Bouteska, Ahmed; Regaieg, Boutheina

Article

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Earnings announcement effect on the Tunisian stock market

Ahmed Bouteska[1]* and Boutheina Regaieg[2]

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*Corresponding author: Ahmed Bouteska, Faculty of Economics and Management of Tunis, University of Tunis El Manar, Tunis, Tunisia
E-mail: ahmedcbouteska@gmail.com

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Abstract: This paper treats the post-earnings announcement drift. Precisely, it revisits the benefits announcement effect using various measurements of surprise unexpected earnings. In addition, this work tries to explain the persistence of post-earnings announcement drift on the financial markets using adapted methodology. The empirical study on the Tunisian stock market shows the persistence of the post-earnings announcement drift over the year 2013. It indicates that the observed post-earnings announcement drift seems to be due to the behavior of investors under psychological biases. This finding shows that the information provided by the prevision and revision of earnings forecasts is not immediately included in the price, but there is an anchoring bias in relation to the past earnings, as well as on the investor time of response to the new information provided by the market.

Subjects: Finance; Investment & Securities; Accounting

Keywords: result announcement; surprise unexpected earnings; forecast revisions; abnormal returns; tunisian stock market

JEL classifications: G14; G10; G12, G41

Ahmed Bouteska

ABOUT THE AUTHORS

Ahmed Bouteska, PhD, University of Tunis El Manar, faculty of Economics and Management of Tunis, Tunisia. His research interests are in behavioral finance, financial intermediation, financial economics, corporate finance, international finance, financial market stability, and empirical asset pricing. He is an associate researcher at URISO (research laboratory) of University of Tunis el Manar, Tunisia.

Regaieg Boutheina, PhD, a professor of finance and accounting at University of Jendouba, faculty of Law, Economics and Management of Jendouba, Tunisia. Her research interests are in behavioral finance, corporate finance, corporate governance, financial economics, international finance, financial market stability, and empirical asset pricing.

PUBLIC INTEREST STATEMENT

Motivated by psychological evidence on anomalous stock price behavior following earnings announcements, we propose to analyze the evolution of stock prices to the effects of profit announcement over 12 months period (year 2013) using two measures of earnings surprise namely, the earnings forecast errors (SUE) and the earnings forecasts revisions (REV), respectively. We find that securities with extreme surprise of unexpected earnings would record higher returns to those of low surprise unexpected earnings securities. We further show that investors overreact and under react to past earnings surprises due to an anchoring bias. However, the reference to past information disappears gradually with time and leads to a correction of the initial reaction. This study of portfolio analysis is globally coherent with the efficient market hypothesis (EMH) confirming the informational content evidence through an adjustment of stock prices at financial earnings disclosure.

1. Introduction

Despite the strong evidence in favor of the theory of market efficiency, research has found empirical results that deviate from expected reactions in financial markets. Anomalies are observed in these markets and have been explained by the irrationality of market participants as well as by the effect of their psychology on the formation of stock prices. The basic studies on the effect of result announcement are the work of Ball and Brown (1968), and Bernard and Thomas (1989). However, in spite of numerous studies analyzing this phenomenon, the explanations of this effect remains a "mystery" as Fama (1998) says. Thus, we devote this paper to further investigating this issue. The aim is to revisit the most interesting anomaly of the persistence of the post-earnings announcement drift effect under assumptions related to the behavioral approach for the case of Tunisian stock exchange. The objective is to extend the existent literature by formulating convincing answers to the question of the earnings announcement effect on emergent stock markets.

Following the Kaestner model (2005), we try to detect through a portfolio study, the anchoring bias of investors on the Tunisian stock market. We propose an analysis of the returns behavior of short-term securities (the window of events is between 1 and 30 days). These returns are evaluated by the market model following recent and previous announcements of results. We investigate some testable implications of behavioral models according to the proposed methodology. Our results show a persistence of the earnings announcement effect on Tunisian stock market which seems to be a "surprise effect". We indicate that the observed post-earnings announcement drift seems to be due to the behavior of investors under psychological biases. This finding shows that the information provided by the prevision and revision of earnings forecasts is not immediately included in the price, but there is an anchoring bias in relation to the past earnings, as well as on the investor time of response to the new information provided by the market. We also highlight the phenomenon of underreaction on the Tunisian market following the announcement of results, where high-earnings surprise securities would record higher returns than low-earnings surprise securities.

This paper is organized as follow. Section 2 exposes the literature review and research hypotheses. Section 3 presents the methodology and data. Section 4 presents the results and discussions of the earnings announcement effect examined through a portfolio study. Finally we conclude in Section 5.

2. Literature survey and research hypothesis

The earnings announcement effect has been extensively documented in the international and emerging financial markets. Ball and Brown (1968) have highlighted the association between abnormal returns and forecast errors. They observe a high drift (respectively low) of the abnormal returns of securities with high (respectively low) growth rates. However, in spite of a number of studies devoted to the earnings announcement effect, this phenomenon remains a mystery (Fama, 1998; Fama & French, 1996). Even the reaction of Ball and Brown (1968) was skeptical. Several explanations were given to the benefit announcement effect.

In the early 1980s, several studies explained the earnings announcement effect by factors at risk. These explanations concern the "beta" risk factor, the PER effect, and the size. These studies have, thus, shown that the explanations of the earnings announcement effect are rational linked to the attributes of the securities. In particular, the earnings effect is more significant for companies with low market capitalization. Some research suggests that the explanations for the effect of the results publication are rational in relation to the microstructure of financial markets, especially transaction costs (Watts, 1978). Recent work on the French financial market goes in this direction (Gajewski, 2000). Studies have highlighted the "Value Line" conundrum in the advent of the earnings effect, where the design offices influence stock markets based on analyst recommendations (Affleck-Graves & Mendenhall, 1992).

Bernard and Thomas (1989, 1990) study the earnings announcement effect on the basis of critics. Specifically, they examine the evolution of the abnormal returns of the US company portfolios. These portfolios are constructed according to the extent of the results surprise (positive or negative), the

surprise being measured by the difference between announced results and results as anticipated by the market. These authors show that despite corrections, the effect of results publication remains on the US financial market. Similarly, Abarbanell and Bernard (1992), using the methodology of Ball, Kothari, and Watts (1993), show that positive (negative) equities are not also (less) risky. For Bernard and Thomas (1989, 1990), and Abarbanell and Bernard (1992), the announcement effect is in contradiction with the theory of the financial markets efficiency in the semi-strong sense, insofar as the prices do not reflect all available public information from firms. The publication of results is, therefore, not immediately incorporated in the stock market prices of securities. A portfolio management strategy resulting from the announcement of earnings through the purchase of securities with good news and the sale of bad securities provides considerable benefits in the short-term. They explain the surprise effect by the investors' under-reaction to earnings with not responding correctly to the results publication that they receive. De Bondt and Thaler (1985, 1987), and Ou and Penman (1989a, 1989b) follow this same direction but they explain the effect of earnings announcement by the over-reaction of investors. Bernard (1993) synthesis study shows that the surprise effect of the result is due to the biased behavior of investors, precisely to an under-reaction and not to an over-reaction as suggested by De Bondt and Thaler (1987).

Studies by Fama and French (1992, 1993, 1995) have revived the debate between orthodox and heterodox on the earnings announcement effect. The effect of the results is explained by the defenders of financial market efficiency as an inadequate adjustment of the abnormal return of securities to fundamentals risk factors. For the orthodox, securities with negative surprise would be less risky whereas high benefits surprise securities would be very risky in the short-term. Faced with this inherent and visible risk, investors demand a risk premium, hence the observed abnormal returns. It is, therefore, important to consider better methodologies for valuing these securities. Fama and French (1995) found a difficulty in their tri-factorial model with pre-specified factors in capturing the effect of the results on the US market. Nevertheless, their model that is to say the model of Fama and French (1993) explains a majority of the financial market anomalies. Ball and Bartov (1996) consider investors to be more than rational and non-irrational, as suggested by Bernard and Thomas (1989, 1990), and Bernard (1993). Rangan and Sloan (1998) confirm the random seasonality of incomes. Their work seems to contradict the results of Bernard's (1993) synthetic study and corroborate the results of Ball and Bartov (1996). A study conducted by Soffer and Lys (1999) reconciles the conflicting studies of Bernard and Thomas (1989, 1990), and Ball and Bartov (1996).

As for the defenders of behavioral finance, they justify the effect of earnings announcement through the cognitive biases of investors. They focus on the phenomena of the under-reaction of Bernard and Thomas (1989), and Jegadeesh and Titman (1993), and the over-reaction of De Bondt and Thaler (1985, 1987). Jegadeesh and Titman (1993) have highlighted the "momentum" effect in which stocks that performed well in the past year will continue their momentum in the following year, but those whose performance was poor will not correct the situation the following year. Chan, Jegadeesh, and Lakonishok (1996) link the "momentum" effect of Jegadeesh and Titman (1993) to the earnings effect. By examining the book-to-market ratio effect found by Fama and French (1992), Chan et al. (1996) show the predominance of the "momentum" effect on the book-to-market effect around the date of earnings announcement. This effect is named by Chan et al. (1996) the earnings momentum effect. For these authors, the effect "earnings momentum" may be linked to the under-reaction of investors. Similarly, recent studies have focused on the "momentum" and over-reaction effects to create behavioral models.

The general approach of these studies is the use of certain cognitive biases identified at individuals in the social sciences such as social and cognitive psychology. The cognitive biases would cause erroneous judgments on the part of individuals in their decision-making. Psychologists describe individuals as non-rational people in their judgment when they think they are rational. These cognitive biases can be heuristics (Kahneman & Tversky, 1982; Tversky & Kahneman, 1973, 1979), attribution bias and personal satisfaction, overconfidence, etc. The Behavioral models incorporate cognitive biases of investors in the modeling of asset prices. Thus, dynamic models of asset prices are created.

The main models are those of Delong, Shleifer, Summers, and Waldmann (1991), Barberis, Shleifer, and Vishny (1998), Daniel, Hirshleifer, and Subrahmanyam (1998), and Hong and Stein (1999) for equity assets, and the Poteshman (2001) model for options. Behavioral models attempt to explain the effect of earnings in a behavioral approach. They reconcile the phenomena of under and over-reaction to the earnings announcement.

In our empirical study, we try to re-examine the effect of earnings on the Tunisian stock market under the assumptions of behavioral approaches. Our research hypotheses are as follows:

- If the incorporation of the announced benefits is gradual in stock prices i.e. if investors under-react to the earnings announcements then the high-earnings surprise securities are higher than those of the low-earnings surprise securities.
- If investors are unbiased and the market is efficient, then the reaction of investors to the announcement of results would instantly be incorporated into the price of the security at the announcement of the information. The difference in return between good and bad news would be statistically zero.

3. Methodology and data

3.1. The sample

The sample is composed of publicly traded companies operating on the Tunisian stock exchange during the year 2013. The choice of the sample is explained by the market availability of data. After the Tunisian revolution in 2011, data on securities transactions becomes scarce and discontinuous, so it has been preferable to limit our study to the year 2013 with a more complete database. Firms that have been rated as non-significant by the market model are eliminated. Only 28 companies were retained (Table 1). The firms in our sample share a common feature: that of announcing a result. We try to detect the anchor bias of the investors following the publication of the financial statements during the year 2013.

3.2. Data and variables

Financial data such as the daily price of the shares and those of the Tunindex are provided by the Tunisian Stock Exchange. In our portfolio analysis, the Tunindex is used as a market index. The forecasted profits and those realized are extracted from the "guide stocks" of the following intermediaries on the stock exchange: MAC sa, Tunisia Values, Amen Invest, Cap Finance, and CGF. Three variables are used: the surprise variable (SUE), the earning variation variable (ΔEPS), and the revision of prevision variable (REV).

3.2.1. SUE variable

The SUE variable ("Surprise Unexpected Earnings") measures the surprise of earning announcement. The individual earnings forecasts are aggregated by calculating earnings surprises following the announcement date of earnings for each security. These earnings surprises are based on systematic comparisons of an achievement and a forecast. All these comparisons are standardized over the share price.

Table 1. Companies composing the portfolio study

AMEN BANK	BNA	AIR LIQUIDE	MNP
ENNAKL	BT	ICF	NBL
HEXABYTE	CIL	PLACE-TUNISIE	POULINA
SIMPAR	GIF-FILTER	TUNISIE RE	SFBT
ATTIJARI LEASE	SITS	ADWYA	SIPHAT
ATL	SOTUMAG	ASSAD	STEG
BH	TUNI-INVEST	ELECTROSTAR	TELNET

$$SUE_i = UE_i / P_i \quad (1)$$

UE_i is the unexpected earnings, which is equal to the difference between earnings per share (i) realized and expected earnings per share (i), such as:

$$UE_i = \text{EPS realized} - \text{EPS expected} \quad (2)$$

P_i is the price of the security on the day preceding result announcement. The expected earnings represent the earnings forecasted by the financial analysts.

These earnings surprises reveal whether investors tend to underestimate or overestimate earnings announcements based on the average error for each horizon. In addition, the SUE variable gives additional information by indicating the share price proportion of the difference between the realization and the earning forecast.

The SUE_{S1} announcement surprise corresponds to the first half of SUE, and SUE_{S2} corresponds to the SUE of the second half of the year. If the date of the results' announcement occurred at the beginning of the year, the surprise of the announcement (SUE) corresponds to the SUE of the first half of the year. If the date of the announcement was made toward the end of the year, the SUE corresponds to that of semester 2.

3.2.2. ΔEPS variable

The earning change corresponds to the difference between the EPS realized during the second half of the year and the one realized in the first half of the same year, as follows:

$$\Delta EPS = EPS_{S2} - EPS_{S1} \quad (3)$$

with EPS_{S2} means to the earnings per share realized during the second half of the year and EPS_{S1} the earnings per share realized during the first half of the same year. The change in earnings per share realized ΔEPS_{S2} is the difference between the earnings per share realized between the second and the first half of the year. The change in earnings per share realized ΔEPS_{S1} is the difference between the earnings per share realized between the first half of the year and the second half of the previous year.

3.2.3. REV variable

The REV variable is the revision of profit forecasts prior to the profit announcement date. It corresponds to the difference between two current profit forecasts by financial analysts. This allows evaluating the evolution of the forecast for each security on the market. Most analysts readjust their forecasts and recommendations as soon as possible after profit announcements by companies.

$$REV_{i,t+1} = \text{EPS expected}_{i,t+1} - \text{EPS expected}_{i,t} \quad (4)$$

3.3. The methodology

3.3.1. The choice of the method of events

Three categories of tests emerge from the broad set of empirical studies, notably those of Fama (1991). Profitability predictability tests include low efficiency form tests, semi-strong form tests, and private information tests that detect the strong form. We choose an event-time study because it seems to be the most relevant of these three tests and is very appropriate for our portfolio analysis. According to this approach, time does not correspond to the real time of the calendar, i.e. the actual time of the calendar (day, month, and year), but rather to the time of the event. In other words, time is defined as a function of an event that occurred at time $t = 0$; the time (t) represents the day of the event. With this approach, we use cumulated abnormal returns ("CARs") method of calculating short-term abnormal returns.

This methodology generally assumes that we proceed in several steps:

- Step 1. Define the event supposed having an impact, which is in our case, the publication of the financial statements during the year 2013.
- Step 2. Determine dates corresponding to the publication of these financial statements, and collect the stock data corresponding to our study.
- Step 3. Isolate the event's effect using the market model, which distinguishes between normal performance in the absence of an event and abnormal return related to the event impact.
- Step 4. Measure the statistical significance of the obtained abnormal returns.

We test our model on two event windows of different lengths for our companies' sample. These are made of these two windows, event and off-event, which leads us to study 28 announcing results for stock market companies. The choice of event windows is not arbitrary. A short period of time (30 days) was chosen to avoid a succession of events, which could minimize the impact of the results' announcement on stock prices.

3.3.2. The model

The methodology based on the market model is initially proposed by Fama, Fisher, Jensen, and Roll (1969). This method allows taking into account the risk associated with each security. The theoretical profitability of securities is linked to the market profitability through a coefficient of proportionality β, specific to each security, as follows:

$$R_{it} = \alpha + \beta LnR_{mt} + \varepsilon_{it}$$

where, $E(\varepsilon_{it}) = 0$nd $\mathrm{Var}(\varepsilon_{it}) = \partial^2_{\varepsilon_i}$

R_{it} and R_{mt} are the returns for the period (t) of the asset (i) and the market portfolio, respectively. *Ln* designs the natural logarithm. β is the regression coefficient that measures the market profitability of the security (i), and α is the intercept.

$$\beta_i = \frac{\mathrm{Cov}(R_i,\ R_m)}{\delta^2(R_m)} \tag{6}$$

The coefficient β of each security is estimated over the entire period without weighting of returns by market capitalization. In this study, the calculation of yields is determined as follows:

$$R_{it} = \mathrm{Log}\left(\frac{P_t}{P_{t-1}}\right) \tag{7}$$

where P_t is the price of the asset at time (t) and Log denotes the logarithmic function.

Abnormal profitability is defined as the difference between the observed and the theoretical profitability. The latter represents the profitability that should have taken place in the absence of events. To do this, we use a market model, which allows us to estimate the monthly return of each security in the sample, and to calculate abnormal profitability.

The abnormal profitability of each security (i) is calculated as the difference between the observed daily yield of the security (i) and the expected daily yield:

$$AR_{i,t} = R_{i,t} - \hat{R}_{i,t} \text{ avec } \hat{R}_{i,t} = E(\hat{R}_i)$$

To judge the performance of a security as abnormal, we need the adjustment of the return observed on the security after the event with the expected return of the security previously estimated by the

market model. We then calculate the average abnormal returns of the portfolios for each day as follows:

$$AR_{t,\text{moyen}} = \sum_{i=1}^{n} (1/nt) AR_{i,t}, \tag{9}$$

We adopt the methodology for calculating abnormal returns, which refers to the cumulative average residual (CAR) method, as pointed out above. The CAR is calculated by cumulating the average abnormal returns of each portfolio over the time horizon to be studied. It is formalized by the following equation:

$$\text{CAR}_{T,\text{moyen}} = \sum_{t=1}^{T} AR_{t,\text{moyen}} = \sum_{t=1}^{T} \sum_{i=1}^{n} (1/n_t) AR_{i,t} \tag{10}$$

Choosing the average CAR to measure the average abnormal performance of a sample of firms leads us to define the following two research hypotheses:

$$H_0: \text{CAR}_{T,\text{moyen}} = 0$$

$$H_1: \text{CAR}_{T,\text{moyen}} \neq 0$$

If the market is efficient in the semi-strong form, the announcement should not have a significant influence on stock prices, which implies that the observed profitability of the R_{it} share is equal to the expected profitability according to the market model $\hat{R}_{i,t}$. In order to calculate the normal yield, it is necessary to first estimate the coefficient of sensitivity β by a time series regression, after carrying out the preliminary tests of stationarity, normality, and autocorrelation of the yields for all equities in the sample.

3.3.2. Results of the market model

Based on the market model presented in Equation (5), we estimate the 28 firm securities of our sample. The main results are summarized in Table 2. Only results exhibiting significant estimates of the coefficient beta are reported. Results not statistically significant are systematically eliminated from the remainder of our portfolio study.

The coefficient beta is a measure of the security sensitivity to market fluctuations. It is, therefore, used to evaluate the specific risk of financial securities. The higher the value of beta coefficient and the more the promise of stock profitability must be strong to offset the additional volatility of the security and the risk it causes. Our results show beta values less than 1, which indicates that securities in Tunisian stock market are defensive and they mitigate market fluctuations. When the beta estimates take negative values, this means that the fluctuations of the security are inverse to that of the market. This finding suggests that securities react by reversing the orientation of its reference market (Tunindex). This can be interpreted as follows: if the beta is negative by −0.31% for Amen Bank securities for example, its value decreases by −0.31% when its market gains 1%.

The problem of residual autocorrelation is corrected with the generalized least squares (GLS) method. The White test is also used to correct the problem of self-correlation of residual variances (heteroscedasticity test). This has significantly improved Durbin Watson's statistics, which show values close to 2 for all estimated securities. The relatively low values of R^2 are justified by the single factor market model, where the return of an asset is explained only by the market portfolio return variable (Tunindex), excluding other controlling variables.

Table 2. Summary of estimates results of the market model

Titers	Obs	$\hat{\alpha}$	$\hat{\beta}$	R^2	DW
Amen Bank	178	−0.0001 (0.0003)	−0.3144** (0.1638)	0.0912	2.0395
BT	179	−0.0002 (0.0003)	−0.3064* (0.1701)	0.0260	2.0774
BH	178	0.0003 (0.0003)	−0.2304* (0.1299)	0.0565	2.0231
BNA	179	0.0002 (0.0004)	−0.3639** (0.1822)	0.0176	2.4075
ICF	179	0.0003 (0.0005)	0.4967* (0.2810)	0.0521	2.3649
AIR LIQUIDE	179	−0.0001 (0.0003)	−0.3082*** (0.1254)	0.0261	2.3837
SFBT	178	0.0001 (0.0004)	−0.3230* (0.1895)	0.0666	2.0476
TUNINVEST	179	0.0010** (0.0004)	0.3705* (0.2092)	0.0172	1.9774
PLAC.TSIE	178	0.0000 (0.0001)	−0.1022* (0.0618)	0.0136	2.0122
CIL	179	−0.0000 (0.0005)	−0.4736*** (0.1896)	0.0231	2.8244
ATL	179	−0.0002 (0.0009)	0.5683* (0.3380)	0.0168	2.3555
MONOPRIX	179	−0.0000 (0.0004)	−0.4462*** (0.1575)	0.0338	2.4014
SIMPAR	178	0.0000 (0.0003)	−0.2328* (0.1380)	0.1153	1.9359
SOTUMAG	178	0.0002 (0.0005)	−0.4101* (0.2386)	0.0872	2.0521
ELECTROSTAR	179	−0.0011 (0.0010)	−1.0878** (0.0010)	0.0320	2.2622
SIPHAT	178	−0.0010** (0.0004)	0.3699* (0.2203)	0.0794	1.9856
STEQ	179	0.0004 (0.0002)	0.2187* (0.1292)	0.0181	2.2068
ASSAD	178	−0.0006* (0.0003)	−0.3543* (0.1896)	0.1235	1.9696
GIF-FILTER	178	−0.0011 (0.0008)	−0.6020* (0.3744)	0.0191	1.9952
SITS	178	−0.0001 (0.0005)	−0.4083* (0.2324)	0.0325	2.0353
ADWYA	178	−0.0003 (0.0004)	−0.4202* (0.2527)	0.0383	2.0140
POULINA GP H	178	−0.0003 (0.0003)	−0.3612* (0.2162)	0.0942	2.1641
TUNISIE RE	179	−0.0005 (0.0005)	−0.4092** (0.1850)	0.0184	2.5724
ENNAKL	178	−0.0003 (0.0004)	−0.6518** (0.3252)	0.0920	1.9660
TELNET	178	−0.0004 (0.0003)	−0.2638* (0.1594)	0.0637	2.1172
Attijari Lease	179	−0.0003 (0.0008)	−0.4246* (0.2385)	0.0120	1.6142
HEXABYTE	179	−0.0007 (0.0006)	0.4697* (0.2804)	0.0123	2.8062
NBL	29	−0.0009* (0.0005)	−1.0187* (0.5617)	0.1019	1.6970

Note: The values in parentheses represent the standard errors of the estimators.

*Statistical significance of the variable at a level of 1%.

**Statistical significance of the variable at a level of 5%.

***Statistical significance of the variable at a level of 10%.

4. Empirical analysis

4.1. Earnings announcement's effect following the variable SUE

After estimating the returns of securities in our sample and calculating the abnormal returns, we use a methodology similar to that adopted by Kaestner (2005) in order to detect the anchor bias of investors in the very short-term stock market. This methodology distinguishing between the portfolios can be studied as a function of the given sign of both the SUE and the ΔEPS variables, and then analyzing the evolution of the abnormal returns over a period of 30 days.

4.1.1. Determination of portfolios to be studied

- The first step consists of decomposing our sample of 28 firms into two portfolios depending on the sign of the surprise (SUE variable). Securities with a positive announcement surprise are

grouped together in the same portfolio, while securities with a negative announcement surprise are classified in another portfolio.

- The second step consists of splitting each of these two portfolios obtained according to the evolution of the earning compared to the second half of 2013 (variable ΔEPS_{S2}). Companies with a positive earning change compared to the first half of 2013 are classified in the same portfolio, while firms with lower earning than in the previous semester will be grouped into a second portfolio.

In total, we have broken our sample of 28 companies into four securities portfolios, according to the sign taken by the two variables SUE and ΔEPS.

Table 3 describes these four portfolios such as:

- SUE positive et ΔEPS positive (Portfolio 1);
- SUE positive et ΔEPS negative (Portfolio 2);
- SUE negative et ΔEPS negative (Portfolio 3);
- SUE negative et ΔEPS positive (Portfolio 4).

4.1.2. Results of the portfolio study

After determining abnormal returns on four securities portfolios, we move to the next step of analysis, which is to calculate the average of the abnormal returns per date in the event window for each portfolio. It has been proposed to study the under-reaction of investors on six windows of different events, each composed of 5 days. Table 4 summarizes the results of average cumulative abnormal returns (CMARs) for our sample of 28 companies.

Our underlying assumption is that if investors under-react to the recent announcement of earnings per share, positive announcement surprise portfolios (SUE > 0) will perform better than those on negative announcement surprise (SUE < 0). Therefore, our study is based on the comparison of abnormal profitability observed after positive and negative surprises.

Table 3. Portfolios under analysis

Portfolio 1	Portfolio2
SUE (+) and ΔEPS (+)	*SUE (+) and ΔEPS (−)*
AMEN BANK	AIR LIQUIDE
ENNAKL	ICF
HEXABYTE	PLACE-TUNISIE
SIMPAR	TUNISIE RE
Portfolio 3	**Portfolio 4**
SUE (−) and ΔEPS (−)	*SUE (−) and ΔEPS (+)*
ATTIJARI LEASE	ADWYA
ATL	ASSAD
BH	ELECTROSTAR
BNA	MNP
BT	NBL
CIL	POULINA
GIF-FILTER	SFBT
SITS	SIPHAT
SOTUMAG	STEQ
TUNI-INVEST	TELNET

Table 4. Evolution of abnormal returns over a period of 30 days

	SUE > 0		SUE < 0	
	Δ EPS > 0	Δ EPS < 0	Δ EPS < 0	Δ EPS > 0
	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4
Interval of time	**CMAR**	**CMAR**	**CMAR**	**CMAR**
[0,5]	0.0257	−0.0093	−0.0367	−0.0092
[0,10]	0.0317	−0.0061	−0.0367	−0.0091
[0,15]	0.0323	−0.0079	−0.0414	−0.0132
[0,20]	0.0331	−0.0010	−0.0486	−0.0144
[0,25]	0.0222	−0.0022	−0.0540	−0.0100
[0,30]	0.0267	−0.0001	−0.0532	−0.0106

Table 5 reports the daily mean abnormal yields for our four portfolios studied. Results show that portfolios with positive SUE and ΔEPS generally have higher mean abnormal returns than those with negative SUE and ΔEPS. In order to test the significance of this hypothesis, the Student test was performed on an average daily abnormal yields (MAR). Results of significance test are summarized in the last column of Table 5. The Student test shows that the mean abnormal yields are generally statistically significant.

Theoretically the prices' adjustment after the result announcement must be identical for these two announcement surprises. However, in the face of anchoring bias affecting investors, the difference between these two returns will be non-zero, and will depend on the evolution of earnings per share. From Table 5, it can be seen that the abnormal profitability ratios (CMARs) of the positive announcement surprise portfolios are higher than those of negative one, regardless of the event window chosen. Portfolios 1 and 2 with a positive SUE have higher abnormal returns than portfolios 3 and 4 with a negative SUE. In fact, these results show a significant price reaction within 5 days of the profit announcement when the surprise has the same sign as the change in earning; this is the case for portfolios 1 and 3. This reaction is accentuated within 20 days of the announcement. Portfolio 1 returns are the highest among the four portfolios. However, the abnormal returns of portfolio 3 are the lowest in our sample, whatever the window of event studied.

It should also be noted that portfolio 2 displaying an announcement surprise with a sign opposite to that of portfolio 1, has achieved lower abnormal returns than the latter. This important result can be explained by the negative evolution of EPS. Indeed, investors remained anchored to previous earnings which are higher than earnings realized during the second half of 2013, which caused an under-reaction of the market following result announcement. Investors have not adjusted their beliefs to the new information. Indeed, in the absence of this bias, these two portfolios should record absolutely identical returns.

On the other hand, we note that portfolio 4 has exhibited abnormal returns higher than those of portfolio 3, despite the fact that it has an announcement surprise of the same sign (negative SUE). These different abnormal returns could be explained by the change in earning. This confirms the anchoring bias of investors.

4.1.3. Graphical presentation of results

Figure 1 illustrates our main empirical results. It validates our underlying assumption that if investors under-react to information, then good surprise's portfolios perform better than bad surprise's ones. Graphically, the cumulative abnormal returns of the positive announcement surprise portfolios are significantly higher than those of negative announcement ones. These results confirm the conclusion of Kaestner (2005): "The price adjustment is not simply a function of the new information brought to the market (surprise), but depends also of the difference between this information and

Table 5. Student's test of mean abnormal returns

	SUE > 0		SUE < 0		
	Δ EPS > 0	Δ EPS < 0	Δ EPS < 0	Δ EPS > 0	
	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	
Day	MAR	MAR	MAR	MAR	*p*-value
0	−0.0043	−0.0013	−0.0153	−0.0038	0.0105***
1	0.0129	−0.0065	−0.0032	−0.0020	0.8231
2	0.0050	0.0008	−0.0027	0.0009	0.0130**
3	0.0115	0.0003	−0.0029	0.0001	0.0440**
4	−0.0046	−0.0040	0.0031	−0.0028	0.0187**
5	0.0052	0.0013	−0.0154	−0.0017	0.3702
6	0.0037	0.0010	0.0001	−0.0016	0.0003***
7	0.0028	0.0000	0.0010	0.0030	0.0014***
8	−0.0007	−0.0013	−0.0016	−0.0031	0.0638*
9	0.0010	0.0029	0.0005	0.0010	0.0572*
10	−0.0008	0.0004	−0.0002	0.0009	0.0825*
11	−0.0051	0.0003	−0.0008	−0.0018	0.4249
12	0.0003	−0.0018	0.0000	0.0011	0.0899*
13	−0.0011	−0.0003	−0.0005	−0.0021	0.1030*
14	−0.0000	0.0007	−0.0020	−0.0012	0.0010***
15	0.0065	−0.0005	−0.0012	0.0000	0.0841*
16	0.0004	0.0019	−0.0020	0.0004	0.0136***
17	−0.0058	0.0000	−0.0007	0.0001	0.7475
18	0.0034	−0.0006	−0.0007	0.0028	0.1099*
19	−0.0005	0.0015	−0.0008	−0.0021	0.6392
20	0.0032	0.0038	−0.0028	−0.0025	0.7809
21	−0.0045	0.0008	−0.0012	0.0018	0.7984
22	0.0028	0.0005	−0.0002	0.0006	0.0358**
23	−0.0000	−0.0015	0.0010	−0.0006	0.7509
24	−0.0005	−0.0007	−0.0044	0.0021	0.8001
25	−0.0084	−0.0003	−0.0005	0.0003	0.4977
26	0.0018	−0.0005	0.0034	0.0002	0.0429**
27	−0.0027	0.0006	0.0013	−0.0013	0.8190
28	−0.0000	0.0044	−0.0030	−0.0024	0.5814
29	0.0011	−0.0014	−0.0002	0.0016	0.0342**
30	0.0042	−0.0010	−0.0006	0.0012	0.0116**

*Statistical significance of the variable at a level of 1%.

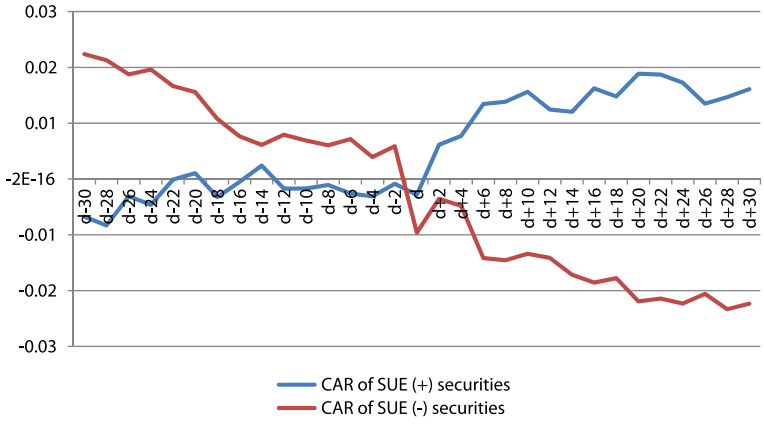
**Statistical significance of the variable at a level of 5%.

***Statistical significance of the variable at a level of 10%.

the anchor information, here constituted by the previous earning". It is noted that this reaction increases over time in a first place before eventually decreasing. A certain kind of return adjustment took place.

Overall, these results show that the good new stocks outperform the bad new ones after the announcement of results. Thus, investors react positively (negatively) to the recent announcement of good (bad) news. These results corroborate the assumption of investors' under-representation to results. They are consistent with Bernard and Thomas (1989) studies, which highlight the fact that

Figure 1. CAR comparative graph to the earnings surprise.



investors take time to revise their valuation. This psychological bias, namely the anchoring mechanism, served as a first hypothesis in the generation of the under-reaction phenomenon in the behavioral model of Barberis et al. (1998). This bias is only a manifestation of this under-reaction of the market where the investor does not sufficiently revise his belief due to the specificity of recent information which is the announcement of results.

4.2. Persistence of earnings announcement's effect following the variable REV

This second portfolio study reanalyzes the anchoring bias of investors on the Tunisian stock market, dealing with the reaction of stock prices following the revision of forecast earnings. Using the same methodology used in the previous portfolio study, we question the persistence of the earnings effect and anchor bias following the variable REV.

In order to analyze the effect of the earning revision on market investors and the performance of securities, we will break down our sample into four portfolios according to the sign given by the variables REV and ΔEPS. This decomposition allows us to determine and compare the abnormal performance of securities for each portfolio after the revision of earning forecasts.

4.2.1. Determination of portfolios to be studied

The first step is to decompose our sample of 28 firms into two portfolios, according to the sign of the revision (variable REV). Securities with a positive revision are grouped in the same portfolio, while securities with a negative revision are classified in another portfolio.
The second step consists in splitting each of these two portfolios obtained according to the evolution of the earning in 2013 (variable ΔEPS). Companies with positive earning changes are classified in the same portfolio, and firms with lower earning than in the previous half of the year will be grouped into a second portfolio.
In total, we broke our sample into four securities portfolios, according to the signs taken by the two variables REV and ΔEPS. Table 6 describes these four portfolios such follows:

- REV positive and ΔEPS positive (Portfolio 1);
- REV negative and ΔEPS positive (Portfolio 2);
- REV positive and ΔEPS negative (Portfolio 3);
- REV negative and ΔEPS negative (Portfolio 4).

4.2.2. Results of the portfolio study

The determination of the abnormal returns in these four securities portfolios allows us to calculate the mean of the abnormal returns per date in the event window for each portfolio. Similarly to the

Table 6. Portfolios under analysis

Portfolio 1	Portfolio 2
ΔEPS (+) and REV (+)	*ΔEPS (+) and REV (−)*
ADWYA	ATL
AIR LIQUID	BT
ASSAD	ELECTROSTAR
GIF FILTER	ENNAKL
POULINA	NBL
SFBT	PLAC TSIE
SIMPAR	SITS
SIPHAT	STEQ
TUNISIE RE	TELNET
Portfolio 3	**Portfolio 4**
ΔEPS (−) and REV (+)	*ΔEPS (−) and REV (−)*
BH	AMEN BANK
BNA	ATTIJARI LEASE
CIL	ICF
HEXABYTE	TUNINVEST
MONOPRIX	
SOTUMAG	

previous portfolio study focusing on the variable SUE, it was also proposed to study investors' under-reaction on six windows of different events, each composed of 5 days. Table 7 summarizes the results of cumulative mean abnormal returns (CMARs) for our sample.

Our hypothesis is that if investor under-react to the revision of earning per share forecasts, then the positive revision portfolios (REV > 0) will perform better than negative revision ones (REV < 0). Therefore, our study is based on the comparison of abnormal profitability observed ex-post, after a surprise of positive or negative announcement following the revision of earnings forecasts.

Results in Table 7 seem to validate the earnings announcement effect following the forecasts revision (REV) as well as the under-reaction of investors on the Tunisian stock market. Indeed, there is a difference of abnormal returns between the portfolios with positives revisions on the one hand and those with negatives revisions on the other. Among the four portfolios studied, returns from portfolio 1 with positives values of REV and ΔEPS are the highest ones. Results indicate a positive reaction during the 5 days following the earnings announcement which increases during the following

Table 7. Evolution of abnormal returns over a period of 30 days

	ΔEPS > 0		**ΔEPS < 0**	
	REV > 0	**REV < 0**	**REV > 0**	**REV < 0**
	Portfolio 1	**Portfolio 2**	**Portfolio 3**	**Portfolio 4**
Interval of time	**CMAR**	**CMAR**	**CMAR**	**CMAR**
[0,5]	0.0306	0.0168	0.0155	−0.0088
[0,10]	0.0315	0.0093	0.0085	−0.0123
[0,15]	0.0503	0.0085	0.0149	−0.0086
[0,20]	0.0528	0.0160	0.0147	−0.0237
[0,25]	0.0507	0.0061	0.0067	−0.0198
[0,30]	0.0558	0.0109	0.0101	−0.0160

30 days. However, the abnormal returns of portfolio 4 are negatives and are the lowest in our sample whatever the window of event studied.

Table 8 reports the daily mean abnormal yields for our four portfolios studied. Results show that portfolios with positive REV and ΔEPS generally have higher mean abnormal returns than those with negative REV and ΔEPS. We conclude that securities with a high-earning forecast revision outperform the low-earning forecast revision ones. To test the significance of results, the Student test was performed on daily mean abnormal returns (MAR). Test results are summarized in the last column of Table 8. The Student test indicates that the mean abnormal yields are generally statistically significant.

Table 8. Student's test of mean abnormal returns

	ΔEPS > 0		ΔEPS < 0		
	REV > 0	REV < 0	REV > 0	REV < 0	
	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	
Day	MAR	MAR	MAR	MAR	*p*-value
0	0.0066	−0.0031	−0.0064	−0.0057	0.3634
1	0.0037	0.0091	0.0039	−0.0001	0.0125**
2	0.0083	−0.0023	−0.0020	−0.0025	0.7896
3	0.0067	0.0001	0.0057	0.0047	0.0981*
4	0.0047	0.0075	0.0113	−0.0032	0.0099***
5	0.0003	0.0054	0.0028	−0.0019	0.3998
6	−0.0028	0.0006	−0.0044	−0.0003	0.0459**
7	−0.0008	−0.0029	−0.0009	−0.0018	0.0025***
8	0.0050	0.0000	−0.0004	0.0031	0.3528
9	−0.0000	−0.0008	0.0022	−0.0029	0.0875*
10	−0.0003	−0.0045	−0.0035	−0.0014	0.0025***
11	0.0047	−0.0010	0.0021	0.0016	0.4597
12	0.0046	−0.0007	−0.0003	−0.0038	0.9745
13	0.0026	0.0008	−0.0002	−0.0004	0.7272
14	0.0048	0.0007	0.0020	0.0055	0.0989*
15	0.0017	−0.0005	0.0027	0.0008	0.7801
16	−0.0011	0.0011	0.0009	−0.0032	0.0782*
17	0.0013	−0.0004	0.0018	−0.0030	0.7243
18	0.0039	0.0018	0.0000	−0.0061	0.8506
19	0.0054	0.0051	0.0001	0.0005	0.0967*
20	−0.0070	−0.0002	−0.0032	−0.0032	0.0255**
21	0.0002	−0.0022	0.0000	0.0028	0.4802
22	−0.0022	0.0000	−0.0018	−0.0049	0.0603*
23	0.0006	−0.0029	−0.0064	0.0032	0.1058*
24	0.0002	−0.0025	0.0004	0.0008	0.0872*
25	−0.0010	−0.0021	−0.0002	0.0019	0.0867*
26	−0.0003	−0.0029	−0.0040	0.0066	0.3194
27	0.0070	0.0055	−0.0008	−0.0008	0.0367**
28	−0.0029	0.0037	0.0057	−0.0014	0.6566
29	0.0010	0.0019	0.0020	0.0004	0.5546
30	0.0002	−0.0035	0.0003	−0.0009	0.0702 *

*Statistical significance of the variable at a level of 1%.

**Statistical significance of the variable at a level of 5%.

***Statistical significance of the variable at a level of 10%.

On the other hand, it can be seen that portfolio 3 exhibiting the same sign of earning revision as portfolio 1, has achieved mean abnormal returns that are generally lower than the latter. This result is explained by the negative evolution of EPS and reflects the investors' anchor to previous earnings which are lower than those realized during the second half of 2013. This market reaction is the consequence of result announcement. Similarly, for portfolios 2 and 4 which exhibited a negative earning revision have generally achieved higher mean abnormal returns. This result can be explained by the positive evolution of EPS and reflects the over-reaction of investors. In both cases, investors have not adjusted their beliefs to the new information.

4.2.3. Graphical presentation of results

Figure 2 illustrates our results. It seems to confirm our first observation that investors under-react to bad news and over-react to good news. Graphically, the cumulative abnormal returns of the positive earnings revision portfolios are significantly higher than those of the negatively revised portfolios.

This finding shows that the information provided by the revision of earnings forecasts is not immediately included in the price, but there is an anchoring bias in relation to the past earnings, as well as on the investor time of response to the new information provided by the market. Abnormal returns are, thus, observed between the positive and negative earnings revision portfolios. This result corroborates the studies of Jacquillat, Roger, and Grandin (1989), and Grandin (1995) on the French stock market, and the work of Liu, Strong, and Xu (2003) on the English market namely from the market to earning revision. This second test shows a persistence of the result announcement effect following the revision of earnings forecasts on the Tunisian stock market.

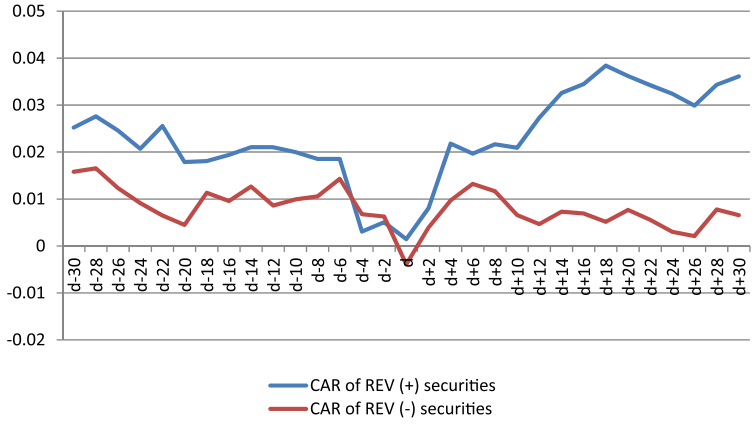
4.3. Earnings announcement's effect following the interaction of variables SUE and REV

In addition, we examine the effect of earnings announcement and anchoring bias following the interaction of variables SUE and REV on the one hand, and the change in real earnings per share ΔEPS on the other hand. Our analysis consists on evaluating their combined effect in order to check the robustness of the psychological bias of investors when revising earnings on the Tunisian stock market.

4.3.1. Determination of portfolios to be studied

Our methodology is similar to previous study but this time portfolios are composed according to three combined variables ΔEPS, SUE, and REV. The first step consists of decomposing our sample into two portfolios according to the sign of the change in EPS (variable ΔEPS). Securities with a positive change are grouped in the same portfolio, while securities with a negative variation are classified in another portfolio. Then these two portfolios obtained will be split according to the sign of the variables of announcement surprise (SUE) and earnings revision (REV). Companies with positive surprise and revision are classified in the same portfolio, and firms with negative surprise and revision will be grouped into a second portfolio. Our sample of 28 firms is reduced to 25 because three of them have an opposite sign of the REV and SUE variables and were eliminated.

Figure 2. CAR comparative graph to the earnings revision.



Finally, we obtain four portfolios of securities whose mean and cumulative abnormal returns will be evaluated in the following. Table 9 describes these four portfolios such as:

- REV and SUE positives, and ΔEPS positive (Portfolio 1);
- REV and SUE negatives, and ΔEPS positive (Portfolio 2);
- REV and SUE positives, and ΔEPS negative (Portfolio 3);
- REV and SUE negatives, and ΔEPS negative (Portfolio 4).

4.3.2. Results of the portfolio study

Table 10 summarizes the results of cumulative mean abnormal returns (CMARs) for our sample of 25 companies studied in the event window centered on the projected earnings revision date. Investor reaction is also assessed on six different event windows, each composed of 5 days.

Previous results are confirmed. Portfolios with positive surprise and revision of earnings outperformed those with negative surprise and revision. Indeed, the differences between the ex-post cumulative mean abnormal returns of the portfolios with negative surprise and revision of earnings (portfolio 4) and the positive ones (portfolio 1) over 5 days, 15 days, and 1 month are, respectively, equal to −3.28, −6.77, and −7.78%.

Table 11 reports the daily mean abnormal yields for our four portfolios studied. Results show that portfolios with positive ΔEPS, REV, and SUE generally have higher mean abnormal returns than those with negative ΔEPS, REV, and SUE.

To test the significance of these results, the Student test was performed on daily mean abnormal returns (MAR). Test results are summarized in the last column of Table 11. Results on mean abnormal returns are generally statistically significant. As before, our results seem to confirm the persistence of the announcement effect of earnings on the Tunisian stock market following the interaction

Table 9 Portfolios under analysis

Portfolio 1	**Portfolio 2**
ΔEPS (+), REV (+) and SUE (+)	*ΔEPS (+), REV (−) and SUE (−)*
AIR LIQUIDE	ATL
ADWYA	ATTIJARI LEASE
ASSAD	BT
POULINA	ENNAKL
SIPHAT	NBL
	SITS
	STEQ
	TELNET
Portfolio 3	Portfolio 4
ΔEPS (−), REV (+) and SUE (+)	*ΔEPS (−), REV (−) and SUE (−)*
BNA	ELECTROSTAR
CIL	ICF
HEXABYTE	PLACE TSIE
MONOPRIX	TUNI-INVEST
SIMPAR	
SFBT	
SOTUMAG	
TUNISIE-RE	

Table 10. Evolution of abnormal returns over a period of 30 days

	ΔEPS > 0		ΔEPS < 0	
	REV > 0 SUE > 0	REV < 0 SUE < 0	REV > 0 SUE > 0	REV < 0 SUE < 0
	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4
Interval of time	**CMAR**	**CMAR**	**CMAR**	**CMAR**
[0,5]	0.0315	0.0147	0.0155	−0.0012
[0,10]	0.0378	0.0071	0.0121	−0.0047
[0,15]	0.0571	0.0103	0.0187	−0.0106
[0,20]	0.0601	0.0161	0.0249	−0.0185
[0,25]	0.0562	0.0083	0.0227	−0.0184
[0,30]	0.0666	0.0124	0.0249	−0.0112

Table 11. Student's test of mean abnormal returns

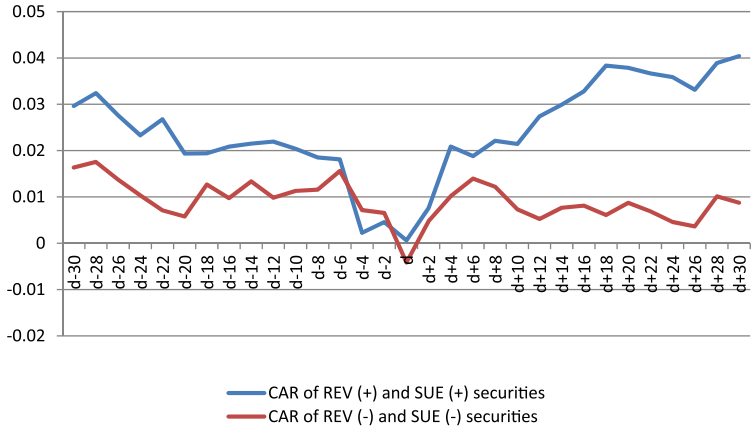
	ΔEPS > 0		ΔEPS < 0		
	REV > 0 SUE > 0	REV < 0 SUE < 0	REV > 0 SUE > 0	REV < 0 SUE < 0	
	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	
Day	**MAR**	**MAR**	**MAR**	**MAR**	***p*-value**
0	0.0023	−0.0040	−0.0004	−0.0043	0.3634
1	0.0035	0.0094	0.0031	0.0011	0.0125**
2	0.0074	−0.0007	0.0022	−0.0042	0.7896
3	0.0128	0.0023	0.0015	−0.0020	0.0981*
4	0.0053	0.0033	0.0085	0.0069	0.0099***
5	0.0000	0.0044	0.0004	0.0013	0.3998
6	−0.0021	0.0012	−0.0024	−0.0013	0.0459**
7	−0.0001	−0.0032	0.0003	−0.0015	0.0025***
8	0.0082	0.0004	0.0000	0.0019	0.3528
9	0.0000	−0.0010	0.0025	−0.0022	0.0875*
10	0.0002	−0.0050	−0.0039	−0.0003	0.0025***
11	0.0023	0.0012	0.0018	−0.0030	0.4597
12	0.0061	−0.0035	0.0025	0.0016	0.9745
13	0.0030	0.0013	−0.0011	0.0000	0.7272
14	0.0020	0.0025	0.0019	−0.0005	0.0989*
15	0.0056	0.0017	0.0014	−0.0038	0.7801
16	−0.0006	0.0016	0.0002	−0.0015	0.0782*
17	0.0039	0.0008	0.0018	−0.0064	0.7243
18	0.0023	0.0001	0.0031	−0.0015	0.8506
19	0.0006	0.0032	0.0062	0.0049	0.0967*
20	−0.0032	−0.0001	−0.0053	−0.0033	0.0255**
21	−0.0032	−0.0008	0.0039	−0.0005	0.4802
22	−0.0033	−0.0028	−0.0017	0.0025	0.0603*
23	0.0030	0.0005	−0.0042	−0.0050	0.1058*
24	0.0001	−0.0038	0.0009	0.0046	0.0872*
25	−0.0005	−0.0007	−0.0010	−0.0013	0.0867*
26	0.0021	−0.0024	−0.0044	0.0048	0.3194
27	0.0087	0.0048	0.0014	0.0024	0.0367**
28	−0.0011	0.0037	0.0031	−0.0002	0.6566
29	−0.0027	0.0009	0.0024	0.0021	0.5546
30	0.0032	−0.0030	−0.0002	−0.0019	0.0702*

*Statistical significance of the variable at a level of 1%.

**Statistical significance of the variable at a level of 5%.

***Statistical significance of the variable at a level of 10%.

Figure 3. CAR comparative graph to the earnings surprise and revision.



of surprise and revision variables (SUE and REV). Portfolios with negative surprise and revision of earnings experience lower performance than portfolios with positive surprise and revision.

The divergence of results following the positive or negative sign taken by the evolution of earnings per share (ΔEPS) confirms the importance of investors' anchoring bias to the past earnings. Results are biased by this latter variable. A negative change in past earnings generally corresponds to a mean abnormal return lower than that associated with a positive change, although the surprise and revision of forecasts have the same positive sign. Similarly, when the evolution of real earnings is favorable, and although negative surprise and revision forecasts, the mean abnormal return is clearly higher than that of the case of an unfavorable return evolution.

4.3.3. Graphical presentation of results

Figure 3 illustrates our results. Graphically, the cumulative abnormal returns of positive earnings surprise and revision portfolios are significantly higher than those of negative surprise and revision ones.

This later test on the result announcement effect confirms our first results when the earnings announcement effect was analyzed according to the SUE and REV forecast earnings variables separately. This effect of result announcement following the interaction of earnings surprise and revision is due to the behavior of investors under psychological biases as Bernard and Thomas (1989, 1990) studies show. It is an under-reaction of investors after recent earnings announcement.

5. Conclusion

This paper revisits the earnings announcement effect on the Tunisian stock market over the year 2013. It relied on two earnings surprise measures: earnings forecast errors (SUE) and earnings forecast revisions (REV).

Our results show a persistence of the earnings announcement effect. The reaction of the market consecutively to a publication of result is not only based on the information actually made during this announcement. Investors systematically extrapolate the received signal and over-react, causing excessive stock price reaction. When excessive expectations are not confirmed by the following surprise, a phenomenon of correction occurs with cumulative abnormal returns contrary to the initial over-reaction. The reaction of the price to the announcement of the realized earnings per share corresponds in part to the correction of this previous under-reaction and results for a given surprise of announcement by higher abnormal returns in the event of a positive change in earnings. Evidence proves that anchoring to past earnings is translated at the time of the announcement by a price adjustment which is not only a function of the new information but also of the anchor value. Our empirical illustrations largely validate the lessons of behavioral models particularly those of Kaestner

(2005), and Barberis et al. (1998). Recent announcement is not only a function of unexpected earnings (the forecasting error of analysts) but also a function of previous earnings per share that is an important anchor value for investors.

In addition to these confirmations, it has been found that the psychological biases of the investors and the effect of earnings announcement persists even in the revision of actual and forecast results of the financial analysts because they are themselves subjected to these biases. Our portfolio study verifies that investors are under-reacting to the revision of earnings per share forecasts and that in this way positive revision portfolios will perform better than those found on negatively revised portfolios. The empirical evidence validates our fundamental theoretical hypothesis according to which the psychological biases stemming from the effect of revision of the forecast profit are related to the abnormal profitability of the securities. We can highlight the importance of the revision effect on the behavior of investors on the one hand, and the informational content of the analysts' forecasts and the biases that they can lead on the other. We make general recommendations on the Tunisian stock market. Financial analysts are called upon to improve the quality of their forecasts and subsequently their earnings revisions, given that investors' reaction to the market is highly dependent on them and is reflected in the securities return. This makes it necessary to reduce forecast errors and to take them into account in revisions.

At the end of this paper, we recognize that the implications and recommendations of this study should be interpreted with caution because of the small number of firms operating on the Tunisian stock market. However, this weakness is the major obstacle facing the study of emergent stock markets that must be remedied.

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Author details
Ahmed Bouteska[1]
E-mail: ahmedcbouteska@gmail.com
ORCID ID: http://orcid.org/0000-0002-5710-501X
Boutheina Regaieg[2]
E-mail: b.regaieg@yahoo.fr
[1] Faculty of Economics and Management of Tunis, University of Tunis El Manar, Tunis, Tunisia.
[2] Faculty of Law, Economics and Management of Jendouba, University of Jendouba, Jendouba, Tunisia.

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References

Abarbanell, J., & Bernard, V. (1992). Tests of analysts' overreaction/ under-reaction to earnings information as an explanation for anomalous stock price behavior. *The Journal of Finance, 47*, 1181–1207. https://doi.org/10.1111/j.1540-6261.1992.tb04010.x

Affleck-Graves, J., & Mendenhall, R. (1992). The relation between the value line enigma and post-earnings-announcement drift. *Journal of Financial Economics,* 31, 75–96. https://doi.org/10.1016/0304-405X(92)90012-M

Ball, R., & Bartov, E. (1996). How naïve is the stock market's use of earning information. *Journal of Accounting and Economics, 21*, 319–337. https://doi.org/10.1016/0165-4101(96)00420-X

Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research,* 6, 159–178. https://doi.org/10.2307/2490232

Ball, R., Kothari, S. P., & Watts, R. (1993). Economics determinants of the relation between earnings changes and stock returns. *The Accounting review, 68*, 622–638.

Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics,* 49, 307–343. https://doi.org/10.1016/S0304-405X(98)00027-0

Bernard, V. L. (1993). Stock price reactions to earnings announcements: A summary of recent anomalous evidence and possible explanations. In *Advances in Behavioral Finance/Thaler Richard H., Russel Sage Fondation*, 303–340.

Bernard, V. L., & Thomas, J. K. (1989). Post-earnings-announcement drift: Delayed price response or risk premium? *Journal of Accounting Research (Supplement), 27*, 1–36. https://doi.org/10.2307/2491062

Bernard, V., & Thomas, J. (1990). Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics, 13*(4), 305–340. https://doi.org/10.1016/0165-4101(90)90008-R

Chan, L. K., Jegadeesh, N., & Lakonishok, J. (1996). Momentum strategies. *The Journal of Finance, 51*, 1681–1713. https://doi.org/10.1111/j.1540-6261.1996.tb05222.x

Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under – overreaction. *Journal of Finance, 53*, 1893–1885.

De Bondt, W. F. M., & Thaler, R. (1985). Does the stock market overreact? *The Journal of Finance, 40*, 793–805. https://doi.org/10.1111/j.1540-6261.1985.tb05004.x

De Bondt, W. F. M., & Thaler, R. (1987). Further evidence on investor overreaction and stock market seasonality. *The Journal of Finance, 42*, 557–581. https://doi.org/10.1111/j.1540-6261.1987.tb04569.x

Delong, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1991). Positive feedback investment strategies and destabilizing rational speculation. *Journal of Finance, 45*, 379–395.

Fama, E. (1991). Efficient capital markets: II. *The Journal of Finance, 46*(5), 1575–1617. https://doi.org/10.1111/j.1540-6261.1991.tb04636.x

Fama, E. (1998). Market efficiency, long term returns and behavioral finance. *Journal of Financial Economics, 49*(3), 283–306. https://doi.org/10.1016/S0304-405X(98)00026-9

Fama, E. F., Fisher, L., Jensen, M., & Roll, R. (1969). The adjustment of stock prices to new information. *International Economic Review, 10*(1), 1–21.
Fama, E. F., & French, K. (1992). The cross-section of expected stock returns. *The Journal of Finance, 47* n°2 (June), 427–465. https://doi.org/10.1111/j.1540-6261.1992.tb04398.x
Fama, E. F., & French, K. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33*, 3–56. https://doi.org/10.1016/0304-405X(93)90023-5
Fama, E. F., & French, K. (1995). Size and book-to-market factors in earnings and returns. *The Journal of Finance, 50*, 131–155. https://doi.org/10.1111/j.1540-6261.1995.tb05169.x
Fama, E. F., & French, K. R. (1996). Multifactor explanations of asset pricing anomalies. *Journal of Finance, 51*, 55–84.
Gajewski, J. F. (2000). *Frictions et asymétrie d'information sur les marchés d'actions*. Paris: ECONOMICA.
Grandin, P. (1995). *Production d'informations privées et gestion de portefeuille*. Paris: Collection Finance, PUF.
Hong, H., & Stein, J. C. (1999). A unified theory of under-reaction, momentum trading and overreaction in asset markets. *The Journal of Finance, 54*, 2143–2184. https://doi.org/10.1111/0022-1082.00184
Jacquillat, B., Roger, P., & Grandin, P. (1989). *Avantage informationnel d'un consensus de marché et rentabilités boursières* Cahier de recherches du CEREG, n° 8905.
Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance, 48*(1), 65–91. https://doi.org/10.1111/j.1540-6261.1993.tb04702.x
Kaestner, M. (2005, September). *Prévisions de résultat et réactions : Etude de deux sous-réactions sous l'angle du biais d'ancrage*. Montpellier: Montpellier University Seminar.
Kahneman, D., & Tversky, A. (1982). The psychology of preferences. *Scientific American, 246*, 160–173. https://doi.org/10.1038/scientificamerican0182-160
Liu, W., Strong, N. C., & Xu, X. (2003). Post-earnings-announcement drift in the UK. *European Financial Management, 9*, 89–116. https://doi.org/10.1111/eufm.2003.9.issue-1
Ou, J., & Penman, S. (1989a). Financial statement analysis and the prediction of stock returns. *Journal of Accounting and Economics, 11*(4), 295–329. https://doi.org/10.1016/0165-4101(89)90017-7
Ou, J., & Penman, S. (1989b). Accounting measurement, price-earnings ratio, and the information content of security prices. *Journal of Accounting Research, 27*(Supplement), 111–144. https://doi.org/10.2307/2491068
Poteshman, A. M. (2001). Underreaction, Overreaction, and Increasing Misreaction to Information in the Options Market. *The Journal of Finance, 56*(3), 851–876. https://doi.org/10.1111/0022-1082.00348
Rangan, S., & Sloan, R. G. (1998). Implications of the integral approach to quarterly reporting for the post-earnings-announcement drift. *The Accounting Review, 73*(3), 353–371.
Soffer, L. C., & Lys, T. (1999). Post-earnings announcement drift and the dissemination of predictable information. *Contemporary Accounting Research, 16*, 305–331. https://doi.org/10.1111/care.1999.16.issue-2
Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology, 5*, 207–232. https://doi.org/10.1016/0010-0285(73)90033-9
Tversky, A., & Kahneman, D. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–292.
Watts, R. L. (1978). The time series behavior of quarterly earnings announcements. *Journal of Financial Economics,6* (2–3), 127–150. https://doi.org/10.1016/0304-405X(78)90027-2