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The Effects of Labour Strikes on the Share Returns of JSE Top 40 Companies

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Abstract: Labour strikes are a platform that enables workers to demonstrate their disagreement and/or their dissatisfaction towards their employer, concerning labour relation issues such as remuneration, working conditions and employee benefits. Labour strikes in South Africa date back to 1922, post the Anglo-Boer war of 1899-1902, within the mining sector and have since become the fabric of our society in correcting historic socio-economic ails of unemployment, minimum wages and inequality. The occurrence of global financial crises of 2008/2009 exposed South Africa's well-hidden vulnerabilities of poverty, unemployment and inequality and resulted in a significant rise in the number of labour strikes. Therefore, the article analyses the effect that labour strikes between 2010-2017 have on the share return of companies that were list on the Johannesburg securities exchange (JSE) index during this timeframe. The results indicate that resolve of protected and unprotected labour strikes affects the share return of JSE Top 40 companies. From an investment perspective, it can be concluded that labour strikes can have severe effects on the share returns of companies listed on a stock exchange. Thus, influencing investor confidence in those companies experiencing the labour strike. **Objectives** The main objective of this article is to determine the effects of protected and unprotected labour strikes, collectively, on the share return of JSE Top 40 companies. The resolve of labour strikes results in the disruption of the day-to-day operations of a firm, loss in market share and subsequently profitability of a firm. The article aims to bridge the gap in academic knowledge on the effects of labour strikes have on the share return of companies list on the JSE Top 40 index. **Prior Work** Researchers have in the past decade examined the effects of labour strikes at length, focusing on the effects of labour strikes on the shareholder value, equity returns, economic performance, and investor confidence of affected companies. Various methods of testing including regression analysis, event study methodology and accounting-based ratio analysis were employed. **Approach** To obtain the research objective, the article made use of a literature review and an empirical study. Secondary data from INET BFA IRESS, the annual industrial action report, newspaper articles and news feeds were used to achieve the articles' empirical analysis. An event study methodology was employed to analyse the secondary data over an event window of 61 days. Thirty days before and after the day of the announcement of the strike, the

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day of the strike considered day zero. To achieve the articles' objectives a trend analysis, z-statistical significance test, a periodic analysis of cumulative average abnormal return (CAAR) and summary significance test on the effects of protected and unprotected labour strikes on the share return of JSE Top 40 companies was conducted. **Results** The trend analysis revealed that the share returns of affected JSE Top 40 companies deteriorate at the start of the wage negotiations, continuing past the day of the announcement and the commencement of the strike. The share returns of affected companies rebound at day 5, taking on a growth trajectory throughout the remainder of the event window. At a 95 per cent confidence interval and 1.96 critical value, the article rejects the null hypothesis with a z-statistic of -2.46, making the statement true for the alternative hypothesis. This affirmed that the resolve of protected and unprotected labour strikes affects the share return of JSE Top 40 companies. **Implications** The article's findings provided knowledge on the effects that protected and unprotected labour strikes have on the share return of JSE Top 40 companies. Due to the unavailability of settlement dates of labour strikes. The article was unable to analyse the effects of short and long term strikes on the share return of affected companies. This further prevents the research from observing at what point do the share returns of affected companies return to equilibrium. The limitation in the lack of data creates the opportunity for further possible research in areas of interest. **Value** The key contribution of the article is to bridge the gap in financial markets' understanding of the effects of protected and unprotected labour strikes, collectively, on the share return of JSE Top 40 companies. The article's findings intend to assist investors and portfolio managers to optimise their share returns during periods of labour strikes. The article further raises consciousness of the impact of wage negotiations on companies and implore bargaining agents to employ an integrative approach when engaging in wage negotiations.

Keywords: labour strikes; JSE Top 40 companies; Event study methodology; protected and unprotected labour strikes; global financial crises

JEL Classification: R23

1. Introduction

Labour strikes in South Africa date back to 1922, post the Anglo-Boer war of 1899-1902, within the mining sector and have since become the fabric of our society in correcting historic socio-economic ails of unemployment, minimum wages and inequality (Norman, 1922). Following the 2008/2009 global financial crises (GFC) the number of labour strikes increased significantly due to the exposure of long-standing structural problems of poverty, unemployment and inequality. The recession which followed the GFC resulted in a loss in consumer purchasing power and an increase in demands for higher wages (Department of Labour, 2016). Men and women across the world are subjected to accepting minimum wages as a result of sluggish global economic conditions (International Labour Organization, 2016). The notion of subscribing to minimum wages has been met with fury and frustration in South Africa's labour market, leading to the rise in labour strikes.

Labour strikes in South Africa more than doubled following the GFC, increasing from 51 in 2010 to 132 in 2017 (Industrial Action Report, 2017). In 2010 a historical number of 20 674 737 working days were lost in production, as a result of prolonged public servant strikes (Industrial Action Report, 2016). The rise in the number of labour strikes was a result of wage discrimination, inequality, and socio-economic conditions (Jorge & Adams, 2018). The reoccurrence of labour strikes in South

Africa between 2010 and 2017 was likened to the certainty of death and taxes (Urbach, 2010). The increase in labour strikes during 2014 dampened investor confidence and brought the country's economy to the brink of recession (Odendaal, 2014).

Labour strikes for businesses mean a disruption in the day-to-day operations and certain cases a complete halt in production (De wet, 2012). The resolve of a labour strike results in a direct deviation in the main purpose of a company, which is to turn a profit and maximise share returns (Mas, 2008). The occurrence of labour strikes results in a loss in the value of a company and subsequently the businesses' market share (Sapa, 2013). The value of a publicly listed company is embedded in the share price of the company (Tremblay, 2006). Investors make use of a company's share price to gauge the market perception of the share and determine whether a company is profitable (Bernstein & Damodaran, 1998). Labour strikes negatively affect investor confidence and subsequently, investors share returns. Researchers have investigated the effects of labour strikes on the share return of publicly listed companies at length. However, little recent work has been done around the effects of labour strikes on the JSE Top 40 index. Making use of the event study methodology, the paper will investigate the effect of labour strikes on the share return of the JSE Top 40 companies.

2. Literature Review

Labour strikes and their effects on financial markets have been researched at length in the past decade. Using regression analysis, event study methodology and accounting-based ratio analysis researchers have analysed the effects that labour strikes have on shareholder value, equity returns, economic performance and investor confidence. Recent studies of Neumann (1980), Bhana (1997), Becker and Olson (1986), DiNardo and Hallock (2000) Davidson *et al.* (1988) Seedat (2013) and Greer *et al.* (1970) are reviewed below:

Neumann (1980) researched the predictability of labour strikes and their effects on the share return of publicly listed companies. Neumann challenges Hick's (1966) rationale that labour strikes are a result of faulty negotiations. Neumann (1980) opposes the narrative that labour strikes are a result of an error in the bargaining process, making labour strikes random and unpredictable. He argued that faulty negotiations are contradictory to the idea of mature collective bargaining. Neumann (1980) held that labour strikes are predictable as a result of political and/or organisational lines, which outlines the need for labour strikes, as they facilitate the union's relevance.

Neumann (1980) believed that the predictability of labour strikes hinged on the set protocols outlined during preparations of wage negotiations. Set protocols are

defined as a "set of rules whose values depend on the cost of bargaining agents allowing a dispute to go unresolved and for alternative methods of resolving labour disputes to take the course". Set protocols are best thought of as a complex mixture of contractual statements and rules for set procedures at a specific event. Neumann (1980) indicates that the idea of bargaining relationships as protocols with behavioural signals from both parties, explains a certain type of predictability in strikes and has implications for the statistical study of several aspects of strike activity, which included the duration of a strike and predictability of the strike.

Neumann (1980) argued that if strikes were unpredictable losses from the strike activity would be concentrated on the day of the strike and if they were completely predictable markets would not factor in the possibility of a strike before the day of the announcement of the day of the strike. Neumann found that several trading days before the commencement of the strike and the end of the strike the share returns of the affected company declines in market value. Neumann further established the share price of the security does not recover from the effects of the strike and that the longer the strike the greater the cost implication to the firm.

Bhana (1997) evaluated the effects of industrial strikes on the value of shares listed on the JSE from 1983 to 1993. He observed the short-term effects of labour strikes on a sample of 50 companies that were continuously listed on the JSE over 10 years. In his study Bhana (1997) found that labour strikes negatively affected the value of a firm's share prices and found that losses incurred were sustained and firms do not recover from them. The study revealed that significant movement in the share price of affected firms was found 5-10 days before the announcement of the strike, on the day of the strike and 10 days after the day of the strike. The study's findings were indicative of the notion that capital markets can anticipate whether the end of a wage agreement will result in a strike or settlement. As a result of the predictability of the strike, Bhana (1997) concluded that there were inefficiencies in the JSE and that the longer the duration of the strike the greater the cost implication for firms.

Becker and Olson (1986) researched the impact of strikes on shareholder equity between 1962 and 1982. The purpose of their study was to examine the economic costs to a firm as a result of work stoppage and to establish how the behaviour of capital markets can be an important measure of collective bargaining outcomes. Becker and Olson (1986) tested whether strikes are not costly to shareholders and whether financial markets can consistently anticipate strike cost in the pre-strike period.

Becker and Olson (1986) found that labour strikes are costly to shareholders and conducted a comparison of wage negotiations which resulted in labour strikes and wage negotiations that ended in a peaceful settlement. The study found that financial markets reacted positively to a peaceful settlement and a bulk of the costs associated with labour strikes were attributed to wage negotiations which resulted in labour

strikes. Becker and Olson (1986) established that financial markets can anticipate the occurrence of a labour strike. The study found that investor's share returns declined significantly days before the announcement of a labour strike. Becker and Olson (1986) found that even though the financial markets could predict labour strike, the market participates significantly under discounted costs of labour strikes.

DiNardo and Hallock (2000) assessed the financial market's interpretation of labour conflict and the effect of major strikes between world wars on detailed industry stock prices. The study made use of a combination of labour and market data from the early 1920s and late 1930s and found that labour strikes have a negative effect on the industry stock value of a firm. The study revealed that prolonged strikes, violent strikes, strikes where unions "win", industry-wide strikes that lead to union recognition, and strikes that lead to large wage increases lead to larger negative share returns than the actual strike itself. The study further establishes that market prices adjust to the arrival of "news" of a strike long before its announcement. DiNardo and Hallock's (2000) study strongly suggests that although the financial markets generally expected unions to "lose", they viewed union victories as quite an important determinant of the share of firm profits going to stockholders.

Seedat (2013) analysed the effects of labour strikes on the share value of the South African gold industry from 2006 to 2012. The study observed the effect of unprotected strikes and protected strikes on the day of the announcement of the strike. In addition, Seedat (2013) evaluated the effects of elongated labour strikes on the share return of affected companies. The study established that labour strikes have a negative effect on the share value of affected securities, with less significance found in unprotected labour strikes. Seedat (2013) attributed his finding to the nature of the strike and states that firms are not financially obligated to meet worker's demands, as a result, no financial implications were perceived by the market. The opposite was found in protected strikes, where greater significance was found in share price due to perceived financial implications of the strike by investors. Seedat (2013) also revealed that strikes that lasted for a shorter period have greater significance than prolonged strikes, proving that strikes that have a shorter duration have greater financial implications. This is due to firms giving into labour unions' high initial demand in the negotiations process after the firm realises its financial capacity to meet their demands and cannot afford a halt in production.

Davidson *et al.* (1988) examined the effects of strike activity on the value of a firm. Based on the philosophy of Eaton (1972) and Miller and Modigliani (1961), Davidson believed that labour strikes are an investment for future gains. Eaton (1972) and Miller and Modigliani (1961), asserted that strikes are a poor investment for firms and that for a value of a firm to grow it must have a positive investment strategy. Eaton (1972) and Miller and Modigliani (1961) affirmed that a firm's value depends on its expected future earnings stream. Miller and Modigliani (1961)

explain that If strikes reduce a firm expected future cash flows, its value should decline around the period of the strike activity. As a result, Davidson *et al.* (1988) presumed, if strikes are a negative corporate investment, a reduction in a firm's value should be reflected in negative stock returns during the period of a strike.

Davidson *et al.* (1988) tested the market's reaction to the announcement of a labour strike and the announcement of the settlement of a strike. The study further tested the effects of long term strikes on the cash flow of a firm concerning short term strikes. Davidson *et al.* (1988) found that labour strikes have a negative effect on the share value of a firm. The study found significant abnormal returns the day before the announcement of labour strikes. In line with Becker and Olson (1986), thus indicating that sophisticated market participants who monitor public information regarding firms can predict labour strikes. However, Davidson *et al.* (1988) argue that if market participants were able to predicate labour strikes markets would react long before the day of the strike.

Davidson *et al.* (1988) established that markets reacted more severely to prolonged strikes long before the duration of the strike was known. According to Davidson *et al.* (1988), the findings imply that market participants can foresee the duration of a strike and react accordingly. Davidson *et al.* (1988) further found that markets presented random fluctuations, where labour strikes were averted.

Greer *et al.* (1970) examined the effects of labour strikes on the share returns of affected companies, with respect to the duration of the strike. The article observed the effects of labour strikes concerning short, intermediate, and long-term strikes. A sample of 91 strikes between 1951 and 1973 was observed in intervals of 1 to 10 days (short duration), 11 to 29 days (intermediate duration) and 30 to more days (longer duration).

Greer *et al.* (1970) found that the share returns of firms affected by short-term labour strikes deteriorated in value before the announcement of the strike and continued to decline after the strike had commenced. Greer *et al.* (1970) attributed the loss in shareholder return to markets interpretation of management losing the strike to unions due to the financial position of the firm, which could not afford the firm to incur a strike. Greer *et al.* (1970) found that strikes that continued for an intermediate period exhibit deterioration in share return before the announcement of the strike and rebound significantly after the strike commenced and settled. Greer *et al.* (1970) attributed these findings to management's ability to prolong the strike long enough for unions to succumb to their threats.

Greer et al. (1970) found that firms with greater market share returns were prone to long terms strikes, due to unions being under pressure to obtain a favourable return from the firms' profitability. Greer et al. (1970) found that following the announcement and the commencement of the share returns of the affected firm deteriorates significantly for a prolonged period. According to Greer et al. (1970),

this is due to the markets' perception of deteriorated the financial viability of the firm.

3. Research Methodology

An event study methodology was employed to evaluate the effects of labour strikes on the share return of affected JSE Top 40 companies. Kothari and Warner (2006), defined an event study is a statistical study that attempts to examine the behaviour of a firm's stock price movement around corporate events. The primary objective of an event study is to determine whether there is abnormal price movement in the share price of a security, which is due to an associated event (Gilson & Black, 2003). Market efficiency is a key assumption of event studies (McWilliams & Siegal, 1997). Market efficiency facilitates the identification of an event (Tabak, 2010). Ang *et al.* (2011) define an efficient market as "a market in which the price of security reacts instantaneously without any form of bias to the arrival of new information to the market. The efficient market hypothesis implies that investors act in such a manner that deviations about the mean are random and unexpected (Fama, 1991). Deviations of actual returns from expected returns occur unpredictably, allowing the researcher to identify the effect of a specific event without any bias. To identify deviations about the mean of the security's share return, normal returns and expected returns are estimated.

3.1 Normal Returns Estimation Models

Normal returns are defined as returns that would have been realised in the absence of an identified event (Brown & Warner, 1968). To obtain normal returns, event studies models expected returns of the affected security. A market model is employed to estimate the expected returns as opposed to the constant mean return model. The constant mean return model is regarded as the simplest model when estimating expected returns, researchers find that by making use of historical return averages the constant mean return model outperforms the more complicated approaches because of the models' estimation error term (Brooks, 2014). However, according to Campbell *et al*. (1997), the market model provides an improvement in relation to the constant mean return model, by removing the portion of the return that is related to variation in the market's returns, the variance of the abnormal return is reduced. Campbell *et al*. (1997) further explain that removing the variation in returns from the market model increases researchers' ability to detect events effects. Due to its ability to detect the effects of an event, the article made use of the market model to estimate the expected return.

Expected returns were estimated using the market model and were estimated as follows:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + e_t \quad (1)$$

Where:

$E(R_{it})$is the expected return on the company i during the period t;

α_i is the intercept of the regression;

β_i is the slope of the regression;

R_{mt} is the return on the market during period t; and

e_t is the error term.

Calculation of normal returns is then estimated. Actual share returns of change in share price:

$$R_{it} = In\left(\frac{P_{it}}{P_{it-1}}\right) \quad (2)$$

Where:

R_{it} is the share price of company i on period t; and

P_{it} is the share price on period's t-1.

3.2. Abnormal Returns

To examine the individual effect of a labour strike on the share return of an affected company, abnormal returns (AR) are estimated. To obtain the abnormal returns of a security the estimated expected returns and actual returns of affect security are subtracted (Brown & Warner, 1968). The AR of each firm i on day t is based on the market model and are defined as follows:

$$AR_{it} = R_{it} - E(R_{it}) \quad (3)$$

Where:

AR_{it} are abnormal returns of the affected company i on period t;

R_{it} are normal returns of the company i in period t; and

$E(R_{it})$ are the expected returns of the company i on period t.

The abnormal return in equation one is subsequently:

$$AR_{it} = R_{it} - E(R_{it}) = R_{it} - \alpha_i - \beta_i R_{mt} \quad (4)$$

The outcome of the equation provides the researcher with an indication of the magnitude and direction of the impact of a strike, the share returns of affected JSE Top 40 companies in relation to protected and unprotected strikes.

3.3. Average Abnormal Returns

To examine the outcome of the overall sample event returns and draw a conclusion of the results of individual companies' AR, the abnormal returns of affected companies must be aggregated over time and for all securities. The individual daily AR are aggregated for each day to obtain the AAR. The estimation of AAR tests the significant effect of the event on individual share prices over the event window (Woon, 2004). The outcome of the estimation provides a generalised outcome of the article. AAR for all companies in the sample for day t were estimated as follows:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \quad (5)$$

N indicates the number of companies in the sample.

3.4. Cumulative Abnormal Returns

According to Erlien (2011), observations of individual AR of firms do not provide a holistic representation of the event of interest. As a result, AR must be aggregated to provide a holistic view of the event of interest. CAR is aggregated across time for company i in observation of the overall impact of the event. The CAR is estimated by summing up the AR of the days in the event window k and is estimated as follows:

$$CAR_i = \sum_{i=1}^{K} AR_{it} \quad (6)$$

3.5. Cumulative Average Abnormal Returns

The final calculation of AR before significance testing is that of CAAR. CAAR aggregate the AR across both time and the firm's yields and provides an overall indication of the impact of the event of interest (Boehmer et al., 1991). The CAAR can be calculated by aggregating the AARs for the respective period or by aggregating the average of the CARs given the specified window period.

CAAR is represented by the following equation:

$$CAAR_t = \sum_{t=1}^{t} AAR_t \quad (7)$$

And

$$CAAR_t = \frac{1}{N}\sum_{i=1}^{N} CAR_t \quad \text{Or} \quad CAAR_t = \sum_{i=1}^{N} w_i * CAR_t \quad (8)$$

Z-statistic

To conclude the above-mentioned calculations, a z-statistic must be estimated to prove the indicated hypothesis. Estimations of the z-statistic will indicate whether AR deviates from zero (Massey & Miller, 2006). The outcome of the estimate in terms of its size and direction of the z-statistic indicates the significance of the test statistics. Calculation of the z-statistic is as follows:

$$Z_{AR} = \frac{AR_{it}}{SD(AR_{it})} \quad (9)$$

Where:

Z_{AR} is the z-statistic of abnormal returns; and

$SD\ (AR_{it})$ is the sample standard deviation of abnormal return.

$$SD(AR_{it}) = \sqrt{\frac{1}{T_0 - 1}\sum_{t-1}^{T_0}(AR_{it} - E(AR_t))^2} \quad (10)$$

Where:

T_0 is the period of the event (estimation window)

At a significant level of 5 per cent, the z-statistic will be compared with the z-critical value.

If the z-statistic > z-critical value then the null hypothesis will be rejected, thus indicating that abnormal returns deviated significantly from zero.

If the z-statistic < z-critical value then the null hypothesis will not be rejected, thus indicating that abnormal returns did not deviate significantly from zero.

3.6. Sample Size and Sample Period

The article observed 41 companies that were listed on the JSE Top 40 index between 2010 and 2017 and were affected by labour strikes. Of the 41 companies that were affected by labour strikes, 32 were affected by protected labour strikes and 9 were affected by unprotected labour strikes. The article focused on the period post the 2008/2009 financial crisis and as a result, the sample period observed was between 2010 and 2017.

The daily historical price movements of affected companies were extracted from IRESS BFA. The identified labour strikes were obtained from the annual industrial action report and secondary data sources such as newspaper articles from News24, MoneyWeb, Business Day live, etc.

3.6.1. Research Sample Selection

The list of identified companies was narrowed down to companies that were listed on the JSE Top 40 index, in their respective years between 2010 and 2017. Forty-one companies were identified to have been affected by labour strikes between 2010 and 2017. The strikes were, thereafter, categorised according to the nature of the strike affecting respective companies. The data sample comprised 32 companies that were affected by protected strikes and 9 companies affecting unprotected strikes.

Table 1. Sample Selection Criteria

SAMPLE SELECTION CRITERIA		**Number of companies**
1.	Companies affected by labour strikes between 2010 and 2017	259
2.	Companies listed on the JSE Top 40 index affected by labour strikes	41
3.	Companies listed on the JSE Top 40 index affected by protected strikes	32
4.	Companies listed on the JSE Top 40 index affected by unprotected strikes	9

The data sample comprises the events listed in Table 2. The identified companies in Table 2 were selected from a pool of companies that were enlisted on the JSE Top 40 index between 2010 and 2017 and had been affected by a labour strike either in the form of a protected strike or unprotected strike

Table 2. Protected and Unprotected Strikes from 2010 - 2017

Sector		**Protected/Unprotected**	**Date**
			Start Date
1.	Retail	Protected	22-Dec-17
2.	Consumer Goods	Protected	08-Aug-17
3.	Retailer	Protected	04-Apr-16
4.	Mining	Protected	05-Apr-16
5.	Mining	Protected	06-Apr-16
6.	Corporate group	Protected	11-May-16
7.	Pharmaceutical	Protected	29-Jul-16
8.	Mining	Protected	27-Oct-16
9.	Mining	Protected	27-Sep-16
10.	Consumer Goods	Protected	13-Oct-16
11.	Telecommunications	Unprotected	20-May-15
12.	Mining	Protected	04-Oct-15
13.	Mining	Protected	04-Oct-15

14.	Mining	Protected	23-Jan-14
15.	Mining	Protected	23-Jan-14
16.	Mining	Protected	03-Sep-13
17.	Mining	Unprotected	14-May-13
18.	Mining	Protected	18-Nov-13
19.	Mining	Unprotected	05-Mar-13
20.	Brewery	Protected	30-Sep-13
21.	Consumer Goods	Protected	15-Nov-13
22.	Mining	Unprotected	20-Sep-12
23.	Mining	Protected	28-Jul-12
24.	Mining	Unprotected	20-Jan-12
25.	Mining	Unprotected	03-Oct-12
26.	Mining	Protected	29-Aug-11
27.	Mining	Protected	24-Jul-11
28.	Mining	Protected	28-Jul-11
29.	Mining	Protected	24-Jul-11
30.	Mining	Protected	28-Jul-11
31.	Mining	Protected	28-Jul-11
32.	Telecommunications	Unprotected	14-Mar-11
33.	Mining	Unprotected	13-Sep-10
34.	Mining	Protected	27-Aug-10
35.	Mining	Protected	23-Aug-10
36.	Mining	Protected	13-Jan-10
37.	Mining	Protected	21-May-10
38.	Mining	Protected	04-Oct
39.	Brewery	Protected	27-Jan-10
40.	Mining	Unprotected	27-Sep-10
41.	Mining	Protected	08-Dec-10

3.7. Hypothesis

The following hypothesises were tested to achieve the article's empirical research objectives:

- **Null hypothesis (H_{01}):** The resolve of labour strikes does not affect the share returns of the JSE Top 40 companies.
- **Alternative hypothesis(H_{A1}):** The resolve of labour strikes affects the share returns of the JSE Top 40 companies.

4. Results and Findings

The results section elaborates on the trend analysis of share return of companies affected by protected and unprotected strikes, collectively.

Figure 1. Share Return of the JSE Top 40 Companies Affected by Protected and Unprotected Labour Strikes Collectively

The movement in CAAR of companies affected by protected and unprotected strikes, collectively, revealed that affected companies experience significant volatility throughout periods of wage negotiations. The share returns of affected companies varied from 0.6 per cent on Day 21 to -2.0 per cent on Day 5. Adverse movement in the share returns of the affected companies was found within the early stages of the negotiations process, 6 days before the day of the strike and continued to 12 days after the day of the strike. Miller and Modigliani (1961), Bhana (1997), Davidson et al. (1988) and Becker and Olson (1986) were aligned in their findings and attributed the volatility in share returns of affected companies to the arrival of news of a looming strike to financial markets. Miller and Modigliani (1961), Bhana (1997), Davidson et al. (1988) and Becker and Olson (1986) attributed their findings to sophisticated market participants access to public information and leakages of insider information relating to potential strikes.

During the first 15 days of wage negotiations, the share returns of affected companies varied between 0.58 per cent and -0.7 per cent. Similar volatility is observed 5 days before the day of the strike and 12 days after the day of the strike and varied between -1.8 per cent and -2 per cent. Observed volatility in the share returns of the affected companies is attributed to a breakdown in set protocol during wage negotiations, which subsequently translated into “bad news” in the market. Neumann's (1980)

study believed that strikes are predictable as a result of "set protocols" determined by bargaining agents within the preparation and discovery stage of wage negotiations. Neumann (1980) described "set protocols" as procedures respective bargaining agents follow at a specific event, a "dictionary" that translates the actions and statements of the parties into a common language.

Five days after the strike, the share returns of companies affected by protected and unprotected strikes collectively rebounded and began to recover entering a growth trajectory that continued until Day 23. Growth in the share returns of the affected companies showed signs of a settlement that was perceived as a positive sign by the market. The observed findings of the recovery in share returns of companies affected by protected and unprotected strikes, collectively, are consistent with those of Nigidi (2011). According to Nigidi (2011), labour strikes in South Africa are generally short and lasts between 1 and 5 days. Nigidis' (2011) findings are affirmed by Nelson, Amoaka-Adu, and Smith (1994) that short terms strikes result in a deterioration in share returns of affected firms as a result of the perceived cost implication of the strikes. According to Greer *et al.* (1970), financial markets perceive the short-term strike as managements lose to unions due to the firms' inability to afford a strike and accepting unions demands.

Hypothesis test of protected and unprotected strikes collectively on share returns of affected companies

Table 3 presents the results of the hypothesis test. A "z-test" at a confidence interval of 95 per cent and a "critical value of 1.96" was considered as a measure of significance. The outcome of the z-statistic greater than the z-critical value of 1.96 allows the researcher to reject the null hypothesis thus making the statement true for the alternative hypothesis. Table 3 presents the z-test on CAAR of protected and unprotected strikes collectively over the 61-day event window.

Table 3. Significance Test of CAAR of the JSE Top 40 Companies Affected by Overall Labour Strikes

Share return of the JSE Top 40 companies affected by overall labour strikes		
Day	**Cumulative average abnormal returns**	**z-statistic**
-30	0.33%	1.04
-29	0.05%	0.18
-28	-0.25%	-0.73
-27	-0.38%	-1.19
-26	-0.64%	-1.59*
-25	-0.25%	-0.85
-24	-0.39%	-1.19
-23	0.13%	0.43
-22	0.58%	1.60*

-21	-0.02%	-0.08
-20	0.28%	0.95
-19	0.52%	1.48*
-18	0.16%	0.41
-17	-0.11%	-0.24
-16	-0.56%	-1.51*
-15	-0.70%	-2.82***
-14	-0.32%	-1.43*
-13	-0.71%	-2.26***
-12	-0.52%	-1.64*
-11	-1.06%	-2.77***
-10	-0.82%	-2.62***
-9	-0.94%	-3.46***
-8	-0.77%	-1.99***
-7	-0.92%	-4.12***
-6	-0.96%	-2.75***
-5	-0.18%	-0.26
-4	-0.80%	-2.55***
-3	-1.25%	-2.62***
-2	-0.39%	-1.37*
-1	-0.59%	-2.12***
0	-0.80%	-1.87**
1	-0.99%	-3.82***
2	-1.07%	-2.59***
3	-1.18%	-3.47***
4	-2.03%	-5.33***
5	-1.76%	-5.38***
6	-1.03%	-4.19***
7	-0.77%	-2.93***
8	-0.95%	-2.62***
9	-0.73%	-3.10***
10	-0.48%	-1.33*
11	-0.74%	-2.80***
12	-1.28%	-3.67***
13	-0.80%	-0.33
14	-0.68%	-2.18***
15	-0.40%	-1.21
16	-0.60%	-1.95**
17	-0.51%	-1.66**
18	0.07%	0.26
19	0.26%	0.84
20	0.08%	0.30
21	0.23%	0.88
22	0.36%	0.96

23	0.44%	1.41**
24	0.32%	1.12
25	-0.30%	-0.86
26	-0.18%	-0.54
27	-0.07%	-0.30
28	0.12%	0.40
29	-0.05%	-0.15
30	-0.16%	-0.59

Significant at 95 per cent confidence interval *** Significant at 90 per cent confidence interval ** Significant at 80 per cent confidence interval *

At a confidence interval of 95 per cent and z-critical value of 1.96, significant z-statistics were found on Day -15, -13, -11 to -6, -4, -3 and -1 on days before the day of the strike. After the day of the strike, significant abnormal returns were found on Day 1 till today 9 thereafter on Days 11, 12 and 13. On the day of the announcement of the strike ("Day 2") and the day of the strike ("Day 0"), there was no significance, meaning that "no abnormal returns" were obtained on the day of the announcement and the day of the strike.

Periodic analysis of protected and unprotected strikes collectively

Table 4 presents an interval analysis of share returns of companies affected by protected and unprotected strikes collectively. The table presents the average CAAR standard deviation and z-statistic at a 5, 10 and 20- and 30-day interval before the day of the strike, after the day of the strike and the overall event. The interval analysis aims to provide periodic analysis of the event window.

Table 4. Interval Analysis of Protected and Unprotected Collectively

Interval analysis					
Periods	**Variables**	**5-day**	**10-day**	**20-day**	**30-day**
Before the event	**CAAR**	-0.641%	-0.762%	-0.531%	-0.382%
	STDEV	0.026	0.006	0.022	0.022
	z-test	-1.784	-2.384	-1.683	-1.201
After the event	**CAAR**	-2.026%	-2.026%	-0.779%	-0.496%
	STDEV	0.022	0.020	0.027	0.024
	z-test	-4.120	-3.477	-2.359	-1.495
Overall event	**CAAR**	-1.003%	0.277%	-0.659%	-0.445%
	STDEV	0.024	0.022	0.024	0.023
	z-test	-2.853	-2.880	-2.017	-1.357

Before the Day of the Strike

The interval analysis of the average share returns of affected companies before the day of the strike illustrates a deterioration in share return between 30- and 10-days interval. The deterioration in the average share return of the affected companies at the beginning of the wage negotiations is attributed to leakage in insider information

and the markets perception of the duration of the strike (Bhana, 1997) and (Greer *et al.*, 1970). According to Becker and Olson (1986), sophisticated market participants who monitor public information can predict labour strikes and affect firms share returns at the start of the wage negotiations. According to Greer *et al.* (1970) how markets adjust to strikes when they are anticipated or after they occur is closely linked to the duration of the strike. The markets' adjustments before the announcement of the strike are observed in the increased volatility between day 30 and 5 intervals. The fluctuation between 0.26 and 0.006 illustrates the uncertainty of the market, regarding the duration of the strike. Significant abnormal market returns are observed at 10-day interval are attributed to leakage of insider information relating to potential strikes (Bhana, 1997).

After the day of the strike

After the announcement and commencement of the strike, the average share return of the affected companies began to gradually increase from the 5-day interval to the 30-day interval. These findings are indicative that South African market participants perceive that labour strike affecting companies list on the JSE Top 40 index last between 11 to 29 days. The findings are similar to Greer *et al.* (1970) findings. Greer *et al.* (1970) found that intermediate labour strikes are difficult to interpret and that share return of effects companies are neither below nor above-market returns. Greer *et al.* (1970) further established that share returns of intermediate labour strikes gradually rebound following the commencement of the strike. Volatility in the in-share return of affected companies fluctuated between 0.020 and 0.027 between the interval on Day 5 and Day 30. The minimal movement in volatility illustrates markets prediction of the duration of the strikes. These findings are affirmed in the obtained significant abnormal returns obtained intervals Day 5 to day 20.

Overall Event

Observation of share returns over the 5 days before and after the day of the strike, together with 10 and 20 days before and after the day of the strike indicate that over a 20-day event window, labour strikes resulted in significant AR of -2.853, -2.880 and -2.017, respectfully. Volatility in the share returns of the after companies fluctuated between 0.022 and 0.023 over the 5,-10,-20, and 30-day event window for before and after the day of the strike. The findings of overall interval analysis indicate that market participants perceive labour strikes affect JSE Top 40 companies to last between 1 to 29 days. This indicated as the articles find imitate result of both short and intermediate labour strikes in accordance with Greer *et al.*, (1970)

Summary hypothesis test of the JSE Top 40 companies affected by protected and unprotected strikes, collectively

To conclude the hypothesis test on whether the resolution of labour strikes affects the share returns of the JSE Top 40 companies, a significance test considering each

day of the 61-day event window was conducted. Table 5 presents the cumulative outcome of the significance test of protected and unprotected strikes collectively over the 61-day event window. The hypothesis test is performed at a confidence interval of 95 per cent and a z-critical level of 1.96.

Table 5. Summary Significance Test of Share Returns of Companies Affected by Protected and Unprotected Labour Strikes

Event outcome: Effects of protected and unprotected strikes collectively	
CAAR	
AR	
-0.445%	
n_1	
61	
σ_1	
0.005557118	
H_0	**AR=0**
H_1	**AR≠0**
Test statistic	-2.46
Probability that H0 is true	0.02
Significance level a	5%
Confidence level	95%
Critical value	1.96
DF	59
Std error	0.20%
95% CI	-0.04%
	-0.85%
Test	Reject H0

At a 95 per cent confidence interval and z-critical value of 1.96, the research rejects the null hypothesis with a z-statistic of -2.46. This makes the statement true for the alternative hypothesis that the resolve of labour strikes affects the share returns of the JSE Top 40 companies.

5. Conclusion and Recommendations

The main objective of the article was to determine the effects of both protected and unprotected labour strikes, collectively, on the share return of the JSE Top 40 companies. A data sample of 41 companies listed on the JSE Top 40 index, which were affected by protected and unprotected labour strikes between 2010 and 2017, were evaluated using an event study methodology over a 61-day event window. The

article found that labour strikes have a negative effect on the share return of the JSE Top 40 companies. A trend analysis of the movement in share returns of protected and unprotected labour strikes, collectively, establish that affected JSE Top 40 companies experience significant instability throughout periods of wage negotiations. The share return of affected companies presented adverse movement 21 days before the day of the strike.

The volatile movement in share return of affected companies continued passed the day of the strike and rebounded 5 days after the day of the strike. The movement in share returns of affected companies before the day of the strike is attributed to the arrival of news of a looming strike to financial markets. The article's z-test at a confidence interval of 95 per cent and a critical value of 1.96 found significant AR between 15 days before the day of the strike and 9 days after the strike commenced. This allowed the article to reject the null hypothesis thus making the statement true that protected and unprotected labour strikes, collectively, influence the share return of the JSE Top 40 companies. A summary analysis of the cumulative effects of protected and unprotected labour strikes on the share return of the JSE Top 40 companies concluded that indeed labour strikes influence the share return of affected companies.

The article's findings indicate that labour strikes are increasingly becoming a custom of South Africa’s labour market, affecting the firm's day to day operations and subsequently investor confidence. Though frowned upon, labour strikes are vital to regulating a good working relationship between employees and employers. The facility the establishment of new terms and conditions of employment, provide employees with a sense of respect, responsibility and dignity. Consequently, the employer gains a motivated workforce that increases production and profits. This necessitates a conscious integrative approach to wage negotiations, which is geared towards an amicable resolution to wage agreements. A conscious integrative approach to wage negotiations will enhance cohesion among bargaining agents and instil investor confidence in the labour market and subsequently financial markets. A cohesive collective bargaining process will eliminate losses due to disruptions in daily operations allowing for maximum share returns to stakeholders.

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