTIL | 0.438598[c] | 0.0128 | 0.737477[c] | 0.0314 | −0.108765 | −0.0010 |
| | (2.848613) | | (3.146112) | | (0.663973) | |

### 3.2. Model Conditional to the Business Cycle

In the previous analysis, we have confirmed that stock returns respond negatively to unexpected component of inflation news 2 days after the announcement is published with ARS calculated by MAR; whereas, in the case of ARS calculated by MM, stock returns respond positively to unexpected component of inflation news 2 days before the announcement is published. In the following analysis, we want to measure this effect over the business cycle. Several previous studies, including McQueen and Roley (1993), Veronesi (1999), Andersen et al. (2007), Boyd et al. (2005), and more recently, Cenesizoglu (2011), Birz and Lott (2011), Díaz and Jareño (2009; 2013), Pavel and Wilson (2013), and Cenesizoglu (2015), between others, analyze the reaction of S&P500 returns (Díaz and Jareño for Spanish market) to macroeconomic news conditional to the business cycle and they find that this reaction differs between economic expansion and recession periods. Aforementioned, we have utilized two classifications of the state of the economy, NBER and McQueen and Roley's methodology. In this way, we can test the robustness of the results. In order to take into account the business cycle, we modify Equation (6) and we introduce two dummy variables in the case of NBER classification: $D_H$ and $D_L$ (Equation 7), and three in the case of McQueen and Roley's methodology: $D_H$, $D_M$ and $D_L$ (Equation 8). $D_H$ is equal to 1 when the state of the economy is high, $D_M$ is equal to 1 when the state of the economy is medium and $D_L$ is equal to 1 when the state of the economy is low. The value of these variables is zero otherwise.

$$ARS_i(t) = \alpha_i + \beta_{1i}\pi_t^u \cdot D_H + \beta_{2i}\pi_t^u \cdot D_L + u_{it} \quad (8)$$

$$ARS_i(t) = \alpha_i + \beta_{1i}\pi_t^u \cdot D_H + \beta_{2i}\pi_t^u \cdot D_M + \beta_{3i}\pi_t^u \cdot D_L + u_{it} \quad (9)$$

Table 7 shows the results of our model conditional to the business cycle. We can anticipate that the state of the economy is an important variable in the model. The investors react the different form depending on if the economy goes through an expansion or a contraction period.[24]

On one hand, Panels A and B of Table 7 depict the results of the unexpected component of CPI with ARS calculated by MAR and MM, respectively, and conditional to the business cycle by NBER's classification. The results become consistent with the previous analysis: In the case of ARS calculated by MAR, the sectors show a negative and statistically significant response in post−event period. This response is very strong in all sectors. Instead, in the case of ARS calculated by MM, the response of the sectors is positive and statistically significant in pre−event period. The new result that we have obtained is that on announcement day, a great number of sectors has a significant response. Moreover, we can observe that all significant responses occur when the economy is in contraction.

On the other hand, Panels C and D of Table 7 show the results of the unexpected component of CPI with ARS calculated by MAR and MM, respectively, and conditional to the business cycle by McQueen and Roley's classification. The results obtained in this section are less clear than the results obtained formerly. We can observe significant responses in pre−event, post−event and announcement day. Besides, the significant responses happen when

24 The stock returns hardly respond to PPI announcements, so these tables are not shown (although these are available upon request).

**Table 7: Response to inflation announcements conditional to the business cycle**

| US sector | Pre - event | | | Announcement day | | | Post - event | | |
|---|---|---|---|---|---|---|---|---|---|
| | CPIU ($D_H$) | CPIU ($D_L$) | $R^2$ Adj | CPIU ($D_H$) | CPIU ($D_L$) | $R^2$ Adj | CPIU ($D_H$) | CPIU ($D_L$) | $R^2$ Adj |
| Panel A: MAR method+NBER's classification | | | | | | | | | |
| S5ENRS | 0.002380 | 0.212478 | −0.0020 | −0.474253 | 0.963298[c] | 0.0337 | 0.109105 | −0.813245[c] | 0.0191 |
| | (0.010022) | (0.945606) | | (−1.441606) | (3.089790) | | (0.448848) | (−3.536177) | |
| S5MATR | 0.165039 | 0.538103[b] | 0.0075 | 0.066462 | 0.246217 | −0.0050 | −0.104677 | −0.708003[c] | 0.0177 |
| | (0.693531) | (2.390011) | | (0.204183) | (0.798165) | | (−0.477802) | (−3.415776) | |
| S5INDU | 0.220513 | 0.264459 | 0.0019 | 0.000895 | 0.83215 | −0.0058 | −0.259476 | −0.692276[c] | 0.0262 |
| | (1.080502) | (1.369635) | | (0.003094) | (0.668638) | | (−1.370575) | (−3.864934) | |
| S5COND | 0.206422 | 0.358638[a] | 0.0035 | −0.075435 | 0.132272 | −0.0064 | −0.265632 | −0.877714[c] | 0.0408 |
| | (0.946319) | (1.737782) | | (−0.251560) | (0.455445) | | (−1.387926) | (−4.847246) | |
| S5CONS | 0.220640 | 0.093053 | 0.0009 | −0.135800 | 0.078612 | −0.0053 | −0.147315 | −0.567605[c] | 0.0331 |
| | (1.451099) | (0.646844) | | (−0.652711) | (0.398695) | | (−1.088872) | (−4.434367) | |
| S5HLTH | 0.203264 | 0.212456 | 0.0014 | −0.080744 | 0.409879[a] | 0.0041 | −0.289436[a] | −0.575025[c] | 0.0246 |
| | (1.120665) | (1.238057) | | (−0.326230) | (1.747443) | | (−1.713542) | (−3.598196) | |
| S5FINL | 0.253396 | 0.722201[b] | 0.0095 | −0.432032 | 0.975791[b] | 0.0158 | −0.320579 | −1.303379[c] | 0.0339 |
| | (0.850884) | (2.563211) | | (−0.982241) | (2.340851) | | (−1.046154) | (−4.495600) | |
| S5INFT | 0.547066[b] | 0.136907 | 0.0047 | −0.398620 | 0.093584 | −0.0042 | 0.211390 | −0.590668[b] | 0.0077 |
| | (2.073004) | (0.548331) | | (−0.902982) | (0.223694) | | (0.804792) | (−2.376835) | |
| S5TELS | 0.267068 | 0.562867[c] | 0.0014 | −0.199452 | 0.028345 | −0.0059 | −0.467752[b] | −0.679131[c] | 0.0269 |
| | (1.299644) | (2.895103) | | (−0.640040) | (0.095979) | | (−2.266929) | (−3.478821) | |
| S5UTIL | −0.066272 | 0.157172 | −0.0014 | 0.195920 | 0.353622 | 0.0046 | −0.066499 | −0.504517[c] | 0.0114 |
| | (−0.409413) | (1.026280) | | (0.842731) | (1.605019) | | (−0.357796) | (−2.869149) | |
| Panel B: MM method+NBER's classification | | | | | | | | | |
| S5ENRS | 0.056954 | 0.236268 | −0.0015 | −0.399862 | 0.945554[c] | 0.0292 | 0.112667 | −0.862867[c] | 0.0222 |
| | (0.241894) | (1.058423) | | (−1.194029) | (2.979359) | | (0.468151) | (−3.781676) | |

*(Contd...)*

**Table 7: (*Continued*)**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| S5MATR | 0.200636 | 0.547106[b] | 0.0085 | 0.077010 | 0.245775 | −0.0049 | −0.102070 | −0.723159[c] | 0.0188 |
| | (0.853099) | (2.453659) | | (0.236919) | (0.797853) | | (−0.469523) | (−3.508677) | |
| S5INDU | 0.229557 | 0.293162 | 0.0030 | −0.009068 | 0.220088 | −0.0051 | −0.261685 | −0.704846[c] | 0.0280 |
| | (1.141589) | (1.537727) | | (−0.031219) | (0.799512) | | (−1.402170) | (−3.983522) | |
| S5COND | 0.234931 | 0.998891[c] | 0.0249 | −0.109799 | 0.807138[b] | 0.0107 | −0.244559 | −0.238486 | −0.0001 |
| | (0.871625) | (3.908944) | | (−0.285769) | (2.216645) | | (−0.987852) | (−1.016068) | |
| S5CONS | 0.293735 | 0.514211[c] | 0.0147 | −0.030341 | 0.473919[a] | 0.0051 | −0.123218 | −0.209902 | 0.0001 |
| | (1.522889) | (2.811937) | | (−0.112069) | (1.847113) | | (−0.700302) | (−1.258289) | |
| S5HLTH | 0.151505 | 0.732828[c] | 0.0167 | −0.126808 | 0.961081[c] | 0.0269 | −0.353537 | −0.062790 | 0.0001 |
| | (0.648751) | (3.309834) | | (−0.384757) | (3.077035) | | (−1.564903) | (−0.293153) | |
| S5FINL | 0.294061 | 1.715604[c] | 0.0348 | −0.349005 | 1.954893[c] | 0.0443 | −0.244965 | −0.386041 | −0.0006 |
| | (0.750010) | (4.615290) | | (−0.640800) | (3.787438) | | (−0.664268) | (−1.104140) | |
| S5INFT | 0.659392[a] | 0.667910[b] | 0.0099 | −0.316104 | 0.696044 | −0.0001 | 0.275321 | −0.039447 | −0.0024 |
| | (1.871013) | (1.998955) | | (−0.559122) | (1.299110) | | (0.826519) | (−0.124904) | |
| S5TELS | 0.232439 | 0.950310[c] | 0.0251 | −0.223077 | 0.393673 | −0.0022 | −0.525585[b] | −0.342249 | 0.0076 |
| | (0.908251) | (3.916646) | | (−0.561042) | (1.044742) | | (−2.060169) | (−1.414991) | |
| S5UTIL | 0.254755 | 0.603848 | 0.0133 | 0.631195[a] | 0.832930[c] | 0.0285 | 0.307508 | −0.069879 | −0.0004 |
| | (1.139754) | (2.849499) | | (1.852982) | (2.580167) | | (1.293181) | (−0.309956) | |
| | **Pre - event** | | | **Announcement day** | | | **Post - event** | | |
| | **CPIU ($D_H$)** | **CPIU (DM)** | **CPIU ($D_L$)** | **CPIU ($D_H$)** | **CPIU ($D_M$)** | **CPIU ($D_L$)** | **CPIU ($D_H$)** | **CPIU ($D_M$)** | **CPIU ($D_L$)** |
| Panel C: MAR method+McQueen and Roley's methodology | | | | | | | | | |
| S5ENRS | 0.029372 | 0.542847 | −0.049116 | −0.330834 | 3.107507[c] | −0.709510[a] | 0.117340 | −2.197001[c] | 0.125724 |
| $R^2$. Adj | (0.120217) | (1.541169) | (−0.175347) | (−1.041798) | (6.687640) | (−1.941191) | (0.479531) | (−6.227911) | (0.448159) |
| | −0.0011 | | | 0.1477 | | | 0.0616 | | |
| S5MATR | 0.242204 | 1.155751[c] | 0.015327 | 0.174969 | 2.066272[c] | −1.077210[c] | −0.177826 | −1.706249[c] | 0.068933 |
| $R^2$. Adj | (0.992980) | (3.286737) | (0.054808) | (0.548474) | (4.492786) | (−2.933807) | (−0.799932) | (−5.324029) | (0.270476) |
| | 0.0157 | | | 0.0864 | | | 0.0452 | | |
| S5INDU | 0.3436666[a] | 0.771117[b] | −0.223260 | 0.102389 | 1.661455[c] | −0.912189[c] | −0.426038[b] | −1.531148c | 0.093542 |
| $R^2$. Adj | (1.645151) | (2.560634) | (−0.932228) | (0.358483) | (4.034198) | (−2.774813) | (−2.220996) | (−5.536792) | (0.425351) |
| | 0.0128 | | | 0.0710 | | | 0.0563 | | |
| S5COND | 0.416914[a] | 0.870862[c] | −0.256093 | 0.178815 | 1.155889[c] | −0.876979[b] | −0.529171[c] | −1.829103[c] | 0.121218 |
| $R^2$. Adj | (1.868635) | (2.707501) | (−1.001191) | (0.593285) | (2.660157) | (−2.528035) | (−2.743709) | (−6.578420) | (0.548216) |
| | 0.0158 | | | 0.0377 | | | 0.0805 | | |
| S5CONS | 0.261232[a] | 0.159169 | 0.007271 | −0.071287 | 0.936023[c] | −0.572488[b] | −0.289537[b] | −1.174305[c] | 0.037630 |
| $R^2$. Adj | (1.668901) | (0.705347) | (0.040520) | (−0.341684) | (3.111940) | (−2.384044) | (−2.111944) | (−5.941559) | (0.239414) |
| | 0.0005 | | | 0.0431 | | | 0.0628 | | |
| S5HLTH | 0.212308 | 0.339133 | 0.119335 | 0.040762 | 1.625036[c] | −0.567029[b] | −0.522789[c] | −1.203443[c] | 0.153892 |
| $R^2$. Adj | (1.136663) | (1.259435) | (0.557279) | (0.166197) | (4.595800) | (−2.008660) | (−3.051742) | (−4.872900) | (0.783574) |
| | 0.0003 | | | 0.0743 | | | 0.0529 | | |
| S5FINL | 0.568616[a] | 1.566400[c] | −0.265819 | −0.119743 | 3.125605[c] | −0.922895[b] | −0.730061[b] | −2.626307[c] | 0.152481 |
| $R^2$. Adj | (1.869390) | (3.572106) | (−0.762269) | (−0.274453) | (4.969192) | (−1.837837) | (−2.350770) | (−5.865944) | (0.428261) |
| | 0.0246 | | | 0.0834 | | | 0.0633 | | |
| S5INFT | 0.486913 | 0.524012 | 0.001659 | −0.346000 | 1.420532[b] | −0.863462[a] | −0.054698 | −1.138057[c] | 0.169459 |
| $R^2$. Adj | (1.791703) | (1.337509) | (0.005325) | (−0.771283) | (2.196448) | (−1.672307) | (−0.202618) | (−2.924220) | (0.547535) |
| | 0.0036 | | | 0.0184 | | | 0.0106 | | |
| S5TELS | 0.464466[b] | 1.073725[c] | −0.044715 | −0.099856 | 0.739769 | −0.576918 | −0.614227[c] | −1.614667[c] | 0.124673 |
| $R^2$. Adj | (2.208634) | (3.541637) | (−0.185464) | (−0.313881) | (1.612943) | (−1.575576) | (−2.941769) | (−5.364184) | (0.520825) |
| | 0.0256 | | | 0.0077 | | | 0.0594 | | |
| S5UTIL | 0.030327 | 0.453277 | −0.175475 | 0.289658 | 1.367305[c] | −0.432103 | −0.008548 | −1.551081[c] | 0.117566 |
| $R^2$. Adj | (0.182401) | (1.891068) | (−0.920575) | (1.247962) | (4.086147) | −1.617480 | (−0.045636) | (−5.743926) | (0.547464) |
| | 0.0026 | | | 0.0608 | | | 0.0521 | | |
| Panel D: MM method+McQueen and Roley's methodology | | | | | | | | | |
| S5ENRS | 0.090360 | 0.607826[a] | −0.059615 | −0.244685 | 3.125367[c] | −0.758698[b] | 0.121891 | −2.242158[c] | 0.082533 |
| $R^2$. Adj | (0.373228) | (1.741481) | (−0.214065) | (−0.757336) | (6.709886) | (−2.040263) | (0.503321) | (−6.422162) | (0.296275) |
| | 0.0004 | | | 0.1447 | | | 0.0654 | | |
| S5MATR | 0.270501 | 1.217811[c] | −0.001449 | 0.201475 | 2.108375[c] | −1.125277c | −0.170788 | −1.728061[c] | 0.058856 |
| $R^2$. Adj | (1.122347) | (3.508054) | (−0.05232) | (0.634534) | (4.605899) | (−3.079136) | (−0.774567) | (−5.436278) | (0.232052) |
| | 0.0188 | | | 0.0924 | | | 0.0471 | | |

*(Contd...)*

**Table 7: (*Continued*)**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| S5INDU | 0.349530[a] | 0.872965[c] | −0.241944 | 0.113769 | 1.744607[c] | −0.936876[c] | −0.426671[b] | −1.556605[c] | 0.093268 |
| $R^2$. Adj | (1.701010) | (2.946867) | (−1.023603) | (0.397717) | (4.230388) | (−2.845559) | (−2.258540) | (−5.715507) | (0.429205) |
| | 0.0172 | | | 0.0774 | | | 0.0598 | | |
| S5COND | 0.492303[a] | 1.579594[c] | 0.226808 | 0.251219 | 1.852805[c] | −0.411945 | −0.410812 | −1.224528[c] | 0.612581[b] |
| $R^2$. Adj | (1.778257) | (3.957754) | (0.712224) | (0.643006) | (3.289459) | (−0.916087) | (−1.634975) | (−3.380479) | (2.119465) |
| | 0.0288 | | | 0.0317 | | | 0.0276 | | |
| S5CONS | 0.362989[a] | 0.619543[b] | 0.337889 | 0.086680 | 1.368892[c] | −0.293016 | −0.242623 | −0.825053[c] | 0.348844[a] |
| $R^2$. Adj | (1.826817) | (2.162790) | (1.478325) | (0.316247) | (3.464234) | (−0.928822) | (−1.351112) | (−3.194074) | (1.692578) |
| | 0.0129 | | | 0.0347 | | | 0.0212 | | |
| S5HLTH | 0.244460 | 0.820480[b] | 0.508529[b] | 0.129007 | 2.094037[c] | −0.187017 | −0.470031[b] | −0.807286[b] | 0.545739[b] |
| $R^2$ Adj | (1.014871) | (2.362723) | (1.835330) | (0.386613) | (4.352925) | (−0.486945) | (−2.041208) | (−2.431807) | (2.060348) |
| | 0.0125 | | | 0.0558 | | | 0.0202 | | |
| S5FINL | 0.750565[b] | 2.416224[c] | 0.551747 | 0.164334 | 3.927193[c] | −0.165264 | −0.486925 | −1.873493[c] | 0.897656[b] |
| $R^2$. Adj | (1.858724) | (4.150546) | (1.187850) | (0.297966) | (4.939178) | (−0.260347) | (−1.300776) | (−3.471634) | (2.084710) |
| | 0.0335 | | | 0.0723 | | | 0.0267 | | |
| S5INFT | 0.774281[b] | 1.115610[b] | 0.228316 | 0.042362 | 1.965367[b] | −0.670094 | 0.293205 | 0.700105 | 0.383749 |
| $R^2$. Adj | (2.136417) | (2.135212) | (0.547670) | (0.073371) | (2.361173) | (−1.008377) | (0.856752) | (−1.419016) | (0.974823) |
| | 0.0115 | | | 0.0127 | | | 0.0012 | | |
| S5TELS | 0.337307 | 1.876142[c] | 0.163428 | −0.214935 | 1.514085[c] | −0.381429 | −0.771489[c] | −0.896750[b] | 0.324804 |
| $R^2$. Adj | (1.291461) | (4.982673) | (0.543972) | (−0.530913) | (2.594176) | (−0.818588) | (−2.960391) | (−2.386887) | (1.083516) |
| | 0.0414 | | | 0.0165 | | | 0.0225 | | |
| S5UTIL | 0.397957[a] | 0.927433[c] | 0.179811 | 0.840032[b] | 1.802696[c] | −0.081013 | 0.461614[a] | −1.220837[c] | 0.490988[a] |
| $R^2$. Adj | (1.731237) | (2.798617) | (0.680034) | (2.432817) | (3.621335) | −0.203848 | (1.913828) | (−3.510936) | (1.769659) |
| | 0.0148 | | | 0.0551 | | | 0.0283 | | |

This table reports the results of this regression: $ARS_i(t) = \alpha_i + \beta_{1i}\pi_t^u * D_H + \beta_{2i}\pi_t^u * D_L + u_{it}$ Where $\pi_t^u$ =CPIU (unexpected component of CPI), and $D_H$ and $D_L$ are dummy variables. $D_H$ is equal to 1 when the economy is in expansion and it is equal to zero otherwise. $D_L$ is equal to 1 when the economy is in contraction and it is equal to zero otherwise. ARS are calculated by mean−adjusted returns method. The state of the economy is classified by NBER. t−statistics are in parentheses: [a]P<0.1, [b]P<0.05, [c]P<0.01

the economy is in expansion. When the economy is in contraction, we can find significant effects only on announcement day.

Instead, the results with McQueen and Roley methodology are consistent with those reached in McQueen and Roley (1993), Andersen et al. (2007) and Cenesizoglu (2011). They find that CPI reveals important information about stock returns in expansions. Therefore, our results are not robust to the choice of the business cycle indicator. We obtain different responses when we estimate with NBER or McQueen and Roley classification. This fact can be due to NBER classification considers recession periods shorter than McQueen and Roley classification. Anyway, both classifications are consistent with results for CPI and PPI. The market reacts to CPI announcements. Once again, our analysis allows us to confirm that PPI announcements have not a significant reaction on the market.

### 3.3. Model Conditional to the Business Cycle and the Direction of the Inflation News

In order to complete our analysis, we propose to introduce the direction of the inflation news in the model. The literature distinguishes between positive inflation news (total inflation higher than the expected inflation) and negative inflation news (total inflation lower than the expected inflation). Positive inflation news are considered as "bad news" and negative inflation news are considered as "good news." Previous studies corroborate that this variable has an important effect on stock returns. Andersen et al. (2002) affirm that "bad news" cause a greater impact than "good news." On the other hand, the famous "market direction" hypothesis (MHD) of Veronesi (1999) defends that the impact of macroeconomic announcements depends on the economic context. Therefore, the state of the economy and the direction of the surprises are two relevant factors that may influence in investors. Following Knif et al. (2008), the investors believe that an announcement is "good news" or "bad news" depending on the state of the economy, and therefore, the effect of inflation news on common stock returns can be very different in each scenario. Díaz and Jareño (2009; 2012) also corroborate this theory.

We modify Equation (7) and introduce four dummy variables.

$D_-^H$ and $D_-^H$ are equal to 1 when the state of the economy is high and the direction of the inflation news is positive and negative, respectively. $D^+{}_L$ and $D_-^L$ are equal to 1 when the state of the economy is low and the direction of the inflation news is positive and negative, respectively.

$$ARS_i(t) = \alpha_i + \beta_{1i}\pi_t^u * D_H^+ + \beta_{2i}\pi_t^u * D_H^- + \beta_{3i}\pi_t^u * D_L^+ + \beta_{4i}\pi_t^u * D_L^- + u_{it} \quad (10)$$

Table 8 (Panels A and B) shows the effect of unexpected component of CPI on abnormal returns calculated by MAR and MM, conditional to the business cycle by NBER classification and taking into account the direction of the surprise. The main conclusion that we can deduce is that in both cases the market reaction is very strong 2 days later the announcement in contraction periods to positive news. The market

**Table 8: Response to CPI announcements conditional to the business cycle and taking into account the direction of the inflation surprise**

| Dummy variable | S5ENRS | S5MATR | S5INDU | S5COND | S5CONS | S5HLTH | S5FINL | S5INFT | S5TELS | S5UTIL |
|---|---|---|---|---|---|---|---|---|---|---|
| Panel A: MAR method+NBER methodology taking into account the direction of the surprise | | | | | | | | | | |
| Pre - event | | | | | | | | | | |
| $D_{+}^{H}$ | −0.454012 | −0.270917 | −0.082457 | −0.255915 | −0.125581 | −0.191634 | −0.167442 | 0.180083 | −0.196617 | −0.119110 |
| | (−1.11191) | (0.66257) | (−0.23517) | (−0.68385) | (−0.48047) | (−0.61449) | (−0.32691) | (0.39637) | (−0.55874) | (−0.42792) |
| $D_{-}^{H}$ | 0.399560 | 0.544546 | 0.484359 | 0.608938[a] | 0.521817[b] | 0.546766[a] | 0.619776 | 0.866321 | 0.670839 | −0.020056 |
| | (1.06859) | (1.45433) | (1.50871) | (1.77693) | (2.18016) | (1.91458) | (1.32140) | (2.08229) | (2.081793) | (−0.07868) |
| $D_{+}^{L}$ | −0.111334 | 0.104498 | −0.164546 | −0.152691 | −0.013768 | 0.112604 | 0.265197 | 0.004145 | −0.035744 | −0.138390 |
| | (0.30537) | (0.28622) | (−0.52565) | (−0.45696) | (−0.05899) | (0.40439) | (0.57988) | (0.01021) | (−0.11949) | (−0.556829) |
| $D_{-}^{L}$ | 0.474381 | 0.881813[c] | 0.599397[b] | 0.761892[c] | 0.187263 | 0.303366 | 1.082915[c] | 0.251468 | 1.033211[c] | 0.381703 |
| | (1.50943) | (2.801935) | (2.22129) | (2.64511) | (0.93084) | (1.26384) | (0.006) | (0.71911) | (3.81472) | (1.78167) |
| Announcemen | | | | | | | | | | |
| $D_{+}^{H}$ | 0.044494 | 0.788698 | 0.430219 | −0.270773 | 0.282016 | 0.084148 | −0.306660 | 0.331231 | 0.086555 | 0.547286 |
| | (0.08142) | (1.46014) | (0.89062) | (−0.53947) | (0.81422) | (0.20409) | (−0.41639) | (0.44939) | (0.16609) | (1.41061) |
| $D_{-}^{H}$ | −0.925355[a] | −0.561673 | −0.372548 | 0.094503 | −0.499198 | −0.224075 | −0.541117 | −1.033547 | −0.448198 | −0.109680 |
| | (−1.84369) | (−1.13223) | (−0.83975) | (0.20501) | (−1.56931) | (−0.59174) | (−0.80004) | (−1.52684) | (−0.93651) | (−0.30781) |
| $D_{+}^{L}$ | 0.315102 | −0.303925 | 0.097397 | 0.061921 | −0.154571 | −0.046625 | 1.091926 | 0.272582 | −0.174811 | 0.144608 |
| | (0.649877) | (−0.63419) | (0.22725) | (0.13905) | (−0.50299) | (−0.12742) | (1.67114) | (0.41683) | (−0.37810) | (0.420100) |
| $D_{-}^{L}$ | 1.388952[c] | 0.596972 | 0.226130 | 0.187846 | 0.223121 | 0.717122[b] | 0.89133 | −0.05649 | 0.157153 | 0.484015[a] |
| | (3.45421) | (1.50206) | (0.63622) | (0.508642) | (0.87549) | (2.36381) | (1.644892) | (−0.10417) | (0.40987) | (1.69552) |
| Post - event | | | | | | | | | | |
| $D_{+}^{H}$ | 0.377794 | −0.163830 | −0.025539 | −0.120220 | −0.156564 | −0.326142 | −0.046782 | 0.541323 | −0.441639 | 0.301861 |
| | (0.91969) | (−0.44779) | (−0.07911) | (−0.370011) | (−0.67869) | (−1.12767) | (−0.089840) | (1.20483) | (−1.26261) | (0.95469) |
| $D_{-}^{H}$ | −0.125763 | −0.051485 | −0.463607 | −0.392917 | −0.139753 | −0.257977 | −0.559971 | −0.076337 | −0.491379 | −0.387583 |
| | (−0.33433) | (−0.15091) | (−1.56817) | (−1.32059) | (−0.66156) | (−0.97407) | (−1.17438) | (−0.18554) | (−1.53408) | (−1.33860) |
| $D_{+}^{L}$ | 0.530205 | 0.244589 | 0.080806 | 0.046132 | −0.034470 | −0.064035 | 0.132939 | 0.310132 | 0.340668 | 0.329047 |
| | (1.445543) | (0.73525) | (0.28030) | (0.159017) | (−0.16735) | (−0.24797) | (0.28592) | (0.773063) | (1.090766) | (1.16550) |
| $D_{-}^{L}$ | −1.834969[c] | −1.422382[c] | −1.283390[c] | −1.578748[c] | −0.968440[c] | −0.958098[c] | −2.395193[c] | −1.281727[c] | −1.447610[c] | −1.146512[c] |
| | (−5.80363) | (−4.96019) | (−5.16482) | (−6.31296) | (−5.45427) | (−4.30399) | (−5.97609) | (−3.70636) | (−5.37695) | (−4.71107) |
| Panel B: Unexpected component of CPI and MM method conditional on the business cycle by NBER methodology taking into account the direction of the surprise | | | | | | | | | | |
| $D_{-}^{L}$ | S5ENRS | S5MATR | S5INDU | S5COND | S5CONS | S5HLTH | S5FINL | S5INFT | S5TELS | S5UTIL |
| Pre – event | | | | | | | | | | |
| $D_{+}^{H}$ | −0.379403 | −0.251267 | −0.085065 | −0.766753 | −0.208605 | −0.406423 | −0.515718 | 0.095498 | −0.913840[b] | −0.548198 |
| | (−0.93683) | (−0.62179) | (−0.24635) | (−1.66126) | (−0.6S29975) | (−1.01372) | (−0.76529) | (0.15744) | (−2.106401) | (−1.433081) |
| $D_{-}^{H}$ | 0.436746 | 0.594061 | 0.503607 | 1.106421[c] | 0.730455[b] | 0.636472[a] | 0.997958 | 1.150190[b] | 1.230281[c] | 0.953484[c] |
| | (1.17773) | (1.60545) | (1.59273) | (2.61792) | (2.409053) | (1.73369) | (1.61726) | (2.070863) | (3.096915) | (2.72208) |
| $D_{+}^{L}$ | −0.124313 | 0.061968 | −0.199039 | 0.551940 | −0.651265[b] | 0.970846[c] | 2.045603[c] | 0.200882 | −0.165481 | 0.092705 |
| | (−0.34391) | (0.17181) | (−0.64579) | (1.33978) | (−2.20352) | (2.713003) | (3.40089) | (0.371048) | (−0.42735) | (0.271515) |
| $D_{-}^{L}$ | 0.527463[a] | 0.933633[c] | 0.679725[b] | 1.377750[c] | 0.429506[a] | 0.573499 | 1.496110[c] | 1.045018[b] | 1.843459[c] | 1.023801[c] |
| | (1.68372) | (2.98678) | (2.54475) | (3.85894) | (1.676809) | (1.849216) | (2.87006) | (2.22724) | (5.493124) | (3.45991) |
| Announcement | | | | | | | | | | |
| $D_{+}^{H}$ | −0.735553 | 0.306809 | 0.114314 | −0.753515 | −0.206312 | −0.535111 | −0.674895 | −0.212394 | −1.319801[b] | −0.492647 |
| | (−1.35405) | (0.59064) | (0.245635) | (−1.206550) | (−0.46987) | (−0.992568) | (−0.754251) | (−0.22778) | (−2.042920) | (−0.89656) |
| $D_{-}^{H}$ | 1.563968[c] | 0.993830[c] | 0.876487[c] | 1.363040[c] | 0.735509 | 1.167571[c] | 2.232622[c] | 0.863744 | 1.215596[c] | 1.821706[c] |
| | (4.12751) | (2.74286) | (2.70008) | (3.128971) | (2.401488) | (3.10483) | (3.62471) | (1.32799) | (2.69756) | (4.75293) |
| $D_{+}^{L}$ | −1.100271[b] | −1.198434[b] | −1.038086[b] | 0.152104 | 0.359589 | 0.583199 | 0.618724 | −0.573384 | −0.696012 | −0.049178 |
| | (−2.07551) | (−2.36414) | (−2.28577) | (0.249574) | (0.839202) | (1.10851) | (0.70857) | (−0.63012) | (−1.10399) | (−0.09171) |
| $D_{-}^{L}$ | 0.117194 | −1.221892 | −1.072041 | −0.907994 | −1.265253[b] | −0.709058 | −1.224986 | −0.030310 | 0.262531 | 0.506435 |
| | (0.148037) | (1.614096) | (−1.58069) | (−0.997655) | (−1.97731) | (0.90249) | (−0.93941) | (−0.02231) | (0.27885) | (0.632428) |
| Post - event | | | | | | | | | | |
| $D_{+}^{H}$ | 0.405398 | −0.118561 | −0.037859 | −0.533414 | −0.261711 | −0.574205 | −0.313903 | 0.402396 | −1.278938[c] | −0.175835 |
| | (0.99566) | (−0.32056) | (−0.11896) | (−1.26917) | (−0.877964) | (−1.49248) | (−0.50610) | (0.70210) | (−2.93335) | (−0.43291) |
| $D_{-}^{H}$ | −0.143093 | −0.088605 | −0.457043 | 0.005641 | −0.003560 | −0.162457 | −0.187023 | 0.164257 | 0.129086 | 0.727215 |
| | (−0.38379) | (−0.26162) | (−1.56837) | (0.01466) | (−0.01304) | (−0.46114) | (−0.32929) | (−0.31299) | (0.32333) | (1.95527) |
| $D_{+}^{L}$ | 0.449964 | 0.236875 | 0.078306 | 0.852232[b] | 0.644140[b] | 0.834083 | 1.816414[c] | 0.572831 | 0.161447 | 0.607826[a] |
| | (1.23814) | (0.71753) | (0.27567) | (2.271811) | (2.42099) | (2.42891) | (3.28107) | (1.11979) | (0.41486) | (1.67660) |
| $D_{-}^{L}$ | −1.872689[c] | −1.452650[c] | −1.309756[c] | −1.056777[c] | −0.854040[c] | −0.736307[c] | −2.058388[c] | −0.510040[c] | −0.696036[b] | −0.566502[a] |
| | (−5.94582) | (−5.07737) | (−5.31796) | (−3.250018) | (−3.70379) | (−2.47409) | (−4.29025) | (−1.15045) | (−2.06377) | (−1.80305) |

This table reports the results of this regression: $ARS_i(t) = \alpha_i + \beta_{1i}\pi_t^u * D_H^+ + \beta_{2i}\pi_t^u * D_H^- + \beta_{3i}\pi_t^u * D_L^+ + \beta_{4i}\pi_t^u * D_L^- + u_{it}$ Where, $\pi_t^u$ = CPIU (unexpected component of CPI) and $D_H^+$, $D_{H_2}^-$, $D_+^L$, $D_L^-$ are dummy variables. $D_+^H$ and $D_-^H$ are equal to 1 when the state of the economy is high and the direction of the inflation news is positive and negative, respectively. $D_+^L$ and $D_-^L$ are equal to 1 when the state of the economy is low and the direction of the inflation news is positive and negative, respectively. The state of the economy is classified by NBER. t−statistics are in parentheses: [a]P<0.1, [b]P<0.05, [c]P<0.01

**Table 9: Summary of the main results of our research**

| | | |
|---|---|---|
| **Model: Conditional to the business cycle by NBER'S classification** | | |
| Telecommunication Services | Pre−event (recession: +) and post−event (Expansion: −) | MAR and MM |
| Energy | Event in recession (+) | |
| Health care | | |
| Financials | | |
| All sectors | Post−event in recession (−) | MAR |
| 40% of sectors | Post−event in recession (−) | MM |
| 70% of sectors | Pre−event in recession (+) | |
| **Model: NBER'S classification and the direction of inflation news** | | |
| Consumer discretionary consumer staples health care | Pre−event (+) in expansion and negative news | MAR and MM |
| Telecommunication Services | Pre−event (+) and post−event (−) | |
| Materials | in recession and negative news | |
| Industrials | | |
| Financials | | |
| Consumer Discretionary | | |
| All sectors | Post−event (−) | |
| | in recession and negative news | |

also reacts to negative news in contraction periods. In expansions periods, the market hardly reacts to good and bad news.[25]

Finally, Table 9 shows the main results of this research.

## 4. SUMMARY AND CONCLUDING REMARKS

The basic aim of this research consists of analyzing the response of abnormal returns to inflation announcements in the US stock market by sector. Our sample starts in January 1990 and ends in April 2013. We use daily data of S&P500 index by sector in order to estimate the effect of CPI and PPI announcements. Our analysis not only is focused on announcement day, but we also analyze the returns 2 days before the announcement and 2 days later. Thus, we can measure the efficiency of the market.

According to previous studies, the effect of inflation news of common stock returns depends on the state of the economy and the direction of the inflation surprises. Thus, Firstly, we make a preliminary analysis of the abnormal returns by sector. We approach abnormal returns with two different models: MAR and market model (MM). Moreover, we utilize two different classifications of the business cycle: NBER and McQueen and Roley's methodology.

In our preliminary analysis, we do an analysis non conditional to the business cycle. Then, we introduce the state of the economy and, finally, we take into account the state of the economy and the direction of the inflation surprises. The mentioned preliminary analysis shows a few significant responses for CPI and hardly significant responses for PPI. Instead, when we introduce in our model the state of the economy, the majority of the sectors respond to CPI news. Concretely, the majority of significant responses happen 2 days later the announcement. Therefore, we conclude that the market react later to the arrival of new information. PPI news does not cause any significant effect on the market. Finally, taking into account the state of the economy and the direction of the inflation surprises, we observe the significant impact of inflation surprises on abnormal returns in post−event period. Moreover, CPI announcements cause a great impact when the state of the economy is low and the direction of the news is positive.

We conclude that our analysis is quite consistent with previous analysis. The state of the economy and the direction of the surprises are very important variables to analyze the impact of inflation news on abnormal returns.

25 We also have estimated the results with McQueen and Roley methodology, but the results are less clear and, therefore, we not show the tables. The results for PPI shoy the same conclusion that in previous analysis: PPI announcements not cause significant responses in the market. We do not show the tables.

## REFERENCES


Adams, G.L., McQueen, G., Wood, R. (1999), The effects of inflation news on high frequency stock returns. Journal of Business, 77(3), 547−574.

Anari, A., Kolari, J. (2001), Stock prices and inflation. The Journal of Financial Research, 24(4), 587−602.

Andersen, T.G., Bollerslev, T., Diebold, F.X., Vega, C. (2002), Micro Effects of Macro Announcements: Real−Time Price Discovery in Foreign Exchange. National Bureau of Economic Research. Working Paper No. 8959.

Andersen, T.G., Bollerslev, T., Diebold, F.X., Vega, C. (2007), Real−time price discovery in global stock, bond and foreign exchange markets. Journal of International Economics, 73(2), 251−277.

Ariño, M.A., Canela, M.A. (2002), Evolución de la Inflación en España. IESE, Centro Internacional de Investigación Financiera (CIIF), Documento de Investigación No. 446.

Asikoglu, Y., Ercan, M.R. (1992), Inflation flow−through and stock prices. Journal of Portfolio Management, 18(3), 63−68.

Birz, G., Lott, J.R. (2011), The effect of macroeconomic news on stock returns: New evidence from newspaper coverage. Journal of Banking and Finance, 35(11), 2791−2800.

Boudoukh, J., Richardson, M. (1993), Stock returns and inflation: A long−horizon perspective. American Economic Review, 83(5), 1346−1355.

Boyd, J.H., Hu, J., Jagannathan, R. (2005), The stock market's reaction

to unemployment news: Why bad news is usually good for stocks. The Journal of Finance, 60(2), 649−672.
Cenesizoglu, T. (2011), Size, book−to−market ratio and macroeconomic news. Journal of Empirical Finance, 18, 248−270.
Cenesizoglu, T. (2015), The reaction of stock returns to news about fundamentals. Management Science: Journal of the Institute for Operations Research and the Management Sciences, 61(5), 1072−1093.
Díaz, A., Jareño, F. (2009), Explanatory factors of the inflation news impact on stock returns by sector: The Spanish case. Research in International Business and Finance, 23(3), 349−368.
Díaz, A., Jareño, F. (2013), Inflation news and stock returns: Market direction and flow−through ability. Empirical Economics, 44(22), 775−798.
Dimson, E., Mussavian, M. (1998), A brief history of market efficiency. European Financial Management, 4(1), 91−103.
Estep, T., Hanson, N. (1980), The Valuation of Financial Assets in Inflation. New York: Salomon Brothers.
Fama, F. (1981), Stock return, real activity, inflation, and money. The American Economic Review, 71(4), 545−565.
Fama, F., Schwert, G. (1977), Assets returns and inflation. Journal of Financial Economics, 5, 115−146.
Flannery, M.J., Protopapadakis, A.A. (2002), Macroeconomic factors do influence aggregate stock returns. The Review of Financial Studies, 15(3), 751−782.
Geske, R., Roll, R. (1983), The fiscal and monetary linkage between stock return and inflation. The Journal of Finance, 38, 1−33.
Jaffe, J.F., Mandelker, G. (1976), The 'Fisher Effect' for risky assets: An empirical investigation. The Journal of Finance, 31(2), 447−458.
Jareño, F. (2005), Flow−through capability, the Spanish case. Journal of Asset Management, 6(3), 191−205.
Jareño, F. (2006), Sensibilidad de los rendimientos sectoriales a tipos de interés reales e inflación. Investigaciones Económicas, 30(3), 577−610.
Jareño, F. (2008), Spanish stock market sensitivity to real interest and inflation rates. An extension of the stone two−factor model with factors of the Fama and French Three−Factor model. Applied Economics, 40(24), 3159−3171.
Jareño, F. (2009), El impacto de la publicación del IPC sobre el mercado bursátil español. Información Comercial Española, Revista de Economía, 851, 109−120.
Jareño, F., Navarro, E. (2010), Stock interest rate risk and inflation shocks. European Journal of Operational Research, 201, 337−248.
Jareño, F., Navarro, E. (2016), European inflation and Spanish stock market. European Review, 24(4), 609−630.
Jones, C.M., Lamont, O., Lumsdaine, R.L. (1998), Macroeconomic news and bond market volatility. Journal of Financial Economics, 47(3), 315−337.
Joyce, M.A., Read, V. (1999), Asset price reactions to RPI announcements. Applied Financial Economics, 12(4), 253−270.
Knif, J., Kolari, J., Pynnönen, S. (2008), Stock market reaction to good and bad inflation news. Journal of Financial Research, 31(2), 141−166.
Kritzman, M.P. (1994), What practitioners need to know about event studies? Financial Analysts Journal, 60(6), 17−20.
Mackinlay, A.C. (1997), Event studies in economics and finances. Journal of Economic Literature, 35(1), 13−39.
McQueen, G., Roley, V.V. (1993), Stock prices, news, and business conditions. The Review of Financial Studies, 6(3), 683−707.
Nikkinen, J., Omran, M., Salshtröm, P., Äijö, J. (2006), Global stock market reactions to scheduled U.S macroeconomic news announcements. Global Finance Journal, 17(1), 92−104.
Pavel S., Wilson, M. (2013), How Much do investors care about macroeconomic risk? Evidence from scheduled economic announcements. Journal of Financial and Quantitative Analysis, 48(2), 343−375.
Pearce, P.K., Roley, V.V. (1985), Stock prices and economic news. Journal of Business, 58, 49−67.
Peterson, P.P. (1989), Event studies: A review of issues and methodology. Quarterly Journal of Business and Economics, 28(3), 36−66.
Torrecillas, M.C., Jareño, F. (2013), Inflation news impact on stock market: A review, Pensee Journal, 75(11), 414−419.
Torrecillas, M.C., Jareño, F. (2014), How Inflation News Moves the Stock Market: An Overview of US. Working Paper.
Veronesi, P. (1999), Stock market overreaction to bad news in good times: A rational expectations equilibrium model. The Review of Financial Studies, 12(5), 975−1007.

# APPENDIX

**Table A.1.: The GICS**

| Sector name | Subsectors |
|---|---|
| Sector 1: Energy (S5ENRS) | 1.1.− Energy |
| Sector 2: Materials (S5MATR) | 2.1.− Materials |
| Sector 3: Industrials (S5INDU) | 3.1.− Capital Goods |
| | 3.2.− Commercial Services & Supplies |
| | 3.3.− Transportation |
| Sector 4: Consumer Discretionary (S5COND) | 4.1.− Automobiles & Components |
| | 4.2.− Consumer Durables & Apparel |
| | 4.3.− Hotels, Restaurants & Leisure |
| | 4.4.− Media |
| | 4.5.− Retailing |
| Sector 5: Consumer Staples (S5CONS) | 5.1.− Food & Drug Retailing |
| | 5.2.− Food, Beverage & Tobacco |
| | 5.3.− Household & Personal Products |
| Sector 6: Health Care (S5HLTH) | 6.1.− Health Care Equipment |
| | 6.2.− Pharmaceuticals & Biotechnology |
| Sector 7: Financials (S5FINL) | 7.1.− Banks |
| | 7.2.− Diversified financials |
| | 7.3.− Insurance |
| | 7.4.− Real Estate |
| Sector 8: Information Technology (S5INFT) | 8.1.− Software & Services |
| | 8.2.− Technology Hardware & Equipment |
| Sector 9: Telecommunication Services (S5TELS) | 9.1.− Telecommunication Services |
| Sector 10: Utilities (S5UTIL) | 10.1.− Utilities |

GICS: Global industry classification standard