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## Abstract

We complement a former study by Jørgensen, Moritzen and Stadtmann (2012) and estimate a reversed news model for the Danish publicly listed football club Brøndby. In addition to match outcome (as in Jørgensen et al.), news related to corporate governance and the financial status are also important.

**JEL classification:** G14, L83, G32

**Keywords:** Reversed News Model, Asset Prices, Stock Market

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# 1 Introduction

Jørgensen et al. (2012) analyze whether company specific news of the publicly listed football club Brøndby can explain changes in the stock price. They focus on match outcome and use betting odds to disentangle gross news from net news (i.e. to distinguish between expected and unexpected). However, recently Brøndby not only caused news related to the football field but also in the financial press. Brøndby first got into a financial crisis<sup>1</sup> and recently recovered from it by finding new investors.

According to the news model, one should in a first step *identify* company specific information and in a second step examine by how much these information influence stock prices. In contrast to this, the *reversed* news model by Ellison and Mullin (2001) flips these steps around: In a first step, one tries to isolate large stock price changes not explained by the overall stock market. In a second step, one searches for company specific information that might have caused these changes.

As Stadtmann (2006) points out, the reversed news model can be utilized as a robustness check for the news model. In this paper we use the reversed news model to cross-check the results by Jørgensen et al. (2012). We show that Brøndby stock prices are not only independent from short- to medium term market trends but also that they strongly depend on company related financial news.

The remainder of the paper is structured as follows: The next section provides a short overview of the methodology. Section 3 discusses the empirical evidence on the investigated asset's dependency on market trends. Section 4 presents shocks in the asset's operative business dimension that caused changes in the stock price. Section 5 concludes.

## 2 Methodology

Many empirical studies (e.g. Marsh and Merton (1986), Summers (1986), Campbell and Shiller (1988), Lim (2001) or Ofek and Richardson (2002)) show that stock prices do not only depend on fundamentals but on the gap between realized and expected information with respect to period  $t$ . Therefore, the effect of expectations on stock prices can be written as:

$$s_t = \gamma z_t + b(E_t[s_{t+1}] - s_t), \quad b > 0, \quad (1)$$

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<sup>1</sup>Cf. <http://politiken.dk/sport/fodbold/superligaen/ECE1768425>.

where  $s_t$  symbolizes the asset price,  $z_t$  denotes a set of fundamental data and  $\gamma$  and  $b$  are scaling parameters. By adding  $bs_t$  it can be obtained that  $s_t(1 + b) = \gamma z_t + bE_t[s_{t+1}]$  and thus,  $s_t = \gamma(1 + b)^{-1}z_t + b(1 + b)^{-1}E_t[s_{t+1}]$ . Taking expectation regarding more than just one period ahead into account the equation can be solved by iteration:

$$s_t = \gamma(1 + b)^{-1} \left( z_t + \sum_{k=1}^{\infty} \beta^k E_t[s_{t+k}] \right), \quad (2)$$

where  $\beta = b(1 + b)^{-1}$ . Equation (2) represents stock prices taking expectations with an infinite time horizon into account. However, expectations further ahead are increasingly discounted. Deriving expectation errors it can be obtained that

$$s_t - E_{t-1}[s_t] = \gamma(1 + b)^{-1} \left( \underbrace{z_t - E_{t-1}[z_t]}_{f_t} + \underbrace{\sum_{k=1}^{\infty} \beta^k (E_t[z_{t+k}] - E_{t-1}[z_{t+k}])}_{f_{t+k}} \right). \quad (3)$$

Stadtman (2004) goes into details deriving this result. Expectation errors with respect to the stock prices in period  $t$  basically result from two sources:  $f_t$  symbolizes the difference between fundamentals realized in  $t$  and fundamentals expected in  $t - 1$  for  $t$ . Part  $f_{t+k}$  represents news with respect to expected fundamental changes further ahead in the future. Those fundamentals are not realized yet, but changes will also affect asset prices today.

Given rational agents the methodology can focus on short term fundamentals news ( $f_t$ ) that have an immediate stock price impact. Therefore, the reversed news model will be examined in the next section using two essential steps:

- Identification of strong stock price reactions that can be shown not to be determined by general market conditions and
- identification of news that triggered those stock price reactions.

### 3 Empirical Analysis

In order to isolate company specific information from overall stock market tendencies we estimate a modified Capital Asset Pricing Model (CAPM): In contrast to the actual CAPM (which utilizes excess returns), our model relates

daily stock returns of the investigated asset (in this case, Brøndby)<sup>2</sup> to a reference portfolio (in this case, the “OMX Copenhagen 20” index is used).<sup>3</sup> The model is

$$rBrøndby_t = \beta_1 + \beta_2 rOMX_t + u_t, \quad (4)$$

where  $rBrøndby_t$  denotes the daily return of the Brøndby stock,  $rOMX_t$  represents the daily return of OMX and  $u_t$  is an assumed white noise process. Daily returns have been computed using daily stock prices obtained from [www.euroinvestor.com](http://www.euroinvestor.com), the data set consists of 404 observations in the time span from February 28<sup>th</sup> 2011 to October 24<sup>th</sup> 2012.<sup>4</sup> Figure 1 presents Brøndby prices and the OMX index, respectively.

[INSERT FIGURE 1 ABOUT HERE]

If Brøndby stock returns are independent from the market the hypothesis

$$H_0 : \beta_1 \wedge \beta_2 = 0 \text{ vs. } H_1 : \neg H_0$$

must hold. Table 1 presents the regression results. A Wald test could not reject the null hypothesis, empirical p-value = 0.7062.<sup>5</sup> From this it is safe to conclude that Brøndby returns are mostly independent from the reference portfolio and hence, shocks in Brøndby returns are not influenced by market wide shocks.

[INSERT TABLE 1 ABOUT HERE]

## 4 Shocks with Price Impact Potential

In the next step we sort the absolute values of the model’s residuals. The numerically largest of those values determine market-unrelated shocks in the investigated asset returns and must be explained by company specific news. Indeed, for most of the 18 largest returns a new fundamental information can be found. Table 2 presents the results. Most of the shocks identified have been

<sup>2</sup>Brøndby ISIN: DK0010247956.

<sup>3</sup>OMX Copenhagen 20 ISIN: DX0000001376.

<sup>4</sup>The time horizon overlaps with the one used by Jørgensen et al. (2012) on purpose.

<sup>5</sup>Cf. Wald (1943).

caused by financial events that will be explained in the following.<sup>6</sup>

[INSERT TABLE 2 ABOUT HERE]

### **Investment group with 150 million Kroner**

Brøndby has been in an economic and sportive crisis during the investigated period. The comparatively poor performance on the field<sup>7</sup> has contributed to declining attendance<sup>8</sup>, while excessive salaries for players were signed before the financial crisis.

- On September 13<sup>th</sup> 2012 the newspaper “BT” wrote that Brøndby’s former director Frank Buch Andersen together with an investment group were willing to invest 150 million Danish Kroner in the club, provided that it changes its share structure. The stock increased by 24% that day and the next day it increased again by 15%.
- On September 17<sup>th</sup> 2012 the CEO Tommy Sommer Håkansson said that the board of Brøndby will initiate a dialogue with a group of potential external investors. The stock price increased by 16% that day and by 17% the next day.
- On September 20<sup>th</sup> 2012 evening the chairman of Brøndby’s powerful amateur department, Per Bjerregaad, said that he was open for ideas from the investor group (lead by former CEO Frank Buch Andersen) and their suggested modification of the current market share structure (which was separated into “A” and “B” shares).
- On September 28<sup>th</sup> 2012 a press release by Brøndby confirmed that the club was still talking to Frank Buch Andersen and the club expected to present an agreement in the near future. Stock prices increased by 36% during that day.

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<sup>6</sup>Note that there are several “positive” news resulting in negative price reaction. While this is counterintuitive the explanation might be that a positive impact may increase the stock price at one day and investors sell at the increased prices the next day. This will cause a price pressure the day after the “good” news which may be even stronger than the price increase caused by the positive news. This is also supported by the fact that in all cases where there are positive news and negative price shocks these negative shocks occurred one day after the good news.

<sup>7</sup>Cf. <http://brondby.com/article.asp?aid=33491>.

<sup>8</sup>Cr. <http://brondby.com/unitilskuerstat.asp?fr=1&comp=1>.

### Losses of the holiday pay case

The Danish football arbitration had ruled that Brøndby had to pay 4 million Danish Kroner including interest, penalties and costs to the three players Peter Madsen, Thomas Rasmussen and Martin Ericsson in the so-called “holiday pay case”. The arbitration rendered a judgment that Brøndby had to pay pension and vacation for the three players, while Brøndby was acquitted of the issue of discrimination of foreigners. This meant that the 56 former and current players who had sued Brøndby could also claim money, at the same time engaging a dialogue with the Players Association to try to find a solution to the many cases. The Players Association pointed out that a number of clubs, including Brøndby, had not paid certain salary components to their players. This is according to the current agreement on players’ holiday pay of sign-on fee, sign-off fee and bonuses as well as holiday allowances and pension. The Players Association calculated that Brøndby’s amount was due to almost 16 million Danish Kroner plus an interest claim of 7.4 million Kroner, bringing up a total of 23.4 million Danish Kroner. Since Brøndby’s market cap is about 86.7 million Danish Kroner, the claim amounts over 27% of Brøndby’s total market capitalization. However, this case decreased the stock price “only” by 11%, i.e. 9.5 million Danish Kroner, on September 11<sup>th</sup> 2012.

## 5 Conclusion

Markets that are efficient in Fama’s semi-strong sense<sup>9</sup> are influenced by information on fundamental shocks (news). As was shown by Stadtmann (2006), the football industry proves a very appropriate candidate for applying the news model due to specific characteristics: Signals are easy to quantify, occur solely when the markets are closed and become publicly available to all agents at the very same time. Thus, new information are internalized immediately as they become public. We examine a reversed news model: First we present evidence that the investigated asset develops independently from the comparative market. After that large shocks in the asset’s daily returns were identified. News that are fundamentally able to explain those shocks could be found. The results therefore support the findings by Jørgensen et al. (2012).

Jørgensen et al. (2012) focus on sporting success influences and find that success on the field drives the stock price. In addition to this we find that financial/-corporate governance news also have a huge impact on the stock prices.

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<sup>9</sup>Cf. Fama (1970).



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Table 1: Regression estimates.

Coefficient	Estimated value	Standard error	t-value	p-value
$\hat{\beta}_1$	0.0006073	0.0026601	0.228	0.820
$\hat{\beta}_2$	-0.0793721	0.2088214	-0.380	0.704

$R^2 = 0.0003593$ , adj.  $R^2 = -0.002127$

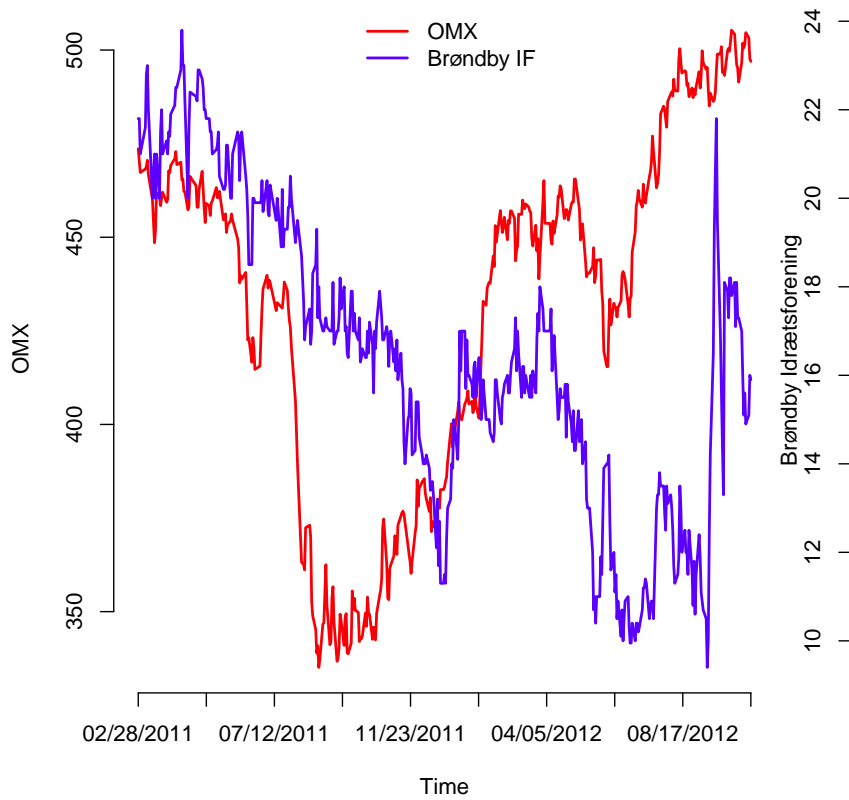


Figure 1: OMX index over time (left scale) and Brøndby stock prices (in Danish Kroner, right scale). Source: [www.euroinvestor.com](http://www.euroinvestor.com)

Table 2: Price shocks in Brøndby stock rates and events.

Number	Date	Price reaction	News	Source
1	09/28/2012	36.02%	Investment group with 150 million Kroner	<a href="http://borsen.dk/nyheder/sport/artikel/1/242194">http://borsen.dk/nyheder/sport/artikel/1/242194</a>
2	09/13/2012	23.86%	Investment group with 150 million Kroner	<a href="http://borsen.dk/nyheder/sport/artikel/1/240996">http://borsen.dk/nyheder/sport/artikel/1/240996</a>
3	07/23/2012	23.58%	Chairman of the board resigns	<a href="http://borsen.dk/nyheder/sport/artikel/1/237466">http://borsen.dk/nyheder/sport/artikel/1/237466</a>
4	09/18/2012	16.92%	Investment group with 150 million Kroner	<a href="http://borsen.dk/nyheder/sport/artikel/1/241263">http://borsen.dk/nyheder/sport/artikel/1/241263</a>
5	09/17/2012	16.10%	Investment group with 150 million Kroner	<a href="http://borsen.dk/nyheder/sport/artikel/1/241263">http://borsen.dk/nyheder/sport/artikel/1/241263</a>
6	09/14/2012	14.51%	Investment group with 150 million Kroner	<a href="http://borsen.dk/nyheder/sport/artikel/1/241093">http://borsen.dk/nyheder/sport/artikel/1/241093</a>
7	08/15/2012	13.43%	N/A	
8	09/24/2012	-13.39%	Investment group with 150 million Kroner	<a href="http://borsen.dk/nyheder/sport/artikel/1/241263">http://borsen.dk/nyheder/sport/artikel/1/241263</a>
9	01/11/2012	13.20%	Apollo continues to sponsor Brøndby	<a href="http://tinyurl.com/9w9vmy5">http://tinyurl.com/9w9vmy5</a>
10	12/21/2011	-11.42%	Danish Bank continues to sponsor Brøndby	<a href="http://brondby.com/print.asp?aid=68853">http://brondby.com/print.asp?aid=68853</a>
11	12/23/2011	-10.98%	Danish Bank continues to sponsor Brøndby	<a href="http://brondby.com/print.asp?aid=68853">http://brondby.com/print.asp?aid=68853</a>
12	05/22/2012	-10.80%	N/A	
13	09/21/2012	-10.54%	Investment group with 150 million Kroner	<a href="http://tinyurl.com/bzvcpln">http://tinyurl.com/bzvcpln</a>
14	09/11/2012	-10.53%	Losses of the holiday pay case	<a href="http://borsen.dk/nyheder/investor/artikel/1/240805">http://borsen.dk/nyheder/investor/artikel/1/240805</a>
15	06/07/2012	-10.50%	Club with the most television viewers in the 2011/2012 season	<a href="http://brondby.com/print.asp?aid=70315">http://brondby.com/print.asp?aid=70315</a>
16	08/24/2011	-10.38%	Signed a national team player, Dennis Rommedahl	<a href="http://borsen.dk/nyheder/investor/artikel/1/213496">http://borsen.dk/nyheder/investor/artikel/1/213496</a>
17	05/31/2012	10.31%	N/A	
18	08/30/2012	-10.26%	Vice director invests money in Brøndby	<a href="http://borsen.dk/nyheder/sport/artikel/1/239802">http://borsen.dk/nyheder/sport/artikel/1/239802</a>