



FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES  
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**Examining the economic impact of Industrial Action  
activities in South Africa, 2003-2014**

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## DECLARATION

I, the undersigned, hereby declare that the work contained in this assignment is my original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

**Megan Williams**

Signature:



Date: 31 January 2017



## ABSTRACT

Workers' right to strike is embedded in the South African Constitution and this right generally reflects a sign of fairness. Strike activities form a vital part of collective bargaining and the supremacy liaison between employers and employees would be severely ruined if workers are not entitled the right to strike. Ever since the right to strike was documented in the South African Constitution, strike actions have been a collective occurrence in the country. Reasons for strikes in South Africa are multi-layered and their effects are harmfully disastrous. Workers are on strikes due to various reasons such as low pay, inequality, and unemployment as a result of union conflicts and the inequitable degree of labour relations. However, strikes would lead to various problems in the economy, such as reduced production, scaring off investors, labour replaced by capital, etc.

This study first defines the various key concepts relating to industrial action, before reviewing the theories on strikes as well as the results of past local and empirical studies. The study moves on to use the Department of Labour's 2003-2014 Industrial Action Report data to provide descriptive statistics on strike activities in 1999-2014 by broad industry categories (examining the number of strikes, work hours lost, work days lost, time-loss ratios, principle causes of strikes, most active trade unions involved in strikes), before using a static approach to estimate the value of total production foregone as well as the value foregone as a proportion of gross value added (GVA) by industry in each year as a result of strikes. Finally, the older 1970-1998 strikes data from the International Labour Organization (ILO) is 'merged' with the abovementioned 1999-2014 data, to examine the econometric relationship between strikes and business cycles, and it is found that strikes are procyclical.

**Keywords:** Industrial relations, work stoppages, lockouts, trade unions, collective bargaining; South Africa.

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## LIST OF ABBREVIATIONS

DOL	Department of Labour
EB	Efficient Bargaining
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GVA	Gross Value Added
ILO	International Labour Organisation
LFS	Labour force survey
LRA	Labour Relations Act
MNC	Multinational Company
MU	Monopoly Union
NUM	National Union of Mineworkers
OHS	October Household Survey
QES	Quarterly employment statistics
QLFS	Quarterly Labour Force survey
RSA	Republic of South Africa
SAB	South African Breweries
SACU	South African Communications Union
SARB	South African Reserve Bank
SASBO	South African Society of Bank Officials
Stats SA	Statistics South Africa



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## CHAPTER ONE: INTRODUCTION

### 1.1 Statement of problem

Strikes signify the vital agreements of workers, represented by trade unions, to implement their demands for higher wages, improved working conditions and unbiased behaviour by employees (Jacobs & Yu, 2013:2). If trade unions are not present or if they do not have the power to enforce accurate collective bargaining, the government could intervene to resolve disputes between employers and employees. Even though strikes are seen as a process of liaison between employers and employees, and point towards a democratic economy, it results in economic cost that can be extremely high, depending on the duration of the strike, the number of employees involved and the industries affected (Jacobs & Yu, 2013:2). These costs consist of, amongst others, working days lost, earnings and output foregone and knock-on effects in other sectors (Barker, 2008: 101-102).

It is important to empirically evaluate the impact of strikes on the South African economy, because strikes have extensive negative effects on the entire economy. On the other hand, as a result of the complex nature of strikes, seldom can one empirically measure the effects of strikes on the economy (Myers and Saretto, 2009). The mining sector is one of the most important industries within the South African economy. In 2014 the mining sector, on average accounted for 8.33 per cent of South Africa's Gross Value Added (GVA). The mining sector has made significant contributions to the South African economy in terms of creating numerous job opportunities within the sector, attracting foreign direct investment (FDI), export earnings, and by contributing to the Gross Domestic Product (GDP) (Chamber of Mines, 2013).

The Department of Labour (DoL) (2013) indicated that even though the mining sector contributes approximately 5 per cent to the overall GDP of South Africa, it surprisingly makes up 50 per cent of the country's total exports. The significance of the mining industry can be justified by its substantial impact as an investor into the South African economy. Therefore, any interference to the production process of the mining sector can have extreme consequences on the economy. Strike action in the mining sector has resulted in a number of work hours lost, and this affected production. As a result of this many workers lost their job in the mining industry (Department of Labour, 2013).

The consequences of strike action range from economic to socio-political effects. Strikes have far and extensive cost to the economy as a whole (Murwirapachena & Sibanda, 2014: 556). Israelstam (2011) stated that “strike means disaster for both parties”; firms who experience a decline in production level and lose business contracts, and the workers who could potentially lose their jobs. Hence, due to strikes, employers, the government, third parties, workers, and the whole economy suffer. Even though, strikes have a direct effect on employment, there are also indirect consequences on employment that originate from the shutdown of firms, trade shortages, and a fall in investments, among others. The relatively high strike incidences of the mining industry in August 2012 had the potential to increase public unrest in the economy (Bhorat, Naidoo & Yu, 2014). Therefore, strikes have a substantial influence upon the production of the mining sector and, as a result indirectly affect the entire economy.

Strikes do not only have economic effects, it can also impact the social fiber of the economy. In various cases, strike action could turn out ugly with a lot of individuals either dying or being injured due to the violent nature of strikes (Murwirapachena & Sibanda, 2014:558). Hence, the employees and their families could experience poverty, as a result of striking employees being unable to work owing to injuries, retrenchments, or even death. Consequently, the government will have to intervene by providing financial support to employees and families suffering from strike injuries, retrenchment, and the death of their loved ones (Murwirapachena & Sibanda, 2014:558).

Major strikes were triggered in the labour history of South Africa during the twentieth century as a result of extensive and severe endemic industrial unrest. This industrial conflict molded part of a liberating process in which disputes in the field of labour were formed, particularly with regards to the relationship between capital and the government (Visser, 2004: 2). Astonishingly, hardly any publications have been made on strikes in the labour history of South Africa up to now. The main reason for the lack of local studies conducted is the non-availability of comprehensive strike data up to 2002. Since 2003, the Department of labour (DoL) has finally been releasing the data publicly and regularly with the release of the Annual Industrial Action Report. Therefore, due to the non-availability of strike data publicly until 2002, the older studies are very superficial, lacking in-depth research on how strikes affect the South African economy.

## **1.2 Rationale and significance of the study**

This study explores the extent to which industrial action impacts the South African economy. In particular, the study focuses on the economic cost of strikes and examines the impact of industrial action on economic growth across all broad industry categories. This research problem is important, because industrial action creates economic cost that is important to the economy. Conversely, South Africa's strong trade union undertaking and strike activity have resulted in frequent work rigidity, wage rigidity and high job losses which can affect the economy negatively. The study will also provide additional information on how to estimate the cost of strikes by using international literature because there are no South African studies done on this topic. The lack of thorough local empirical studies on strikes justifies the significance of this research.

## **1.3 Research objectives**

The study will analyse the cost of strikes as measured by the number of work stoppages, working days lost, time-loss ratio, working hours lost and earnings foregone by broad industry category. However, there are three main empirical components that will be discussed in the methodology section. Firstly, the descriptive statistics will be discussed by each broad industry category for the period of 1999-2014. Secondly, by assuming production equals income, total value of production foregone due to strikes will be estimated as the product of total work hours foregone and the mean hourly wage, *ceteris paribus*. Lastly, the empirical analysis will be discussed, by conducting a multivariate econometric analysis on the two strike composite indices for 1970-2014. In particular, the study will focus on the overall extent of strikes during the period of 2003-2014, before investigating what has been happening across industries and the main causes of the disputes. This information will then be used to answer the key research question: What is the impact of industrial action on the South Africa's economy? The study will test the hypothesis that strikes have a negative impact on the South African economy. In order to achieve the main research objectives, the following analysis will be conducted:

- Extent of industrial action by industry;
- The main causes regarding industrial action;
- Total work hours and work days lost due to industrial action by industry;
- Total earnings foregone due to industrial action by industry;

- Total value of production foregone and this value as proportion of gross value added (GVA) by industry;
- Brief econometric analysis on the relationship between strikes, labour market indicators and business cycles.

#### **1.4 Outline of the study**

The rest of the study is structured as follows: Chapter Two provides a conceptual, theoretical and legislative framework. The conceptual framework discusses all the relevant concepts relating to the study, while the theoretical framework analyses the important strike theories. The legislative framework refers to the Labour Relations Act that allows workers to go on strike and it discusses all the relevant legal aspects relating to industrial action. The review of past local and international empirical studies also forms part of Chapter Two and it reviews all recent local and international empirical studies relating to the study. Chapter Three discusses the methodology and data (including the limitations of the data). This will be discussed in greater detail later, for this study; a static analysis will be conducted when estimating the total earnings forgone due to industrial actions. Chapter Four presents the descriptive statistics and empirically estimates the total earnings forgone due to industrial actions by each broad industry category, before briefly examining the econometric relationship between strikes, labour market indicators and economic growth. Lastly, Chapter Five concludes the study.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 Introduction

This chapter first provides the definition of concepts related to this study, including, amongst others, industrial action, lockouts, strikes and work stoppages. The chapter will also explain how bargaining councils are developed and how they function. This is followed by the theoretical framework, which discusses the theories on strikes. The legislative framework of strikes will be discussed in relation to the Labour Relations Act (LRA) 66 of 1995 which is South Africa's main legislation in terms of strike action. Finally, a review of the results of past local and international empirical studies will be discussed.

### 2.2 Conceptual framework

#### 2.2.1 Industrial Action

Industrial action is described as the movements of unions and employees to force the other party into continuous strike disputes. Note that industrial action is generally referred to as strikes and lockouts but may also consist of protesting, imposing product sanctions, marches by employees, work stoppages and other actions which could interrupt the production process (Department of Labour, 2013:50). It is argued that industrial action is both debatable and essential (Venter & Levy, 2014:532): it is debatable in the sense that it illustrates an important demonstration of disputes inside the work place and by itself, contributes to disorders in economic activities. Therefore, industrial action is important because if it does not take place (in particular strike action), no significant collective bargaining will exist, or there will be no equivalent relationship (Venter & Levy, 2014:532).

#### 2.2.2 Strikes

Hyman (1984:17) defines a strike as a momentary work stoppage by a group of employees to express a complaint or to carry out a demand, while Garbers and Potgieter (2007:300) define a strike action as an incentive and a brief suspension of workers' services from the firm to remove concerns in the employment relationship that the employer is willing to offer when negotiations takes place. In contrast, Bendix (1996:521) describes a strike action as a short-term, collective deferral of work, with the aim to put production on hold and force the employer to take the demands of the workers seriously. All the above-mentioned definitions of strikes are in alignment with the agreed definition of strike action according to Section 213 of the 1995 Labour Relations Act (South Africa, 2002: s213): strike actions represent a



temporary or a deferral of work, by individuals who are currently or have been employed by the same employer, in order to resolve a complaint or solve a conflict that is in the interest of both the employers and employees.

### 2.2.3 Lockouts

A lockout stands for the employer's form of industrial action, and is described as the magnitude of the concluding decision of employees in order to persuade them to agree or yield to a specific ultimatum set out by the employers. For the duration of a lockout, employers attempt to put in force a demand by the means of stopping employees from going into their workplace (Venter & Levy, 2014:548). Lockouts is used as a tool by employers to put pressure on unions and workers, such as losing income capacity and settling for unfavorable changes in working conditions that is offered by the organization (SASBO, 1998:3).

### 2.2.4 Work stoppage

A work stoppage is developed based on a sequence of procedures, involving similar actions. A work stoppage consists of two main features, namely type and degree (Department of Labour, 2013: 49-50). The form of act is both a strike (an action started by the workers) and lockout (behavior taking place as a result of the employer). A strike action can also be known as a labour strike or industrial action, and this can be defined as a work stoppage which results in a mass number of employee(s) refusing to work. This refusal to work by employee(s) is not specifically related to a demand, however if it is linked to a demand, such a demand will not be associated with the employment relationship (Nel, Kirsten, Swanepoel, Erasmus & Poisat, 2012:241). Employees refuse to perform their work duties assigned to them in order to force the employer to listen to their demands, regarding wage increases or better working conditions. In labour management, a work stoppage is seen as a final step when arguing over wages or employment circumstances. The reason for this is that workers are not being remunerated when they participate in strikes and employers lose crucial production work, thus both the parties normally try to avoid such an outcome.

### 2.2.5 Secondary strike

A strike or behavior that expands a strike by workers of another employer is referred to as a secondary strike. The LRA describes a secondary strike as a strike or action, which is in support of a strike by workers that have disputes with their employer. However, it does not

consist of a strike that is in a pursuit of a specific demand that has already been mentioned to a committee, if the striking employees are hired within a listed range of the committee and have a significant concern with the demand (SASBO, 1998:3).

### 2.2.6 Picketing

Picketing is an additional set up to a strike (Venter & Levy, 2014:558). It is known as an action taken by employers or other individuals to make the presence of labour disputes public by guarding or monitoring and being close to the location from where the strike is happening, usually with posters demonstrating the reason for their disputes (Department of Labour, 2003:49-50).

The objective of picketing is merely to make the disputes of the work place public or influence other employees to stop working and to motivate employees to join the disputes, to prevent scab labour, to sway or force clients not to go into the work place, to interrupt distributions or to win over the support of the public (Department of Labour, 2003:49-50).

### 2.2.7 Protected and unprotected strikes

A strike is perceived as protected if it takes place at the end of all debate-clearing processes that are sketched in the Labour Relations Act or in any negotiating committee or acknowledgment/mutual settlement which may happen amongst revelries, have been eliminated (SASBO, 1998:3). Unprotected strikes take place when there is a lack of, or proceeding to, the wearing out of disagreements that are settled under stipulated procedures or those anticipated in the Labour Relations Act (SASBO, 1998:3-4). Formally, these strikes are known as being unlawful or bureaucratic. Unprotected strikes are generally impulsive actions by employees, and usually take place without the authorization of union representatives. They are used as a tool to increase pressure for the duration of indirect debates, or when organizations behavior is viewed as being illegal (SASBO, 1998:4).

However, unprotected strikes must be stopped as soon as possible. It is also extremely important that organizations focus their attention on solving the disputes in the work place by negotiating with unions (SASBO, 1998:4). Currently, there is an extraordinary spark of unprotected strikes that exist and carried out by employees. This occur when all the requirements of the act is not followed.

Whilst protected strikes are bonded by law and help employees to retain their work position after the strike (SASBO, 1998:3), in the case of unprotected strikes, employers have the legitimate right to lay off workers by following courtly procedures (Norton Rose Global, 2009). Unprotected strikes are perceived as illegal, and it results in bigger disputes when compared to protected strikes in which the correct procedures are followed by law. Employers could also adequately prepare and put controls in place to reduce the loss of strikes (Israelstam, 2013).

### 2.2.8 Collective bargaining

Collective bargaining results from a determined sense of balance such as a comparative bargaining authority or power amongst the employers and employees (Venter & Levy, 2014:532). If the parties involved in collective bargaining cannot solve their disputes, industrial action is frequently the outcome. Employees will turn to collective action to emphasize their demands. Collective action under these conditions includes the delay of supply of labour aimed at a particular time frame, or else denoted as a strike action. Collective bargaining and strike action should not necessarily be perceived as being a negative incidence in the economy; if it takes place legally, it could be viewed as a sign of a well-functioning economy where negotiation and communication takes place (Bhana, 1997:43-49).

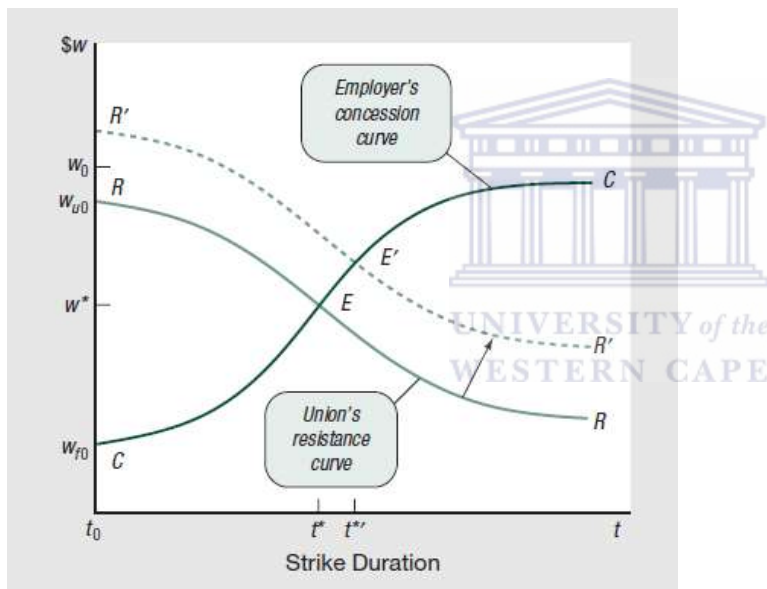
## **2.3 Theoretical framework**

Brown and Ashenfelter (1986:40-87) found that well-organized contract models provide assistance in governing forecasts concerning the outcome of strikes on firms. Trade unions (representing the interests of employees) are conscious of the firm's economic profits and want to obtain these profits for their participants. As a result, an effective strike implies that part of the firm's profit is transmitted onto the employees, causing a reduction in the shareholder value of the firm. The outcome of the strike on the value of the firm will be comparable to the adjustment of profits going to the firm. This was restated by Bhana (1997:43-49) when he refers to: "Eaton (1972: 670-679) revealed that strikes have a tendency to be worthy investments for unions and deprived funds for firms." In this sub-section, the main theoretical models would be discussed.

### 2.3.1 Hicks strike model

In the Hicks model, flawed bargaining takes place between two parties when one party underestimates the true objectives of the other party, and for this reason strikes occur with reference to the Hicks model (Ashenfelter & Johnson, 1969: 35; Reder & Neumann, 1980: 868; Siebert & Addison, 1981: 390). However, strikes should not occur if the information barrier is eliminated between the two parties. Hence, the Hicks model is assumed to be information asymmetry (Ashenfelter & Johnson, 1969: 36; Reder & Neumann, 1980: 868; Siebert & Addison, 1981:390). If the cost of strikes is comparatively high, strike incidences should be lower and the duration of the strikes shorter. This is the main estimate of the Hicks model (McConnell, 1989: 801).

**Figure 1: Hicks model of strike duration**



**Source: Laing (2011: 14)**

In terms of a theoretical perspective, Hicks presents a model of wages that relates to strike action, as displayed in Figure 1. The employer's concession curve is compared to the union's concession curve in the Hicks model. The firm's concession curve (CC) is defined as the maximum wage rate offered by the firm (Laing, 2011: 13). If the employer's concession curve shows an upward-sloping, it implies longer strike duration and the firm is willing to offer a higher wage (Venter & Levy, 2014: 150).

If the estimated period of an industrial stoppage increases, the highest wage the employer is willing to offer in order to terminate the strike would also increase (Flatua, 2001:53-55). In

other words, the CC curve slopes upwards as the strike duration increases. As the strike duration gets longer, the employer starts to worry that production stoppages may persist, so he/she would increase the offering wage to the workers on strike, thereby hoping the strikes would end as soon as possible. The employer's concession curve would then be constrained directly above the wage at which the employer would have no desire to operate anymore (the zero economic profit position) (Flatua, 2001:53-55).

The trade union's resistance curve (RR) depicts the lowest wage acceptable to unions (Hicks, 1932:141). A downward sloping resistance curve (RR) of union's indicate that the unions are willing to accept a lower wage settlement, and this implies that the strike duration will be longer and more costly (Venter & Levy, 2015: 150; McConnell, 1989: 802). The union's resistance wage, at a particular duration of the strike, signifies a sense of balance among the two factors. The first is the likelihood of lower wages in forthcoming years, and next is the prospect of job losses due to wage suggestions being too high (Laing, 2011:13-14). The RR curve is downward-sloping, because as the strike duration increases, the employees on strike become more realistic (or even afraid they would lose their job), so they would lower their asking wage level as time goes by. However, the lengthier the anticipated extent of the strike, the larger is both the loss of income and the odds of job loss (Flatua, 2001:53-55).

In an imperfect capital market, it will be beneficial for workers to decrease the least possible accepted wage as the estimated extent of the strike increases (Flatua, 2001:53-55). Nonetheless, the maximum wage that the union can attain when both sides have the same prospects, regarding the length of the strike is the point where the employer's concession curve and the union's resistance curve come together (Laing, 2011:13-14). Therefore, the Hicks's model specifies a deterministic wage solution (Flatua, 2001:53-55).

The original equilibrium is at point E in Figure 1 where the curves CC and RR intersect, with equilibrium wage and strike duration at  $w^*$  and  $t^*$  respectively. The outline of this model expects changes to occur in the surroundings that will shift one or the other of the resistance curve (RR) and the concession curve (CC); this will have an impact on both the wage settlements and the extent of the strike. For instance, the compensation of unemployment benefits to protesters decreases the costs of every union member on strike. The outcome of this will result in an upward shift of the RR schedule to  $R'R'$ . Sequentially, the end result will have an impact on the extent of the strike and the final wage agreements (see point E')

leading to an increase in both. Alternatively, any alteration that make the hand of the employer stronger will shifts the CC curve downwards (despite not being shown in Figure 1), resulting in a lower wage and shorter strike duration. Therefore, the equilibrium of the two curves represents the acceptable wage to both parties.

### 2.3.2 Asymmetric information model

The primary assumption of this model is that one party (the firm) has private information about the economic rent created by the firm, and therefore employees strike to dig up additional information about the surplus generated by the firm (Fudenberg, Levine & Ruud, 1985; Gunderson, Kervin & Reid, 1989; McConnell, 1989; Laing, 2011). Strike action is instigated by workers and unions to force employers to come to an agreement, regarding demands for higher wages (Bhorat, Lundall & Rospabe, 2002; McConnell, 1989). The union uses strike action as a tool to obtain private information on economic rent that the firm is accumulating (McConnell, 1989).

The private information models states that the country is overflowing with both doubt and inadequate information. Strikes can, therefore help to generate adequate information (Hayes, 1984; Fudenberg, Levine & Ruud, 1985; Tracy, 1986; Gunderson, Kervin & Reid, 1989; McConnell, 1989). For instance, unions do not know the exact demand for a firm's product and the firm might not want to disclose such information. Therefore, firms constantly claim that there is a weak demand for their merchandise in the market and therefore they persuade the unions to accept lower wage offerings. As a result, unions could use strikes to find out whether the firms are dishonest about the state of their products within the market and for that reason, be able to achieve a suitable wage settlement.

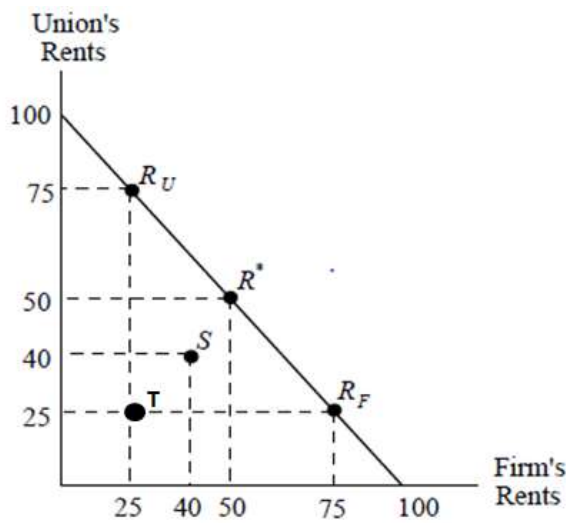
As discussed by Reyniers (1998), it is often expected that firms have an information advantage in wage bargaining models. This advantage allows them to be acquainted with the value of their employees, whereas employees are somewhat unaware of their own worth. However, from an empirical view point, Ashenfelter & Johnson (1969) were the first individuals who tested a systematic regression analysis of strike statistics. They delivered for the most part a long-lasting theory associating strike likelihoods to former real wage alterations. On the other hand, Hayes (1984) and Morton (1983) assume that the employer holds asymmetric information on the true worth of their manufactured goods. In this instance,

the strike is a tool used by unions to demand the employer to pay the wage that is equal with this value.

Partial knowledge can stop unions and firms from achieving Pareto optimality (Brown & Ashenfelter, 1986). According to Ashenfelter and Johnson (1969) as well as Marchiori (1989), it is not possible to construct a bargaining model where both trade unions (who represent the employees) and the employers are practical and fully informed, on the other hand where the result of the bargaining manner is not Pareto-optimal. Thus, striking activity is seen as a case of a Pareto-inefficient bargaining outcome (Brown & Ashenfelter, 1986; Marchiori, 1989; Laing, 2011). Nevertheless, it can result in practical actions by firms and unions as strikers are a nominal asset in recovering important information (Hayes, 1984; Laing, 2011). Asymmetric information models highlight the unions uncertainty about the firm's true financial position and hence the firms actual ability to meet the unions wage demands. This is due to management that is better informed about the firms prospects than the union.

If we assume that the firm's economic rent is equal to R100 which is allocated to both the trade union (acting on behalf of the employees) and the firm itself, as shown in Figure 2. The firm preferred the outcome at point  $R_F$  as the firm wants to grab a bigger share of economic rent (R75) than the employees (R25). However, the union desires point  $R_U$  on the graph, whereby they get R75 for their participants and the firm gets only R25 with this deal. If both parties are unable to find a solution during the bargaining process, a strike will occur. Strikes tend to be very costly, and the post-strike expenditure arises at point S; where both parties retain R40. Had both parties accepted the prestrike settlement at point ( $R^*$ ) right at the beginning, both parties would have benefited from it by getting R50 each (instead of R40). If the unions and firms still cannot settle at a total economic rent of R80 (e.g. perhaps the unions want to get R60 while the firms also want to get R60, i.e. they refuse to accept the equal split of R40 each), the strikes will persist. The economic rent would diminish further to, for example, R50. Eventually they agree to each get an equal share of R25 (point T in Figure 2), but this is such an inefficient outcome, as they should have settled at  $R^*$  (R50 each) right at the beginning.

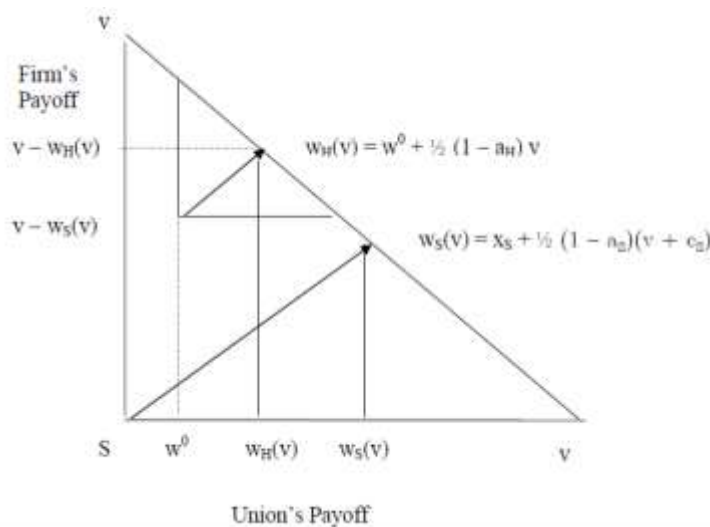
**Figure 2: Hicks paradox model of strikes that are not pareto optimal**



Source: Borjas (2013: 439)

It is generally perceived that the union will choose a strike threat on the condition of higher bargaining expenditures that are related to strikes which are more than made up for by a higher wage. Figure 3 illustrates the *Ex-Post* outcomes for strike and holdout threats. Let  $v$  represents the firm's value of the present union labour force that works under contract for period  $T$ . In general  $v$  is drawn from the distribution of  $F$  and consists of a positive density  $f$  with an interval of support  $[l, h]$ . However, the firm is the only one who knows the realized value of  $v$  at the outset of the bargaining.

**Figure 3: The *Ex-Post* outcomes for strike and holdout threats**



Source: Cramton & Tracy (2002:9)



The unions select a threat  $\theta \in \{H, S\}$ , at the beginning of the negotiations, where  $H$  represents the holdout threat and  $S$  indicates the strike threat. Until a payment agreement is reached, the union choice of threat remains in effect. In the threat  $\theta$ , the settlement to the union is  $x\theta$  and the payout to the firm is  $y\theta(v) = a\theta v - b\theta$ , where  $a\theta \in [0, 1)$  and  $b\theta \geq 0$ . The dispute cost is captured by the term  $1 - a\theta$  during the threat. Throughout, the threat the relative fee change is defined by  $c\theta = (b\theta - x\theta) / (1 - a\theta)$ . The slice of “pie” that the union and firm are negotiating over (the difference between the settlement and threat payouts) is denoted by  $(1 - a\theta)v + b\theta - x\theta = (1 - a\theta)(v + c\theta)$ , since the total payment during the settlement is indicated by  $v$  and the total payment of the strike threat  $\theta$  is  $a\theta v - b\theta + x\theta$ .

The Holdout threat can also be described in further detail. For instance, let  $w_0$  signify the payoffs under the expired labour settlement. The terms and conditions remained in effect of the labour settlement that was made previously during the holdout and the employees’ wages remain  $w_0$ , so  $x_H = b_H = w_0$  and  $c_H = 0$ . During a holdout some inadequacy was detected where,  $a_H < 1$ . Cramton and Tracy (1992) signaled an equilibrium using three propositions. Figure 3 indicates an example of the third proposition imposed by Cramton and Tracy (1992). The third proposition is denoted by;

If  $w^0 < \tilde{w}$ , the union selects the strike threat; if  $w^0 > \tilde{w}$ , the union selects the holdout threat, where  $\tilde{w} = x_S + (1 - a_S)(m(c_S) + c_S)[1 - F(m(c_S))] - (1 - a_H)m(0)$  and  $m(c\theta)$  maximizes (M).

The result of this negotiation process between the firm and union is signified by  $\langle t, w, \text{ and } \theta \rangle$ . This includes the time of the payment  $t$  where  $t \in [0, T]$ , the threat chosen by the union  $\theta$ , and the wage settlement  $w$ . Conversely, the union and firm payouts are calculated by adding the threat payouts and the settlement payouts together, weighted by the fraction of the result of time spent. Therefore, the union will prefer the holdout threat if recent wages are below the terminated labour settlement, as illustrated in Figure 3.

In Figure 3, the strike threat payoffs has been returned to normal at the origin. Hence, if the strike threat (S) is chosen, the payment will take place at the wage  $w_s(v)$ . Yet again, this reimbursement wage compensate to the union their threat price during the period of the strike and more than half of the inadequacy imposed throughout the strike period. If the holdout

threat (H) is carefully chosen, then the payment will take place at a wage of  $w_H(v)$ . The union will choose the strike threat if and only if the wage difference between the strike and holdout threats fund the additional costs to the union which is known as the dispute costs gained from the strike threat. For instance, if the real wage below the terminated labour contract is increased, the wage differences between the strike and holdout threats, will turn out to be relatively smaller, however the additional dispute overheads from the strike remains the same (Cramton & Tracy, 2002:9).

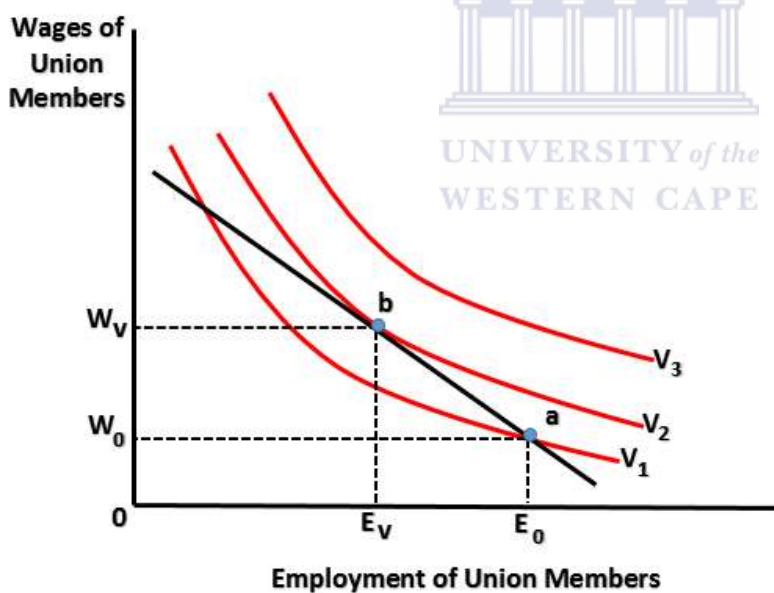
On the same point,  $\tilde{w}$ , as  $w^0$  keeps on influencing the unions preferences to change from a strike to the holdout threat. The general occurrence of strikes does not solely depend on the general occurrence of disputes, but it also focuses on the disputes that includes strike activities. The alignment of disputes between strikes and holdouts hinge on  $w^0$ , the threat payoffs and the whereabouts of the distribution depends on  $v$ . For instance, the model expects that the structure of disputes will move in the direction of strikes based on the following scenarios: (i) once the duration of a uncompensated inflation, results in the real value of  $w^0$  to drop, and (ii) if the circumstances in the resident labour market are constricted, causing the reservation wages of employees to increase in the period of a strike threat. Additionally, if there are any level of doubt it will be somewhat consistent over time, at that point the swings in the occurrence of strikes will largely be replicated by shifting the arrangement that was made in strike and holdout disputes.

Nonetheless, research indicates robust findings with regards to strike frequencies if there is a growth in real wages. This is evident from studies conducted by Ashenfelter and Johnson (1969), Gramm (1986), Mauro (1982), and Vroman (1989) by means of U.S. data, and by Gunderson, John, and Reid (1986) in which they use Canadian data. Similar studies by, McConnell (1989) and Vroman (1989) illustrate that the likelihood of a strike occurrence is positively correlated to the sum of uncompensated inflation during earlier contracts. The part that labour-market conditions play is consistent with regards to studies, indicating that strike occurrences in the United States is an increasing function of both the growth in development of resident work and the positive nonconformities about this development (Tracy, 1986). Lastly, the model provide details, behind the reasoning of strike incidence that could be procyclic (Harrison and Stewart, 1989a,b; Kennan, 1986). In addition, strike frequency increases as a result of the upward shift in  $u$ , whereas the existing wage is constant at  $w^0$ .

### 2.3.3 Monopoly Union model

In the monopoly union (MU) model, the price of labour is set by the union and the employer reacts by adjusting the number of workers in order to maximize profits, based on the new established wage rate of the firm (Ehrenberg & Smith, 2012:451). It is presumed that the union is fully conscious of the fact that a higher wage setting will lead to a lower labour demand by the firm. This can be troublesome for unions, because both the wage and level of employment is important (Laing, 2011:6). Hence, we assume that the union values both wages and employment levels in the MU model demonstrated below and knows the preferences of unions to effectively denote the union utility function that hinges on these two variables (Ehrenberg & Smith, 2012:451). The utility function is demonstrated by the individual indifference curves labeled as  $V_1$ ,  $V_2$  and  $V_3$  (see Figure 4). A locus of employment or wage combinations is demonstrated by every single indifference curve and it signifies how the union is indifferent (Ehrenberg & Smith, 2012:451).

**Figure 4: Monopoly union model**



*Source: Ehrenberg & Smith (2012:452)*

In order to maintain a given utility level, the union must first be reimbursed for a drop in one of the variables (such as employment or wages) by a rise in the other variable (Ehrenberg & Smith, 2012:451). As a result of this, the indifference curves are negatively sloped. It is presumed that unions are willing to put up with a decrease in employment in return for a rise in wages which will grow smaller as the rate of employment drops (Ehrenberg & Smith,

2012:451). This, therefore show the property of diminishing marginal rates of substitution. As a final point, higher levels of union utility are illustrated by higher indifference curves.

If we assume a scenario in which a union is not present, the wage will be  $W_0$  and employment will be  $E_0$  (at point *a* in Figure 4) as a result of market forces (Ehrenberg & Smith, 2012:452). Collective bargaining in this case will affect this situation, in which the union and the employer reach an agreement on a higher wage rate and based on this wage rate, the employer will decide the number of union members to hire (Ehrenberg & Smith, 2012:452). The level of employment will be decided by the employer, by using the labour demand curve, this will be contingent on a bargained wage rate. It is assumed that the union knows that this action will be taken by the employer and their goal will therefore be to maximize utility, which is limited to fact that the wage or employment combination lies on the demand curve (Ehrenberg & Smith, 2012:452). The union will prefer to move to point *b* in the figure. This point shows that the indifference curve  $V_2$  is just tangent to the labour demand curve. At point *b* wages would be  $W_V$  and employment  $E_V$ . The highest utility level that is attainable by the union is represented by point *b* in the figure, given the restraint modeled by the labour demand curve.

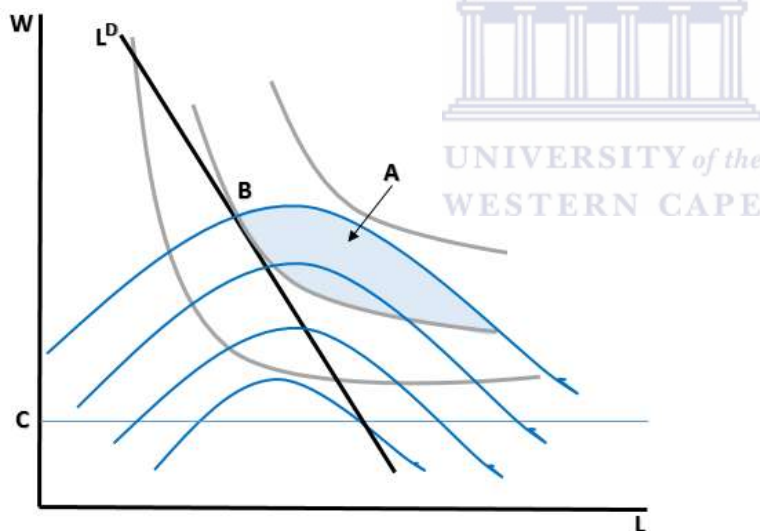
Moreover, in a bilateral monopoly model, the wage rate could increase by the rise in the bargaining power of trade unions. The result of this would be lower employment levels since there will be an upward movement along the demand curves by the firms (Brown & Ashenfelter, 1986). In addition, once all the parties has made their final decision, negotiations are finalized and the contract decided upon by both parties will be executed (Laing, 2011). This represents a flaw in the model because there are no counteroffers allowed, once the two parties negotiated with each other and, therefore, the MU model generates wage disputes since wages is generally determined in the real world by a bargaining process (Oswald, 1985; Laing, 2011).

The MU model is very popular in depicting union wages and employment outcomes, partially due to the underlying game structure that relates to reality; most collective bargaining processes normally provide employers with a freedom of choice over the number of workers (Lawson, 2010:4). Nonetheless, the result of the MU model is proven to be not Pareto efficient; the union and the firm could both be better off due to wage-employment combinations that are not on the labour demand curve (Lawson, 2010:4). This was first

evident, by Leontief (1946), with regards to the labour market, and Fellner (1947), made further developments before being given a more detailed algebraic and graphical treatment by (McDonald & Solow, 1981).

Figure 5 demonstrates the inefficiency of the MU model; the outcome is an area of wage-employment combinations, illustrated by point A in the figure, whereby at point B at least one of the firm and union can be made better off, and avoid making the other party worse off (Lawson, 2010:5). The labour demand curve is defined as the locus of points where the firm's isoprofit curve is horizontal, and the union's indifference curve is always downward-sloping (provided that the union desires higher employment levels at a prearranged wage). Hence, Pareto efficiency calls for the tangency of the firm's isoprofit curve and the union's indifference curve, which under no circumstances can take place beside the labour demand curve (Lawson, 2010:5).

**Figure 5: Inefficiency of monopoly union outcome**



*Source: Lawson (2010:5)*

Therefore, another model was developed, in which the firm and union bargain towards achieving an efficient Pareto outcome. The underlying principle for such a model is that economic agents in a one-to-one negotiation would not leave untapped gains from trade (Lawson, 2010:5). This model will be referred to as the Efficient Bargaining (EB) model, to be discussed next.

#### 2.3.4 Efficient Bargaining model

A Pareto efficient allocation of labour will take place if the isoprofit and union indifference curves are tangent to each other (Lawson, 2010:6). This describes the locus of Pareto efficient wage-employment combinations, which, is normally referred to as the contract curve in the literature (Lawson, 2010:6). An earlier paper written by Hall and Lilien (1979) stated that union preferences can result in a vertical contract curve<sup>1</sup> or else a downward-sloping curve, whereas in McDonald & Solow's (1981) expected-utility formulation, the contract curve will essentially remain upward-sloping.

The EB model is different from the MU model, as the former model does not point towards a situation of unused gains in bilateral negotiation of trade (Lawson, 2010:7). Hence, the main censure of the EB model is that its central structure does not seem to relate to reality as strongly as the MU model does; we normally do not perceive firms and unions negotiating straightforwardly with each other, over the total number of employment and also wages (Lawson, 2010:4). The MU and EB models forms part of the two most common alternative economic depictions of the wage-employment results of collective bargaining, and these two models do have some strong normative implications.

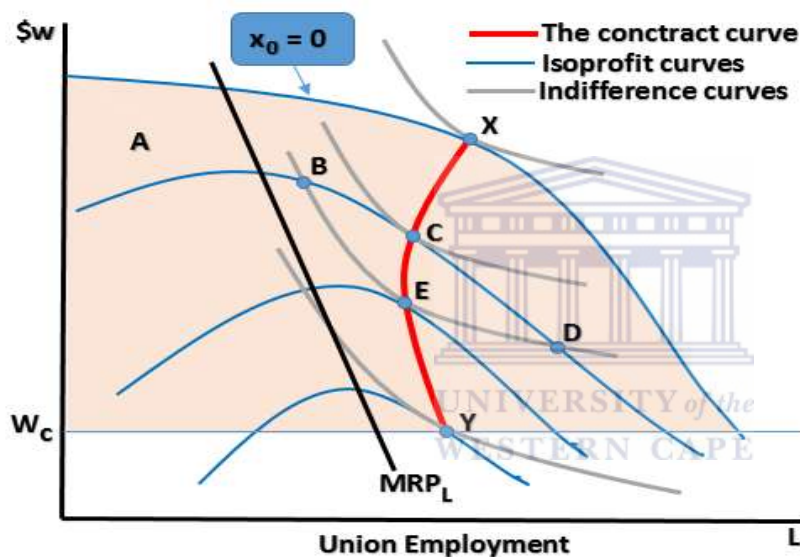
If the MU model is accurate, employment in unionized firms will be inadequately low and wages will be extremely high; when conducting a simple efficiency analysis, unions will be regarded as socially inefficient institutions and if the power of unions weakens it is to be expected that social welfare will increase (this is based on the assumption that non-unionized labour markets continue to remain reasonably competitive) (Lawson, 2010:7-8). If the EB model could describe realism to a better extent, these conclusions may be proven to be untrue; if there is a vertical drawing of the contract curve, the employment level will be calculated efficiently, and then employment will also be too high or too low for social efficiency (Lawson, 2010:7-8). This result will be less socially inefficient when compared to the outcome of the monopoly union. Hence, at whichever rate, it will surely be the case that policy references in relation to labour markets will not be the same, and it will depend on how correct the model is (Lawson, 2010:8).

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<sup>1</sup> The Hall & Lilien (1979) vertical contract curve resulted from their assumption of zero income elasticity of labour supply; this is evident in (McDonald and Solow, 1981), who also exhibit a downward-sloping contract curve that could be the outcome if the union behaved as a community or household. Brueckner (2001) examines several ways to determine which way the contract curve slopes.

Figure 6 shows the feasible bargaining set A, the union's indifference curves, and the firm's isoprofit curves. The contract curve illustrated by the line YX, and this plays a key role in the economic analysis of bargaining (Laing, 2011). As illustrated, it is made up of the locus of tangency points between the firm's isoprofit curves and the union's indifference curves that lie also within the feasible bargaining set A or lie on its frontier (such as Y and X). The significance of the contract curve YX results from the noteworthy facts that (i) all the contracts lie alongside the contract curve and (ii) it is evident that all the contracts that lies on the contract curve is efficient (Laing, 2011).

**Figure 6: Efficient Bargaining model – The Contract Curve**



*Source: Laing (2011:8).*

Any point that lies off the contract curve is not efficient. This is shown by point B in the figure: it is feasible but it is not on the contract curve. It is evident that this contract is not efficient and the firm's profits, and the union's utility are both increased by the lens BCDE because it is feasible. Therefore, any movements alongside the contract curve will severely result in lowering either the utility of the union or else cut the firm's profits (Laing, 2011). In relation to point E, all the other points in A will result in making either the firm or the union not as well off, suggesting that point E illustrates an efficient contract.

## **2.4 Legislative framework**

The main reason for the implementation of the Labour Relations Act (LRA) of 1995 is to “advance economic development, social justice, labour peace and the democratization of the workplace by fulfilling the primary objectives of the Act” (RSA, 1995: 8). The LRA controls the legislative rights of trade unions; it includes the right to strike, sets collective bargaining, and in addition controls the solving of disputes and firing measures (Bhorat, Lundall and Rospabe, 2002: 43). Section 64 of the LRA provides the constitutionally imbedded right to strike, whereas it also provide employers with the means to lockout. Picketing, secondary strikes, and socio-economic dispute actions are also documented in Section 64 of the LRA.

The steadiness of labour has radically not been a viable objective in post-apartheid South Africa. Employees’ constitutional rights, as enclosed in the Labour Relations Act (Act 66 of 1995, which was later amended in 2002), have steered employees towards spending more time on protesting and demonstrating every time they feel they have been treated unfairly. The Act resulted in the implementation of Section 27 of the Constitution amended civil rights of trade unions, supporting collective bargaining, and identifying the right to strike. It also provided instruments for the purpose of disputes and introduced Labour Court and Labour Appeal Court as a high court, with limited authority to decide on difficulties arising. The LRA offers the legislative structure for the development of bargaining councils. In relation to the legislation, at least one verified trade union and also registered firms’ are permitted to create a bargaining council for a region and segment. The government is allowed to be a member of any bargaining councils as a result of this Act, condition on the fact that the government is an employer in that region and section where the bargaining council is developed in (RSA, 1995:22).

### 2.4.1 The right to strike and recourse to lockout

These constitutional rights indicate that if employees are absent from the workplace due to them taking part in strike activities and if employer’s forbid employees to enter the place of work it will be regarded as a breach in the hiring contract of employees. This will create a legitimate holdup in the relationship between employees and their employers (Treu, 1992:1054). Internationally, most countries only acknowledged the right to strike, and they do not recognize the right to lockout. The purpose of this, as disputed, is that imbalances exist in the bargaining relationship if workers are given the right to recourse lockout in industrial action. However, South Africa’s Interim Constitution secured the right to lockout, the



Constitution of the Republic of South Africa Act, 1996 has shown this, by recalling only employees' right to strike.

#### 2.4.2 Collective Bargaining in terms of strike action

If employees are deprived of their right to strike, the bargaining power of unions will to some extent diminish in the collective bargaining process. In the *National Union of Metal Workers of SA & others v Bader Bop (Pty) Ltd* the Constitutional Court indicates that "the right to strike is important for collective bargaining. It is actually the factor that makes collective bargaining work. It is through the process of bargaining that indicates what role the engine play in a motor vehicle". However, the authors Van Jaarsveld, Fourie and Olivier explain (2004:908) as cited in (Vettori, 2005:83) that "the right to strike must not be seen in seclusion but viewed and understood against the of strikes background."

The above-mentioned authors at that time quoted Basson (2003) to back up their argument: "Once employees are organised in trade unions, they are able to conduct negotiations with the employer on a more or less equal footing. But effective collective bargaining can still take place only if the demands made by the trade union are accompanied by the capacity to embark upon collective action in the form of collective withdrawal of labour as a counterweight to the power of the employer to hire and fire employees or to close its plant."

The Constitution indicates that all workers are entitled to strike. The right to strike is also stipulated clearly in the LRA (Vettori, 2005:84). Even though the Constitution does not take the employer's right to lock out into account the LRA does. The explanation of a lockout, nonetheless, is to some degree limited to the meaning of a strike and as a result more practical to implement. Employees strike over substances that they are allowed to strike over and follow the agreed process. The law protect strikers and employees cannot be dismissed from the work place for taking part in strike activities. Hence, the employer cannot claim for loss proceeds during the duration of strikes from the trade union(s), nor from the person on strike (Vettori, 2005:84-85). If an employer fires an employee as a result of being part of a protected strike the correct procedures must be followed and if the strike is the only solution to resolving disputes, the firing of those employees will be regarded as an unfair removal of employees from the work place (Vettori, 2005:84). Hence, the legislature's standpoint with regards to strike action is that it has a genuine role to play in the arrangement of collective

bargaining, as long as it is led by efforts to reach agreements by the means of negotiation and resolution, and that no other solutions are available.

Furthermore, the most important resolution establishments that were created by the LRA are the Commission for Conciliation, Mediation, and Arbitration (CCMA) and bargaining councils (Bhorat, Lundall & Rospabe, 2002). The CCMA is an important institution (middle party) to resolve labour disputes. Section 64 of the LRA indicates that every worker has a right to partake in a strike and to use this right legally, and every single employer has the option to lock out, but only if the disputed concern has been mentioned to a council or to the Commission for Conciliation, Mediation, and Arbitration (CCMA) (Republic of South Africa, 1995).

If industrial action takes place it is compulsory for the employers to complete and submit the LRA Form 9.2. The form was created to keep record of any dispute action, lock-out or industrial action concerning workers (Department of Labour, 2014:41). This form must also be filled in by the employer or any pertinent employer organization.

## **2.5 Review of past empirical studies**

This section will review the past local and international empirical studies conducted on industrial actions, and it is evident that there are only few studies done in South Africa.

### 2.5.1 Review of past local studies

To the author's knowledge, there are only fewer than 10 local empirical studies done on strikes, with two of them being highly descriptive. First, the study by Van der Velden & Visser (2006) compared the strike activities in Netherlands and South Africa in 1900-1998. Focusing on South Africa, the authors first provided a comprehensive review on the history of strikes, before providing a descriptive analysis on the following four indicators: (1) number of strikes (N); (2) number of workers involved in strikes (S); (3) intensity of strikes, which stands for the proportion of workers involved in strikes, S/E, where "E" stands for the total number of workers; (4) duration of strikes (the total number of work days lost (D)).

Subsequently, authors derived the following four composite indices (I) for each year (t):

(1) Unweighted index proposed by the authors: 
$$I_t = \left[ \frac{N_t}{N} + \frac{S_t}{S} + \frac{D_t}{D} \right] \times 100$$

(2) The index proposed by Galambos & Evans (1966) by taking the labour force (W) and

base year (b) into consideration: 
$$I_t = \left[ \frac{N_t}{N_b} + \frac{\left( \frac{S_t + D_t}{S_b + D_b} \right)}{\left( \frac{W_t}{W_b} \right)} \right] \times \frac{100}{3}$$

(3) The index proposed by Van Kooten (1988), who suggested that the Galambos-Evans

index should also divide N by W: 
$$I_t = \left[ \frac{\left( \frac{N_t}{N_b} + \frac{S_t}{S_b} + \frac{D_t}{D_b} \right)}{\left( \frac{W_t}{W_b} \right)} \right] \times \frac{100}{3}$$

(4) The index in (3) is revised, as it is argued that the results of the calculation are reliant on the selected base year, thus it may better to use a yearly average for the entire

period as the “base” (i.e. revised Van Kooten index): 
$$I_t = \left[ \frac{\left( \frac{N_t}{N} + \frac{S_t}{S} + \frac{D_t}{D} \right)}{\left( \frac{W_t}{W} \right)} \right] \times \frac{100}{3}$$

Van der Velden & Visser (2006:9) only presented the full results of index (1) and index (4) in terms of simple line charts, and they found that index (1) showed a rapid upward trend in the 1970s and 1980s, while this only took place in the 1980s for index (4).

Using the 1999-2011 Industrial Action Reports by the DoL, Jacobs and Yu (2013) presented the long-term trends on strike activities across trade unions, provinces and industries. They found that although there were significant fluctuations in the number of work days lost, an upward trend in industrial action still existed over the whole period. The authors also conducted a brief correlation analysis between the number of working days lost as a result of strikes, inflation rate and real GDP growth rate, and found that in 2004-2007, the correlation coefficient between the first two variables was very strong (0.98). Otherwise, the empirical work in this factsheet was very superficial since it mainly provided basic descriptive statistics.

Murwirapachena & Sibanda (2014) examined the incidents of strike action in post-apartheid South Africa. Murwirapachena & Sibanda (2014) studied newspaper and other published articles to find the frequency, reasons, and effects of strikes in South Africa. The growth of labour movements forms a crucial element of strike incidences in South Africa. South Africa

has adapted the Kaufman (2010) core principle which is based on the theoretical and policy formulation of industrial relations, and this is evident by workers right and ability to strike in the country. Visser (2007) described South Africa's industrial relations history, particularly relating to strikes, as a reflection of the apartheid era. Visser (2007) indicated that even though data have recently surface on strike occurrences in South Africa, it does not provide a thorough chronological image of strike activities in South Africa. Therefore, there is a lack of sufficient research on strike activities in South Africa and this placed further impetus on the relevance of this paper.

In general, the common cause of strikes in post-apartheid South Africa is wage increases and/or good working conditions. According to Murwirapachena & Sibanda (2014:554) there are also additional factors that play a key role in causing labour unrests in the country. These factors comprises of competition between unions, poverty, unemployment, and discrimination, the use of migrant employees, legacy of apartheid, and employment cuts, amongst others (Murwirapachena & Sibanda, 2014:554). Moreover, production levels decrease as a result of strikes. Productive work hours are lost through negotiations, protesting, and seat-ins during strikes (Murwirapachena & Sibanda, 2014:557). According to Pulse (2012) there was a lost in production of 15% during the 41-day strike at Lonmin's Marikana mine in 2011. Murwirapachena & Sibanda (2014:557) revealed that the 41-day strike at the mine yielded massive production and export losses. Since, mining contributes nearly 5% of South Africa's GDP and contributes roughly 50% of the entire exports in the country.

Murwirapachena & Sibanda (2014:556) indicated that factors such as inequality, poverty, and unemployment provide social and economic needs for prospective wage increases. According to Hartford (2012), regular workers was deeply angered by the lavish spending of newly empowered black entrepreneurs and the lavish spending by newly, and affluent white individuals. This fuelled their demands to secure a bigger slice of the economic cake. However, it is also important to take into consideration the huge inequality of wage differentials between the remuneration structures of CEOs and owners who earn exorbitant remuneration (ratios that are a thousand times more) than that of entry level employees in South Africa. Factors such as poverty, inequality and fear of unemployment, motivate workers to partake in strikes.

The core results of this paper by Murwirapachena & Sibanda (2014) indicate that strikes are triggered by inequality, unemployment, poverty to the competition between unions and the inequitable nature of labour relations. The effects of strikes were also outlined and it was recognized as being both social and economic. Conversely, the paper suggested that labour market stability could be achieved through the development of good stakeholder relations, equality of labour relations, by rotating employees into employers with the use of indigenization policies, and by imposing a national minimum wage.

Wood & Glaister (2008) examined the econometric relationship between unionization and employee collectivism, and managerial strategies for employee participation and involvement. Using the data from a primary survey with a sample size of 663, namely the 2004 Taking Democracy Seriously Survey, the authors derived a composite index on employee collectivism and union organizational presence. This index consisted of numerous variables, ranging from “having participated in industrial action”, “having shop stewards in workplace” and “attended union meetings at least once a month” to “having a workplace forum”, “having a health and safety committee” and “having team work”. It was found that older male workers who spoke indigenous (African) languages and were permanently employed were significantly more likely to be active in unions, and had quality groups in their workplace (i.e. associated with a higher composite index score).

Schoeman, Botha and Blaauw (2010) examined the role that labour conflict plays in the persistence of under-employment. In their empirical analysis, capital/labour ratio was used as a proxy variable of underemployment, and the following regression was run for the period 1970-2004:  $CO = f(LS, STRIKES, RR, DUM, AIDS)$ , where CO = capital/labour ratio; LS = labour share; STRIKES = strike frequency; RR = real interest rate; DUM an institutional dummy which is equal to 1 for the years when interventions by institutions in favor of labour took place (i.e. abolishment of influx control in 1986, implementation of LRA in 1995, its amendment in 1996, 1998, 2000 and 2002); AIDS = a dummy variable which is equal to 1 in 1990-2003 when HIV/AIDS prevalence increased dramatically in South Africa.

At the end, the authors found a significant positive relationship between the strike frequency (lagged by two years) and capital/labour ratio. This implies that as the frequency of strikes increases, the switch to capital is more likely, with the possible secondary effect of higher unemployment. Also, there was a significantly negative relationship between the institutional

dummy (lagged by two years) and capital/labour ratio. This suggests that the regulation of the labour markets increases employment; such a result is not surprising, as labour relation in favor of labour may have created certainty in the labour market as a whole. Furthermore, the results of the impulse response function indicated that the capital/labour ratio reacted to strikes (positive coefficient) and moved away from the equilibrium.

Bohlmann, Dixon, Rimmer & Van Heerden (2014) used a dynamic computable general equilibrium (CGE) model to estimate the (macro) economic impact of the 2014 platinum mining strikes. The authors analyzed four strike situations in order to capture the impact of strikes in the platinum industry, where each strike builds on from previous strikes pertaining to exogenous imposed shocks. This allowed the authors to prudently examine the impact of various components of the shock on the economy. The study showed that real GDP growth declined by 0.7 percent, due to the strike alone, and more than half of the downward amendment in real GDP growth might be solely as a result of the economy-wide effect of the platinum strike.

When the authors modeled simulations, what they observed first was that the metal ores mining was significantly smaller than anticipated with regards to the impact on the total industry activity. The authors then had an idea to use an amount of capital that stayed hidden and the amount of labourers that remained at home, and use this to determine the pro rata effect on the production industry. The model revealed that if the industry stopped working for duration of time it leads to scarce production and increase of the price of products in the markets. The price increases in production led to an increase of the marginal product of labour and this resulted in the mines employing more labour, and harder work was required than usual in the mines.

The second finding was that the county's general investment state was significantly negatively impacted. The outcome of this finding indicates that the effects are far wider than the likely effects of strikes on metal ores and the wide-ranging mining industry. In the first two scenarios investment in the industry of the metal ores were kept at baseline levels. However, in the last two scenarios investment was declined by 10 percent. The economy's total investment demand dropped by more than 1 percent in 2014. Subsequently, half of all the intermediate goods depend on the construction industry and these goods are used for

investment purposes, but the commodities were harshly affected, with the output of the commodities decreasing by 1.55%.

The last finding by Bohlmann *et al.* (2014) was that investor confidence plays a key role in the modeling of results. The higher nominal wages that were one of the main reasons for the occurrence of the strike, as well as the investment scenario discussed previously appear to impact the economy only momentarily. On the other hand, if investor sureness obtains a blow due to a protracted strike in the mining sector, the outcome of the modeling demonstrates that the damage condensed could have a permanent impact on the economy of South Africa.

Jordaan (2016) used a social accounting matrix (SAM)-based Leontief economic-impact model to estimate the likely effect of strike incidences in the platinum-mining industry in 2012. Two situations were established, one that was based on the structure of the model and a second in which amendments were made to the reimbursement of workers, and to the operating gross surplus. The main results obtained shows that there is a reduction in GDP of 0.525 percent for the first situation and a decline of 0.494 percent for the second situation.

The outcome of this impact on GDP relates to Bohlmann *et al.* (2014) in which the authors estimate the impact of the 2014 platinum-mining strike and found similar results as Jordan (2016). Moreover, if workers are employed for more than one year, and given the loss of production, it indicates a modeled loss of nearly 25 000 to provide equal full-time opportunities for situation one and nearly 23 300 for situation two. This indicated that for every employee that participated in a strike, his/her own job and no less than one other worker's job were placed at risk. Also, based on the unintentional cost of strikes which results in a decrease in GDP, less consumption, a drop in tax income, bigger trade deficits, income losses, and the probability of job losses, it is time for the benefits of strike incidence to be clearly examine, based on direct and indirect cost (Jordan, 2016:316).

Bhana (1997) conducted econometric analysis to find out the impact of strikes on share prices in the period of 1984-1993. The study used the model proposed by Bowman (1983) to compute the abnormal returns that relates to each reported strike incidence. The standard methodology associated with a strike incident was used to estimate the stock markets' reaction to industrial action. This study found that the beginning of an industrial action is related to statistically important, returns that tend to be negatively abnormal. The market's

fast reaction to a strike announcement has significant market efficiency implications. Moreover, the results obtained in the study indicate that strikes had a significantly negative impact on share prices. The costs of an industrial action do not seem to be temporary, due to losses that are sustained during the strike period which is not offset by positive excess revenues after making a decision.

The results tend to support the concept that capital markets are typically capable of anticipating whether a forthcoming contract cutoff date will lead to a strike or settlement. Conversely, the short-term consequences for management are clear in the case of strikes. Strikes are expensive to shareholders of companies, since the share returns decrease during the time of industrial action announcements, and managers should bear this in mind during labour settlements. Secondly, meanwhile long strike periods have a greater cost to shareholders; managers should contemplate this for the period of negotiations simultaneous with industrial action. Furthermore, managers might be driven to publicly minimize the extent of the likelihood of strike costs to display a strong bargaining position to trade unions.

## 2.5.2 Review of past international studies

This section examines the international studies done on strikes and various explanatory variables influencing the likelihood of strikes. These studies can generally be categorized into four groups.

### 2.5.2.1 The relationship between strikes and wages

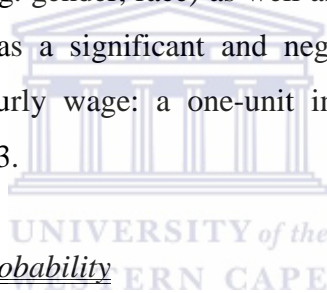
Lacroix (1986) examined the relationship between strikes and the level of negotiated wage agreements by using the data on the 1968-1981 wage settlements signed in the Canadian manufacturing industry. Focusing on about 400 wage settlements that involved strikes, the author conducted the OLS econometric analysis to find out the impact of various explanatory variables (vacancy rate, expected inflation, strikes, amongst others) on wages. The results of the analysis indicated that wages increased more rapidly when excess demand in the labour market was higher (i.e. higher vacancy rate) and inflation was expected to increase. Most importantly, the strike dummy (which was equal to 1 when the collective agreement was signed after the strike) was found to be positive and statistically significant.

Card (1990) used the 1964-1985 Canadian data on wage settlements in the manufacturing industry, which included 2 258 contracts negotiated by 299 firm-union pairs, involving more



than 500 employees. Card conducted an econometric analysis to examine how the first difference of the expected average real wage was influenced by various explanatory variables, including the strike indicators. It was found that, after controlling for inflation, regional unemployment and real wage at the end of the previous contract, there was a significant non-linear effect of strike duration on real wages. The effect was positive and increasing until the strike duration lasted 98 days, before the relationship became negative for longer strikes periods (99 days or above).

Blumenfeld & Victorio (2012) studied the impact of the strike intensity on the firm-level negotiated hourly wage of janitors (sample size was 3 140) in USA in 1972-1986. The strike intensity was defined as the ratio of total work hours spent on strikes to total work hours not spent on strike, multiplied by the mean duration of each strike in days. After controlling for the bargaining characteristics (e.g. union density), firm-level characteristics (e.g. firm size), employee-level characteristics (e.g. gender, race) as well as unemployment rate and inflation rate, it was found that there was a significant and negative relationship between strike intensity and the negotiated hourly wage: a one-unit increase in strike intensity would decrease the hourly wage by US\$3.



#### 2.5.2.2 Factors affecting strike probability

Gunderson, Kervin, & Reid (1986) used explanatory variables such as contract-specific, policy and other variables to explain the likelihood of strikes. This study examined 2 437 private-sector contracts in Canada for 1971-1983. The logit regressions indicated these explanatory variables had a significant impact on strike probability: (1) the larger the bargaining unit size, the greater the probability; (2) the greater the real wage change in the previous contract, the lower the probability; (3) the higher the cyclical unemployment rate, the lower the probability; (4) strike probabilities were lower in jurisdictions requiring a conciliation officer, an officer and a board, and mandatory (but not employer initiated) strike vote and in periods of the anti-inflation board.

Tracy (1986) investigated the determination of the USA's strike activities in 1973-1977, with the sample (n = 1 319) containing information on contract negotiations for which details on strike activities were available. Logit regressions were run to investigate the impact of various factors pertaining to the likelihood of strike occurrences. It was found that the following would significantly increase the probability of a strike occurring: greater volatility

of stock returns; smaller size for the firm (as indicated by lower sales in the previous year), greater capital-labour ratio, the worker being older, being white, and having more years of education.

The other study by Tracy (1987) examined the likelihood of strikes using the same data as in his 1986 study, by focusing on empirically testing the asymmetric information model of strikes, as he argued that the union may be uncertain about the firm's future profitability. Using the standard deviation of raw returns of the firm as a proxy measure of uncertainty, Tracy found that a one standard deviation increase of this measure resulted in a nearly 3% increase in the likelihood of a strike, after controlling for other characteristics.

Booth & Cressy (1990) used the 1984 British Workplace Industrial Relations Survey firm-level data (n = 2 019) to conduct probit regressions on strike probability. The following significant findings were observed: (1) strike incidence probability increased with establishments size; (2) there was a convex relationship between trade union density and strike incidence likelihood; (3) the greater the percentage of skilled workers at the establishment, the higher the strike probability; (4) where the establishments was operating at full capacity, strike probability was reduced, but where sales were rising or stable, the strike probability increased; (5) in establishments where there were payments by results or job evaluation mechanisms, bargaining at the plant of organization level, there was a greater strike likelihood.

Finally, Jansen (2014) investigated the strike incidence in more than 5 000 companies in 2009 using European Company Survey data. The results of the multi-level logistic model indicated the following significant results: (1) strikes were twice more likely in public sector firms; (2) strikes were more likely to happen if the firm size was 100 and more; (3) strike likelihood was higher for larger firms with headquarters and subsidiary sites (reference group: single/independent organizations); (4) strike likelihood was greater if collective wage agreement was reached at a higher level (reference group: firm level); (5) strike likelihood was greater for firms with higher union membership rate, greater number of unions, and union-dominated work councils.

### 2.5.2.3 The relationship between strike frequency, strike duration, wages and labour relations

Mumford (1993) used the 1952-1987 data on the coal industry in New South Wales of Australia (NSW) to examine strike frequencies, by first running a regression in which he found that the previous period's profit has a significant positive impact on the strike frequency, as a change of one standard deviation of the former led to 12% gain in strike frequency. Also, a stock of one standard deviation in real wage was associated with a mere 0.7% increase in strike frequency. In addition, the higher the level of unemployment in NSW and the greater the market power (it stands for the proportion of output produced by the four largest operator in the coal industry), the lower the strike frequency. These results were statistically significant. Furthermore, the greater the physical risks (i.e. higher fatality rate) incurred in the workplace would lead to a significantly higher strike frequency. Regarding the results of the second econometric analysis, it was found that the capital/labour ratio has a significant negative impact on average strike duration, while the average strike duration was positively and significantly associated with the level of export.

Campolieti, Hebdon, & Dachis (2014) investigated the impact of collective bargaining legislation on the private sector strike incidence, strike duration and wage settlements in 1978-2008 in Canada. The authors found that collective bargaining legislation had a minimal effect upon the incidence of striking activity, but had an important impact on the duration of strikes and wage settlements. Three different regressions were run. For the first regression, the authors found that the conciliation and mediation in previous contracts as well as larger bargaining unions were associated with a significant greater likelihood of strikes in the current contract, but the bargaining legislation explanatory variable was insignificant.

For the second regression, larger bargaining unions were associated with significant longer strike durations. Regarding the legislation variables, the following explanatory variables were found to have a significant positive impact on strike duration: cooling-off period, mandatory strike vote, ban on replacement workers, and technical change reopeners. For the third regression, the cooling-off period and negotiated reopeners policy variables were found to have a significant positive impact on average wage level in the contract, while the reinstatement rights and technical change reopeners variables were associated with a significant decrease in wage.

Lastly, Blanchard & Philippon (2004) examined the relationship between the quality of labour relations and the average unemployment across 18 OECD countries in four decades (1965-1975-1995-2003). First, a strike intensity variable was derived by the means of two indicators, namely days lost due to strikes and the number of workers involved in strikes of the 1960s. Next, a variable on the quality of labour relations in 1999 was derived by the means of the firms' response to the question "are labour relations in your firm cooperative?" The answer was given on a scale from 0 (least cooperative) to 7 (most cooperative), and the country mean response was derived. Subsequent, instrumental (IV) regressions on average unemployment were run, with the 1999 labour relations quality variable being instrumented with the 1960s strike intensity variable. At the end, it was found that after controlling for the labour institution differences across countries, countries with better labour relations were associated with significantly lower unemployment.

#### 2.5.2.4 The relationship between strikes and business cycles

Kennan (1985) used the 1968-1976 data on contract strikes in the USA manufacturing industries to examine the cyclicity of strike duration. A flexible duration model was estimated, and it was found that the hazard function for the duration of the contract strikes was U-shaped. The level of the industrial production was also found to have a significant positive impact on the hazard rate. Strike duration was therefore counter-cyclical, that is, an economic boom (or low unemployment rate) in the economy was associated with shorter strike duration.

McConnell (1990) studied the role played by aggregate demand conditions, labour market and product market in the pattern of strikes over time, by using data from over 6 000 contracts covering the period 1970-1981 in the USA. First, logistic regressions on strike probability were run, by including various explanatory variables. The following factors were found to have a significant negative impact on strike likelihood: increase in the unemployment rate, increase in the industry price index, increase in producer price index, increase in the profitability index, a smaller size of the bargaining unit, and most importantly, an increase in business cycle index (it was found that a 10-point increase in the business cycle index increased strike probability by 2%). Hence, strike likelihood was pro-cyclical, meaning an economic boom leads to an increase in the strike probability. Secondly, OLS regressions on logarithm of strike duration were run, and it was found that the industry price index had a significant positive impact on strike duration, while the size of the bargaining unit had a

significant negative impact on strike duration. There was no indication of any significant cyclical variation in strike duration.

Harrison & Stewart (1989) used the monthly data on strikes and lockouts in Canada in 1946-1983. The descriptive statistics indicated that the number and duration of strikes were significantly higher during the trough phase of the business cycle. This is followed by the log of strike duration regressed on the cyclical variable (IP), which was constructed as the residuals from a regression of a 12-month centered moving average of the logarithm of the index of industrial production on a cubic spline in time. Time trend variables, as well as industry and region dummies were also added. It was found that strike durations were counter-cyclical. The other study by Harrison & Stewart in 1994 investigated the cyclical nature of a strike probability and the frequency of strikes using the 1946-1988 Canadian data. The results of the econometric analysis indicated that the strike likelihood was pro-cyclical, particularly in the manufacturing firms. Strike frequency was also found to be pro-cyclical.

Devereux & Hart (2008) used the British engineering industry's records of strike activities in 1920-1970 to investigate the cyclical nature of strike likelihood, strike duration and strike outcomes. In the econometric analysis, it was first found that strike likelihood was pro-cyclical, as a lower unemployment rate was associated with a greater strike probability. Secondly, strike duration was counter-cyclical for both wage and non-wage related strikes. Thirdly, strike outcome (this dummy variable was equal to 1 if the strike was successful – achieving a partial gain or a completely successful resolution for the union) was more favourable to the trade unions when the unemployment rate was lower, i.e. strike outcome was pro-cyclical. This implied that when there was positive economic growth (or lower unemployment), the trade unions were more successful in getting favourable outcomes such as a higher wage and better working conditions.

## **2.6 Conclusion**

The general notion is that strike action has a widespread of harmful influence on the economy. However, adding to the difficulty of the character of strikes, rarely can one empirically measure the effects of strike movements on the economy (Myers and Saretto, 2009). Nonetheless, it is a fact that strikes effects the economy negatively. Across the world, strike motions are associated with instant effects, including loss of production which reduces the GDP, and the long-term effect, such as loss of investment which has a negative effect on

the GDP of a country (Economic Research Division, 2010). Several strike models were created to provide answers to why strikes occur, the causes of strikes and how to solve strike disputes but many of these models were constrained by the lack of available data. Past studies conclude that even though industrial action are seen as a process of relationship between employers and employees, and indicate a democratic economy, they generate economic cost (consisting of working days loss, earnings and output foregone, as well as creating knock-on effects on other subdivisions (Barker, 2008: 101-102) that can be extremely high, conditional on the extent of the strike, the amount of labours involved and the divisions affected.

Finally, upon reviewing the results of past local and international empirical studies, the international empirical studies generally concluded that strike probability, frequency and outcomes were pro-cyclical but strike duration was counter-cyclical. In contrast, there are only few local studies conducted on the impact of strike activities on the South African economy. This added new stimulus to the significance of this study.



## CHAPTER THREE: METHODOLOGY AND DATA

### 3.1 Introduction

This chapter will first discuss the methodology and data, as well as the limitations of the data before examining the impact of industrial action in Chapter Four on the economy of South Africa. Thereafter, the data sources used to corroborate the study will be provided. The data was obtained from Statistics South Africa's using their Quarterly Employment Statistics (QESs), October Household Surveys (OHSs), Labour Force Surveys (LFSs) as well as from the Quarterly Labour Force Surveys (QLFSs), the Annual Industrial Action Reports and the International Labour Organization (ILO) labour database; the data will be used to provide a solid bases for descriptive statistics and empirical analysis. A static analysis will be conducted when estimating the total earnings forgone due to industrial actions before a brief econometric analysis will be conducted.

### 3.2 Methodology

The study will use descriptive statistics and a quantitative approach when investigating the impact of strike activities on South Africa. First, various descriptive statistics will be presented by each broad industry category<sup>2</sup> for the period of 1999-2014<sup>3</sup>, if possible: (1) the level and trend on the number of strike incidents; (2) number of workers involved in the industrial action incidents; (3) total work hours, work days and earnings foregone; (4) the principal cause of disputes; (5) trade unions most actively involved in the industrial actions; (6) time-loss ratios. As far as (6) is concerned, the South African time-loss ratios would be compared with what has been happening internationally. The time-loss ratio is measured as the number of working days lost per 1000 workers as a result of strikes. More specifically, the time-loss ratio provides data that allow comparisons between different industries and countries with various employment sizes (Department of Labour, 2013: 51).

Secondly, by assuming production  $\equiv$  income, total value of production foregone due to strikes is estimated as the product of total work hours lost and the mean hourly wage, *ceteris paribus* (i.e. static analysis is conducted, by assuming the work stoppages would not affect the

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<sup>2</sup> There are 9 broad industry categories in total: agriculture, mining, manufacturing, electricity, construction, wholesale and retail trade, transport, financial intermediation, community services.

<sup>3</sup> In all the available Industrial Action Reports, only the results of two consecutive years are presented in each report, without thoroughly examining what has been happening to each strike indicator over the long period of time. Hence, this study aims to fill this data analysis gap by presenting what has been happening in 1999-2014, and even including a longer "time-series" analysis by including the 1970-1998 ILO strikes data for the analysis.

activities of those who do not join the strikes and other sectors). The detailed methodology of this static analysis is explained as follows:

- The DoL releases total work hours lost due to strikes by industry ( $H_i$ );
- Information on mean monthly income of non-agricultural formal sector employees by industry ( $\bar{Y}_i$ ) in 2004-2014 is available from Statistics South Africa's Quarterly Employment Statistics (QES). Regarding the mean monthly income of formal agricultural workers, it is estimated by using the data from the 2004 to 2007 Labour Force Surveys (LFSs) and the 2008 to 2014 Quarterly Labour Force Surveys (QLFSs);
- The mean usual weekly work hours of formal sector employees in each industry ( $\bar{h}_i$ ) is available in the LFSs and QLFSs;
- The mean hourly wage of formal sector workers by industry ( $\bar{w}_i$ ) is estimated by assuming that the employees work 4.33 weeks per month:  $\bar{w}_i = \frac{\bar{Y}_i}{\bar{h}_i \times 4.33}$ ;
- Assuming production equals income, the total value of production foregone due to strikes is estimated as the product of work hours lost and mean hourly wage, i.e.  $H_i \times \bar{w}_i$ ;
- GVA had strikes not happened would be derived as the sum of the GVA as it is (as released on the Quarterly Bulletin of the South African Reserve Bank (SARB)) and the total value of production foregone due to strikes ( $H_i \times \bar{w}_i$ ).

The same two composite strike indicators done by Van der Velden & Visser (2006) as mentioned earlier will be derived, but instead of merely presenting the trend of these indicators over time, this study would take one step further by examining their relationship with business cycle indicators, real GDP growth and inflation rate. The two indicators are derived as follows (Van der Velden & Visser, 2006:67-70), by using the data from both the 1970-1998 ILO labour database and the abovementioned Annual Industrial Action Reports:

- Indicator (I):  $I_t = \left[ \frac{N_t}{N} + \frac{S_t}{S} + \frac{D_t}{D} \right] \times 100$ , where t = year, N = number of strikes, S = number of workers involved in strikes, D = number of work days lost due to strikes;



- Indicator (II):  $I_t = \left[ \frac{\left( \frac{N_t}{N} + \frac{S_t}{S} + \frac{D_t}{D} \right)}{\left( \frac{W_t}{W} \right)} \right] \times \frac{100}{3}$ , where W= labour force number.

The other two indicators would not be looked at, because of the criticisms about the choice of base year having a huge impact on the indices. The main problem with using these indices is that the results mainly depend on the base year that is chosen (Van der Velden & Visser, 2006:70). The authors choose 1920 and 1970 as the base year once computing the Galambos-Evans index and found that the results differ when using these years. The results indicated that when 1920 were used as the base year the year 1970 peaked and vice versa happened when 1970 were used (Van der Velden & Visser, 2006:70). This showed that the Galambos-Evans index is not an effective way to calculate an index, because the outcome depends on the chosen base year. On the other hand, Van Kooten tried to find a solution to Knowles's criticism of the Galambos-Evans Index by dividing the frequency (N) by the workforce (W). The Van Kooten index provided a solution to Knowles problem (van der Velden & Visser, 2006:70). Nonetheless, base year dependency was still a problem. Upon conducting the annual average for the entire period using Van Kooten's calculation as the base year (Van der Velden & Visser, 2006:70), this problem was officially solved. Therefore, this adjusted Van Kooten's index will be used for this study.

The final part of the empirical analysis conducts a multivariate econometric analysis on the two strike composite indices for 1970-2014. Each variable is regressed on the following explanatory variables:

- Business cycle coincident indicator (CI). If strikes are pro-cyclical, this explanatory variable would have a positive coefficient. Pro-cyclical strikes imply that the demands of trade unions (e.g. higher wages and better working conditions) are more likely to be met.
- A dummy variable that is equal to 1 for the years when there were significant changes in labour legislation (refer to Schoeman *et al.*, 2010: 280)<sup>4</sup>, for instance, the abolishment of influx control in 1986, implementation of the new LRA in 1995 and the implementation of the Skills Development Act in 1999. It is expected that this

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<sup>4</sup> This dummy variable is equal to 1 in the following years, 1973-1975, 1979, 1981, 1986, 1988, 1991-1993, 1995-2000, and 2002.

dummy variable would have a positive coefficient, because it was based on important historical occasions or regulations that happened in the South African labour market. A value of 1 was given to such an occasion or legislation if it had a positive outcome for labour as a production factor. Nearly, all of the institutional improvements after 1973 supported labour as a production factor.

- Real interest rate: there is a positive relationship between real interest rate and strikes, because if real interest rate increases it will be too costly to loan real capital, the demand for labour will than increase and this will lead to a rise in strike incidences as workers are in a more advantaged position.
- A dummy variable that is equal to 1 for 1995-2014. With the advent of democracy and the new LRA in 1995, it is argued that there should be a sustained decline in strike activity, and hence the dummy variable should be associated with a negative sign. A number of analysts suggest that a decline in strike incidences is due to the amended Labour Relations Act of 1995 (from 2003 Industrial Action Report, DoL, 2003:2). According to the 2003 Industrial Action Report these analysts argue that improving the measures of strike disputes create greater expectedness concerning the bargaining process and this has led to a continued decrease in strike events. Improving strike dispute procedures also displayed various issues such as retrenchment and firing workers which were formerly considered as major strike causes (Department of Labour, 2003:2).

### **3.3 Data**

The data that was used in this study was obtained from dependable sources. When examining the economic impact of industrial action in South Africa, an empirical study was done using nationally representative annual data from 2003-2014 Industrial Action Reports by the DoL. These reports provide information on the number of work stoppage incidents, working days lost, work hours lost and causes of strikes in 1999-2014. Regarding the industrial action data before 1999, it is not publicly available. However, the International Labour Organisation's ILOSTAT database contains information on the following data in 1970-1998 by broad industry category: number of strikes (N), number of workers involved (S) and total work days lost (D). These data would be used (by 'appending' them with the 1999-2014 DoL data) for the forthcoming time-series econometric analysis.

Information on mean hourly wage in 2004-2014 is derived with the aid of Statistics South Africa's QESs, before total earnings foregone could be derived. Furthermore, data on the number of formal sector employees is needed before time-loss ratios could be derived. The former information could be obtained from the 1999 OHS, 2000-2007 LFSs and 2008-2014 QLFSs. Finally, the Quarterly Bulletins of the South African Reserve Bank (SARB) include information on the various macroeconomic variables to be used for the econometric analysis (business cycle indicator, real interest rate, gross value added by industry).

### **3.4 Limitations**

One drawback of the study is that, due to the short duration of the availability of the detailed industrial action statistics (comprehensive data on strikes is only available for 16 years, namely 1999-2014), it is not possible to conduct thorough robust econometric analysis, as extended time-series data are only available for three strike-related variables in the ILO labour database (for the years 1970-1998): (1) number of strikes; (2) number of workers involved in the strikes; (3) total amount of working days lost as a result of industrial action. The other drawback is that there are no worker-level and/or firm-level surveys conducted on strikes in South Africa, therefore it is not possible to conduct an empirical analysis as discussed in the review of international studies in Section 2.5.2.

Wilkonson & Chiumia (2013) highlight some concerns on whether the estimates on the economic cost of strikes are accurate or not. The director of the Centre for Economics Journalism in Africa, Reg Rumney stated the readers should be cautious of the estimated loss figures on the estimated cost of strikes, because he implied these figures are simply a "guesstimate". Levy, states that even labour experts are unable to accurately estimate the cost of strikes and there are various losses that must be considered both indirectly and directly. Russel, also agreed to these statements made by Rumney and Levy, that these quoted numbers are merely estimations used to demonstrate the industry's concerns. Moreover, the social cost relating to strikes is significantly important. The impact of strike incidences on employees and the wider communities is important, because in these communities there is zero economic activity during the durations of strikes (Naryshkine). When estimating the cost of strikes to many factors must be considered, both social and economic cost must be taken into consideration in order to accurately estimate the cost of strikes. To conclude, it is not always easy to estimate the economic costs (and even benefits) of strikes accurately.

### **3.5 Conclusion**

This chapter discussed the research methodology that was undertaken in this study, which was used to examine the impact of industrial action upon the economy. The empirical data used for the study was clearly outlined to indicate the validity of the research. Finally, this study would not conduct the highly sophisticated SAM and CGE analysis, as these complicated modelling techniques fall beyond the scope of this study.



## CHAPTER FOUR: EMPIRICAL ANALYSIS

### 4.1 Introduction

This chapter will first present detailed descriptive statistics on industrial action activities in each broad industry to find out which sector is mostly responsible for causing strike activities to be high in each year. Then the results of the static analysis on the total earnings foregone due to strike activities will be discussed for the period between 2004 and 2014. Afterwards, the earnings foregone as a proportion of GVA during the period will be derived, before showing what the total GDP and economic growth would have been without the impact of strikes. Lastly, a simple correlation analysis will be conducted between the strike data and macro-economic variables such as the inflation rate, the real GDP growth rate and the number of work days foregone as a result of strikes, followed by an econometric relationship between strikes and business cycles in 1970-2014.

### 4.2 Descriptive statistics

#### 4.2.1 A brief history of the South African trade union movement

In 1910 the union of South Africa excluded African workers from taking part in any formal political expressions. Afterwards, various laws were passed that would deleteriously effect the labour market outcome (Bhorat, Naidoo & Yu, 2014:2). The Mines and Works Act of 1911 set aside skilled mining jobs only for whites, whereas the 1913 Land Act banned Africans from possessing any land in selected 'white' areas and Africans were only able to live as 'reserves', in certain areas. Africans only accounted for seven per cent of the total land area in the country. Conversely, African workers were forced into low-remuneration industries and careers as a result of Pass Laws which curtailed the free movement of African labour (Van der Berg and Bhorat 1999; Woolard, 2001). Consequently, the labour market was regarded as a strong racial division of labour that would carry on for many years to come.

The government created a 'floating' job bar in 1960 in order to meet the increasing demand for skilled labour. The white-skilled jobs were split into two when the 'floating' job bar was implemented, where African employees were only permitted to carry out the less-skilled part of a job, and the White employees the more skilled part without undermining the laws of apartheid. The African workforce received a conditional labour market mobility, which was desperately needed for a fast-growing economy (Van der Berg & Bhorat, 1999; Woolard, 2001).

In the early 1970s with the rise of inflation and persistently low wages, more strike incidents by African employees were based on wage demands. Pressure on the government started to increase further in the 1970s from several sources, such as a decrease in economic growth, the implementation of the 1974 international trade sanctions, and the 1976 important uprising of black youth in Soweto. Therefore, significant social and economic instability were generated as a result of the job reservation policy, trade union registration, and collective bargaining systems, which operated in the favour of white employees in South Africa (Van der Berg & Bhorat, 1999).

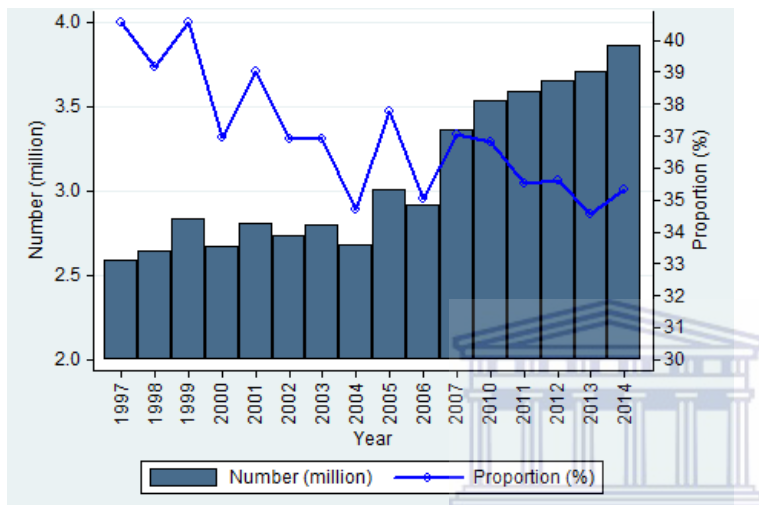
The 1973 wildcat strikes were recognised as a watershed incident in the country's historical labour movement, and this event forced the government and employers to reconsider their methods to industrial relations. The industrial Conciliation Act of 1979 represents an important turning point in the black trade union movement. It indicated the formal legal acknowledgment of this rapidly increasing movement, signifying the ambitions and demands of black employees (Bhorat, Naidoo & Yu, 2014:3). In the mid-1980s trade unions became a vital economic and political force against the apartheid regime. The black trade union movement was at the centre of the political fight against apartheid in South Africa. Industries that have black trade unions, forced other employers' relations to approve their merger into a national bargaining council. Conversely, other industries that did not have any bargaining councils, were approached by large black trade unions and they effectively managed to porch the establishment of a national bargaining council for such industries (Godfrey *et al.* 2010). This paved the way to a more centralized collective bargaining from the 1990s onward.

In South Africa trade union movement plays a significant role in the struggle for democracy. Trade union movement in South Africa has also been indissolubly linked to the anti-apartheid movement. The abolition of influx control was ultimately achieved in 1986, this added stimulus to the already strong labour movement that was provided by the black trade unions in the late 1970s. The goals of the trade union movement was reinforced by the aims of the wide-ranging anti-apartheid movement, along with a non-racial, democratic society, and with particular aims to improve the working conditions of all employees (Bhorat, Naidoo & Yu, 2014:4). Hence, all these developments, together with the post-apartheid amendments to labour regulations stimulated the registration of trade unions in all industries. This paved the way for an extensive growth in the number of trade unions and unionized employees ever since 1994.

#### 4.2.2 Extent of unionization

Figure 7 shows that while there was an upward trend on the number of unionized formal sector employees (increasing from 2.59 million in 1997 to 3.86 million in 2014), a downward trend on the unionization rate (the proportion of formal sector workers being trade union members) took place during the same period as this percentage dropped from 40.55% to 35.33%.

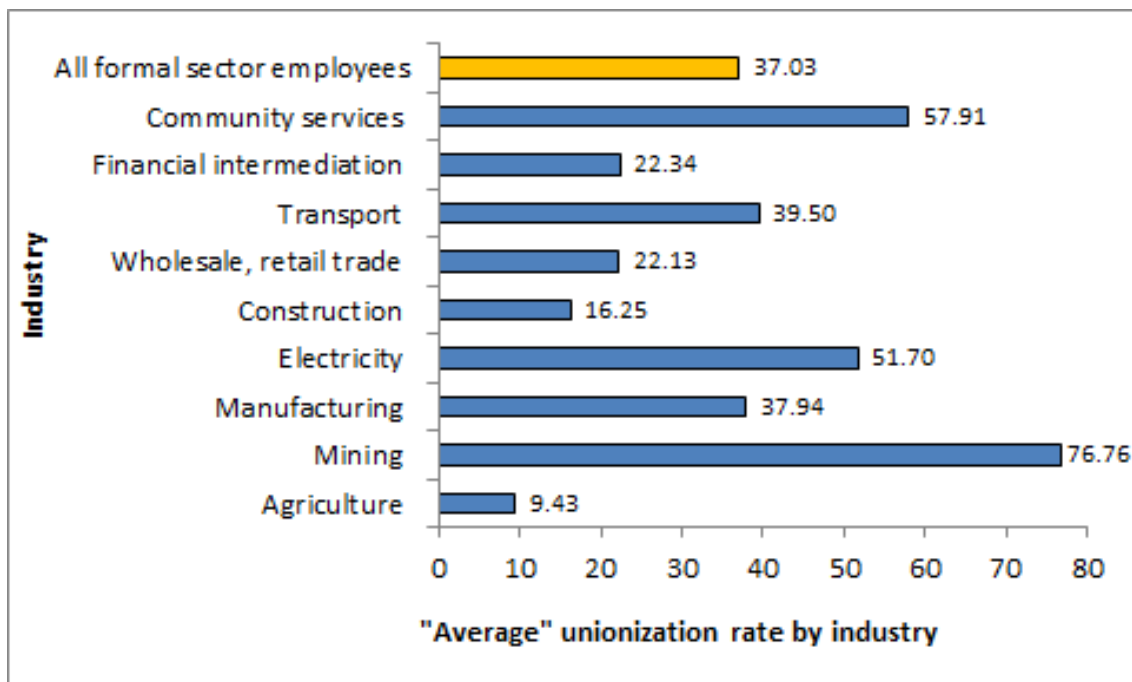
**Figure 7: Number and proportion of unionized formal sector employees, 1999-2014**



Source: Own calculations using OHS 1997-1999, LFS 2000-2007, QLFS 2008-2014 data.

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**Figure 8: Average unionization rate by industry, 1997-2014**



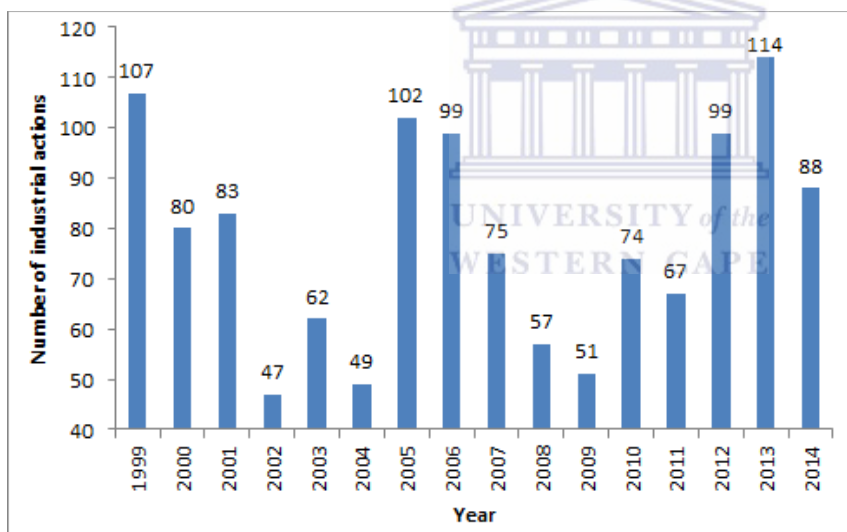
Source: Own calculations using OHS 1997-1999, LFS 2000-2007, QLFS 2008-2014 data.

Figure 8 reflects the average unweighted unionization rate by industry<sup>5</sup> from 1999 to 2014. During the 16-year period under study, on average, mining is the industry with the highest proportion of workers who are trade union members (76.76%), followed by the Community Services industry (57.91%). In fact, these are the only two industry categories with the average unionization rate above 50%.

#### 4.2.3 Number and nature of industrial action incidents

Figure 9 illustrates the total number of strike incidents in South Africa from 1999 to 2014. The year 2002 had the lowest number of strike incidents (47 in total). It increased to 62 in 2003 before dropping to 49 in 2004. This number abruptly increased to 102 in 2005 before a continuous downward trend took place until 2009. An upward trend took place in 2011-2013, with the number peaking at 114 in 2013, before dropping to 88 in 2014.

**Figure 9: Number of industrial actions, 1999-2014**



*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

Figure 10 extends to the analysis of Figure 9 by adding the results of 1970-1998 using the ILO labour database. The number of strikes abruptly increased to nearly 400 in 1973-1974; this was attributed to the wildcat strike<sup>6</sup> in 1973 and it was seen as a defining moment in the labour market history of South Africa (Bhorat, Naidoo & Yu, and 2014:4). The number of

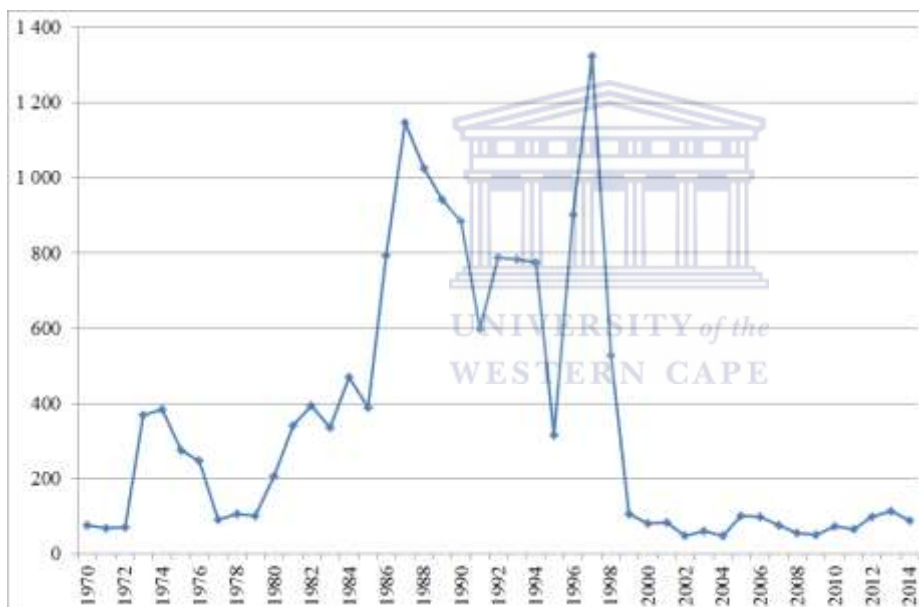
<sup>5</sup> This actually stands for the unweighted average of the annual unionisation rate for the period 1997-2014. For these annual statistics by industry, refer to Table A.1 in the Appendix. The same approach will be adopted in the forthcoming analysis when the ‘average unweighted’ results are presented.

<sup>6</sup> A wildcat strike is a strike that is not controlled by a regular trade union, but, rather by an *ad hoc* working group mounting to a specific incident (Troskie, 1998:56).



strikes suddenly increased to 1 148 in 1987 compared to only 389 in 1985. In 1987, six million workdays were lost as a result of a lengthy and huge strike in the mining industry. Nine people lost their lives during this strike and 500 strikers were wounded. After, these incident workers from the public sector started to assemble. Moreover, in 1987 an industrial action by the South African Transport Services of 18 000 employees, originally started with the firing of a worker which later intensified into a huge clash between the South African Railways and Harbour Workers' Union (SARHWU) and the government (Oberholzer 1992:152). Furthermore, the number of strikes peaked at 1 324 in 1997, before an abrupt downward trend took place in 1998-1999. Finally, it is noticeable that the number of strikes in 1999-2014 was much lower compared with the earlier years.

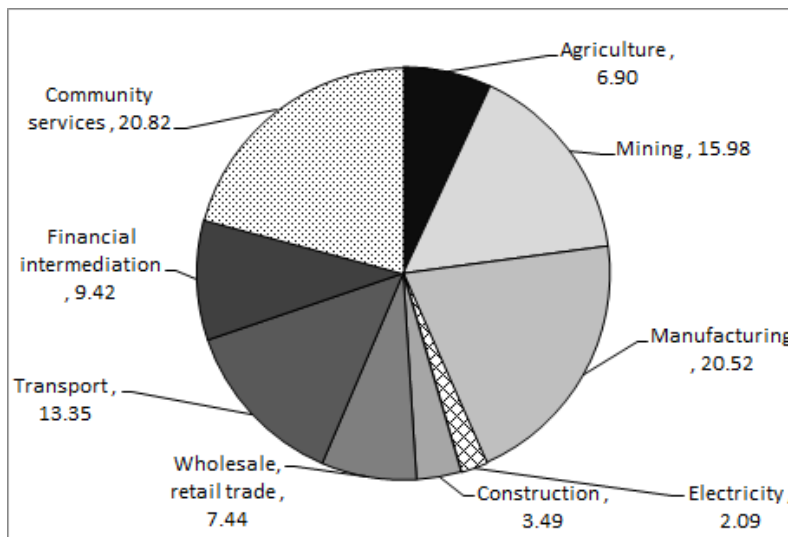
**Figure 10: Number of industrial actions, 1970-2014**



*Source: Own calculations using the data from the ILO labour database and the 2003-2014 Industrial Action Reports.*

The average industrial share of strikes between 1999 and 2014 is presented in Figure 11 (for detailed results by industry in each year, refer to Table A.2 in the Appendix). On average, the Community Services (20.82%), Manufacturing (20.52%) and Mining (15.98%) industries accounted for the highest share of strike incidences during the 16-year period under study.

**Figure 11: Average percentage share of industrial actions by industry, 1999-2014**



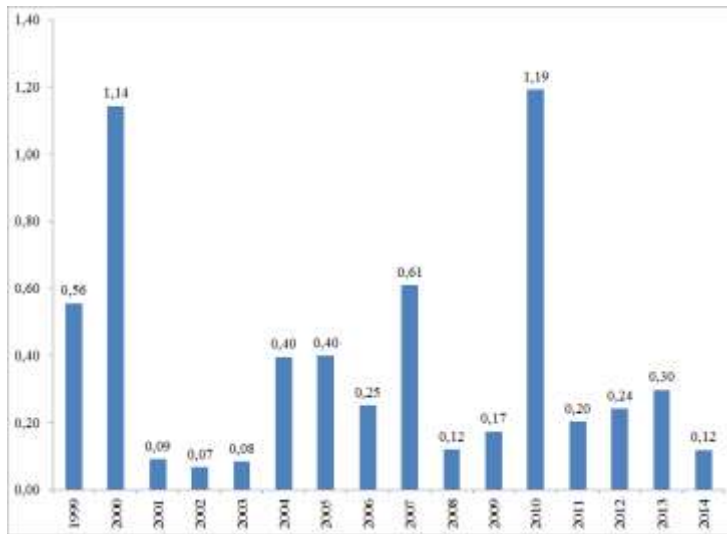
*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

Tables A.5 to A.7 in the Appendix provide additional information on the nature of strikes. First, Table A.5 shows that the majority of strikes (the average proportion being 53.22%) was related to the category “strike company only”; Table A.6 indicates that the majority of the strikes lasted between 1-10 days (the average proportion was 32.91% and 25.37%, for the “1-5 days” and “6-10 days” categories respectively). Finally, as far as strikes by size of establishment is concerned, until 2010, the share of “1000+” was relatively more dominant in most of the years, but in 2011-2014, the majority of strikes rather took place in smaller establishments (see Table A.7). In fact, in these four years, the firms with less than 300 workers accounted for about 60% of the strikes (see the last four columns of the table).

#### 4.2.4 Number of workers involved

Figure 12 presents the total number of workers involved in strikes in 1999-2014. The highest number of workers involved in strikes occurred in 2000 (1.14 million). This year was associated with strikes concerning worker grievances such as employer requirements for staff to be multi-skilled, job grading, productivity targets and perceived or real discrimination practices (IOL, 2001). After 2000, this number fluctuated between 0.07 million to 0.61 million in 2001-2009, before abruptly rising to 1.19 million in 2010 as a result of the public sector strike that happened in July and August 2010. This number dropped to 0.20 million in 2011, before decreasing further to 0.12 million in 2014.

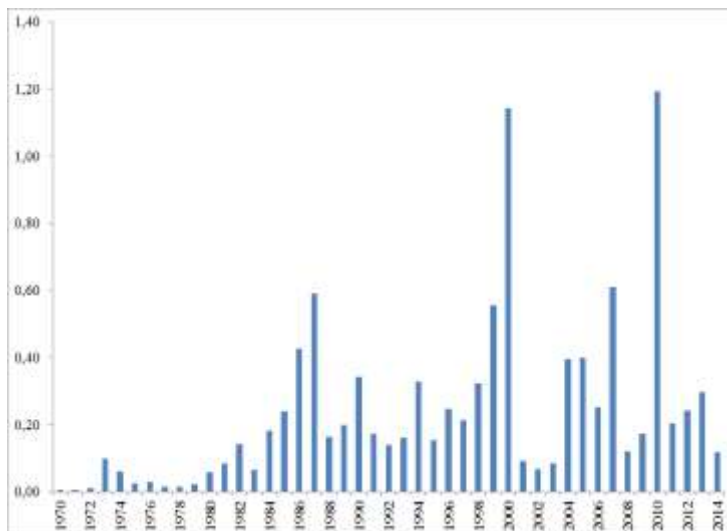
**Figure 12: Number of workers (million) involved in industrial actions, 1999-2014**



*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

Figure 13 extends the above analysis by adding the 1970-1998 results from the ILO labour database. For these earlier years, it can be seen that the number of workers involved in strikes was particularly high in 1986 and 1987, due to the aforementioned wild cat strikes. Finally, Table A.8 in the Appendix shows the number of workers involved in strikes by industry in 1999-2014, and it can be clearly seen that the Community Service industry accounted for a very high proportion of the workers involved in strikes in the two abrupt years (2000 and 2010).

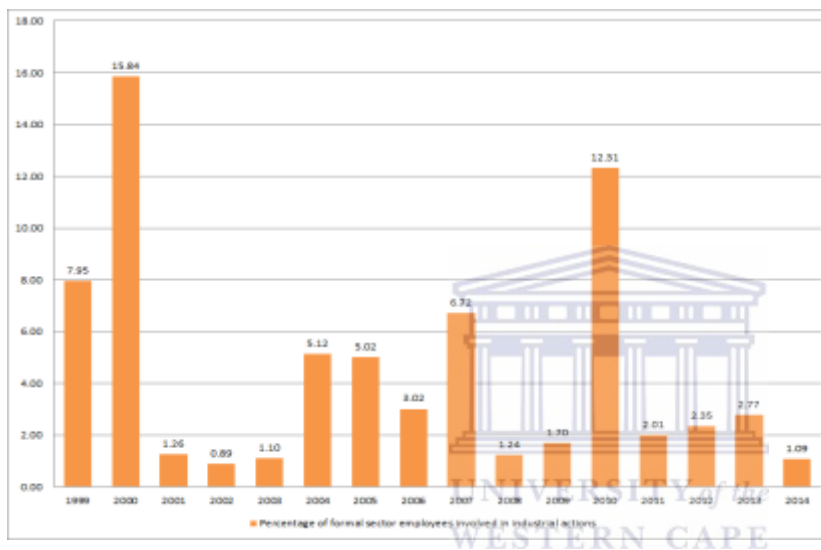
**Figure 13: Number of workers (million) involved in industrial actions, 1970-2014**



*Source: Own calculations using the data from the ILO labour database and 2003-2014 Industrial Action Reports.*

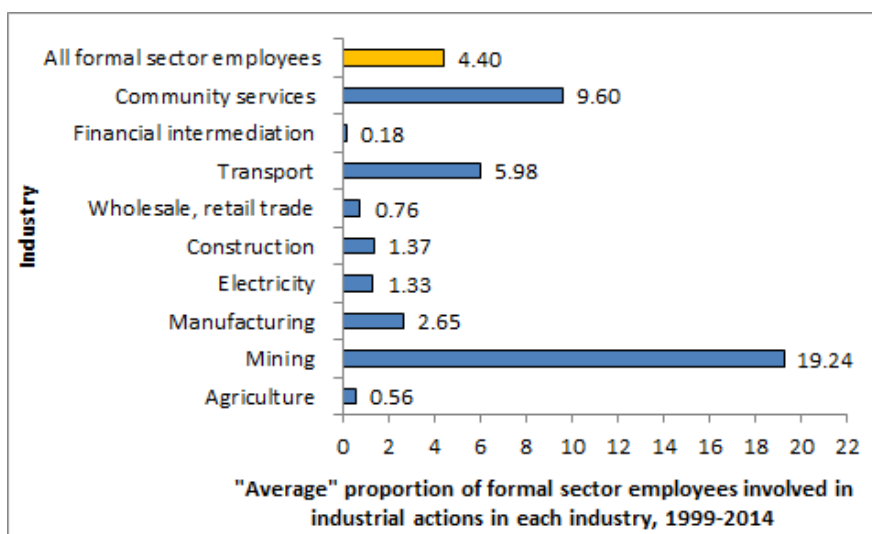
The percentage of formal sector employees involved in strikes in 1999-2014 is showed in Figure 14, and it can be seen that this percentage has been quite unstable, ranging from as low as 0.89% in 2002 to 15.84% in 2000. Table A.10 in the Appendix presents the results by industry and it can be seen that this proportion was relatively higher for the Mining (especially in 2005, 2007, 2012 and 2013) and Community Services (especially in 2000 and 2010) industries.

**Figure 14: Percentage of formal sector employees involved in industrial actions, 1999-2014**



Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.

**Figure 15: Average percentage of formal sector employees involved in industrial actions by industry, 1999-2014**



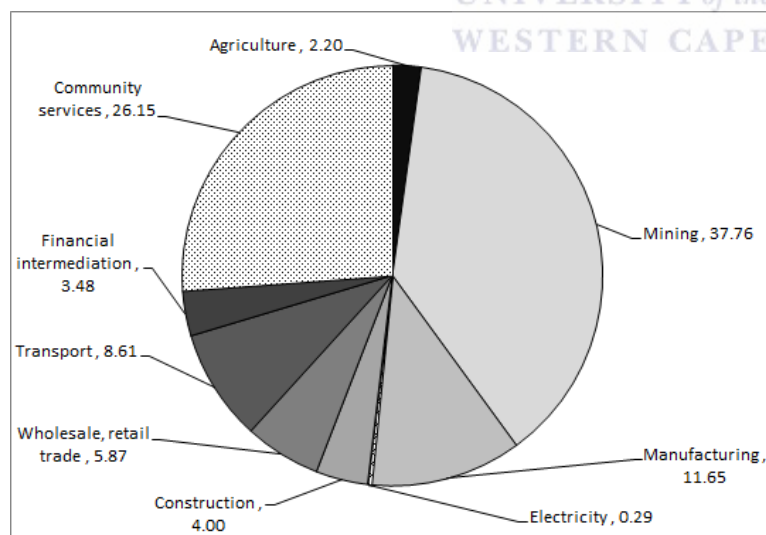
Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.

The average unweighted percentage of formal sector workers who participated in strikes by industry is presented in Figure 15 above. Over the 16-year period under study, this share was the highest in the Mining industry (19.24%), followed by the Community Services industry (9.60%).

#### 4.2.5 Work hours lost

Table A.11 in the Appendix shows the total absolute number of work hours lost due to strikes (the information is only available for 2003-2014); the results indicate that, in overall terms, the total work hours lost was the highest in 2010 (161.85 million hours), followed by 2014 (109.82 million). The last row of the table shows that, on average, the total work hours lost was the highest in the Community Services industry (18.95 million) and Mining industry (15.79 million). On the other hand, Figure 16 illustrates the average percentage share of work hours lost due to strikes by industry, and it can be seen that the Mining industry accounted for the highest share (37.76%), followed by the Community Service industry (26.15%). The detailed results by industry in each year could be found in Table A.12 in the Appendix.

**Figure 16: Average percentage share of work hours lost due to industrial actions of each industry, 2003-2014**



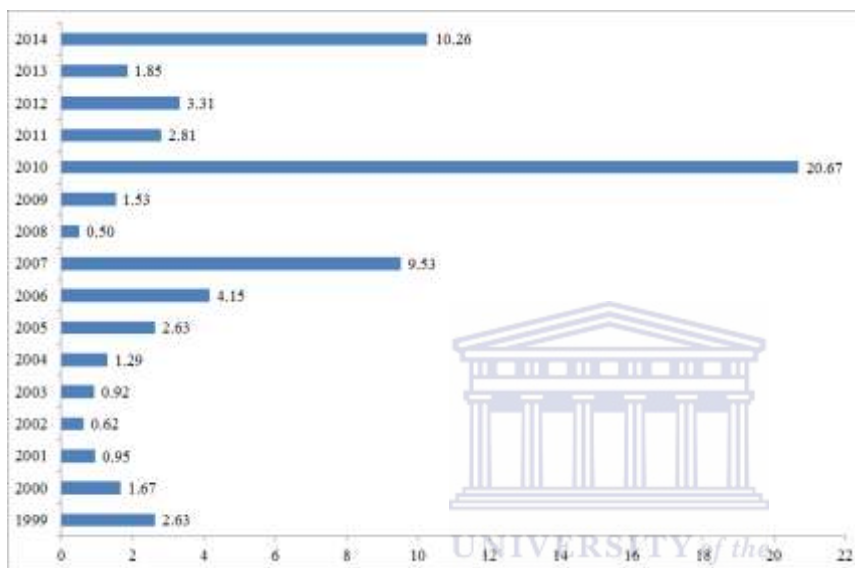
*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

#### 4.2.6 Work days lost

The number of working days lost due to strikes points towards the total number of employees who took part in the strike or lockout multiplied by the duration of the industrial action. First, Figure 17 presents the 1999-2014 results using the DoL data. The more significant strikes

during the period would be reviewed here. The number of working days lost increased from 0.92 million in 2003 to 1.29 in 2004, mainly due to a strike incidence in the North West (Department of Labour, 2004:2; 2005:3) in the latter year. In 2005 the number of working days lost more than doubled to 2.63 million in 2005; in this year, the first nationwide gold miners' strike took place for the first time in 18 years, while the South African Airways (SAA) workers were on strike for a long time (Department of Labour, 2006: 1)

**Figure 17: Number of work days lost (million) due to industrial actions, 1999-2014**



*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

The number of work days lost increased further to 4.15 million in 2006: six larger stoppages took place in the country in this year: the contract national strikes, the security guards strike, Shoprite/Checkers strike, Pick'n Pay strike, Sun International strike, and the labour dispute at Sasko. These six disputes represented nearly 90 per cent of total work days lost in 2006. The largest public service strike in the history of South Africa's labour relations took place in 2007 (Department of Labour, 2008: 1-2), as the public service unions and the government were unable to reach a wage agreement before the second half of 2007 commenced. Hence, the workers had lunch-hour pickets in their respective workplaces, before embarking on a one-day strike on the 25th of May. A long strike (lasting 25 days) eventually took place in early June. This strike alone led to 8.1 million work days lost (representing 85 per cent of total work days lost in 2007).

The highest amount of working days lost was recorded in 2010 (20.67 million). This outcome was due to a public sector strike during July and August of that year, with more than 1 million strike participants (Department of Labour, 2011: viii). This number decreased significantly by 86.4% to 2.81 million in 2011; this huge decline can be described by the fall of strike incidences in the public sector with the formal acceptance of a wage agreement (Department of Labour, 2012:6).

While the work hours and work days lost in 2012 (3.31 million days) were, relatively speaking, not particularly high, the country experienced violent and bloody industrial actions in the mining, transport and agricultural industries during the last three months of the year. Work hours and work days lost were most prominent in the mining industry (Tables 6 and 7), with most striking workers coming from the National Union of Mineworkers (Department of Labour, 2013: 2). Finally, 2014 was nominated by numerous national strikes in the mining industry. These national strikes had a big impact on the South African economy as most of these strikes were related to wage hike demands (Department of Labour, 2015: 3); these strikes eventually led to a huge 10.26 million work days lost.

**Figure 18: Number of work days lost (million) due to industrial actions, 1970-2014**



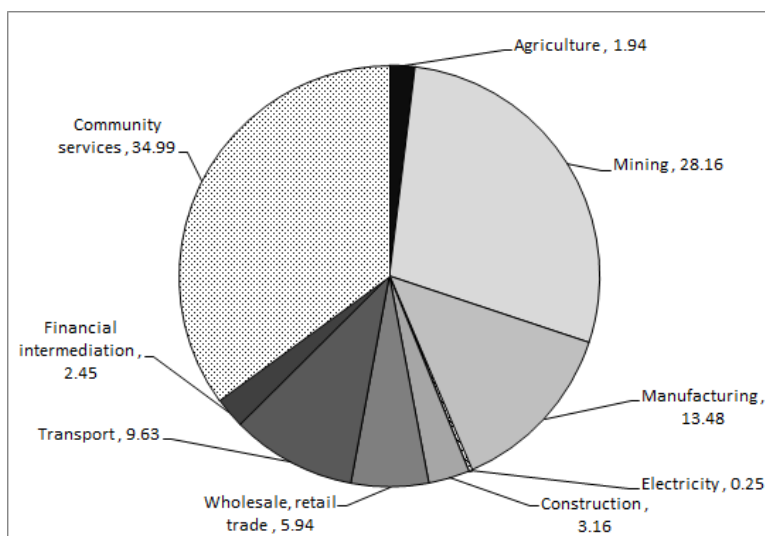
**Source: Own calculations using the data from the ILO labour database and 2003-2014 Industrial Action Reports.**

Figure 18 above extends the analysis by adding the 1970-1998 ILO data. For these older years, the number of working days lost as a result of strikes was particularly high in 1987 (refer to the earlier discussion). Since there are no Industrial Action Reports for the years

1970 to 1998 we can only discuss the big historical strike events in South Africa to a certain extent. Wildcat strikes were taking place from 1979 and trade unions realized that they are losing control over employees during this time (Homma & Hoeksema, 1979). Number of strikes increased from 101 in 1979 to 1 148 in 1987 (Oberholzer 1992:152). The number of working days lost in the mining sector in 1987 was the greatest due to long strike durations (were almost 6 million workdays were lost). After the 1994, election there was a decrease in the strike frequency; this was due to a decrease of activities in the mining and manufacturing industries. Moreover, wage disagreements in both the private and public sector, such as the police, municipal and health services, created a new wave of strike disputes from 1996 to 1999 (Bendix 2001:83; Finnemore & Van Rensburg 2002:374).

Table A.15 in the Appendix shows the number of work days lost by industry in 1999-2014; this number was particularly high in the Mining industry in 2014 (9.61 million) as well as the Community Services industry in 2007 (8.16 million) and 2010 (18.87 million). Figure 19 shows the average unweighted industrial share of work days lost. The results indicate that this share was the highest in the Community Services industry (34.99%), followed by Mining (28.16%) and Manufacturing (13.48%). The detailed results in each year are presented in Table A.16 in the Appendix: the share was the highest in the Mining industry in 7 years (this share was as high as 82.43% in 2012 and 93.64% in 2014), while this share was the highest in the Community Services industry in another 7 years (it was the highest in 2010 at 91.25%).

**Figure 19: Average percentage share of work days lost due to industrial actions of each industry, 1999-2014**



*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

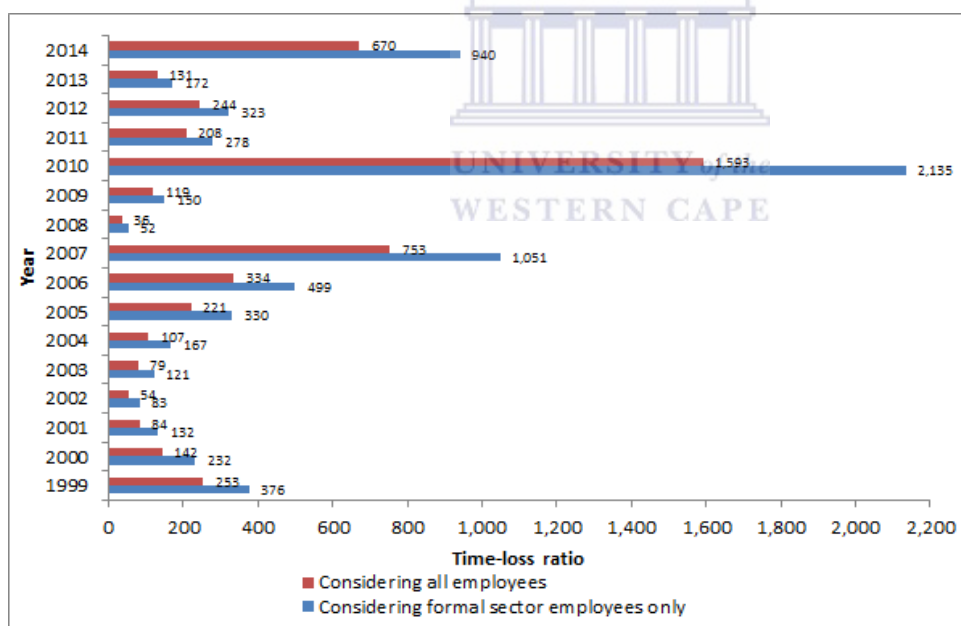


#### 4.2.7 Time-loss ratios<sup>7</sup>

The time-loss ratio indicates the number of work days lost as a result of strike incidences per 1 000 workers (Jacobs & Yu, 2013:6). This is a benchmark indicator and we use it to compare industrial action across various countries, and industries. The time-loss ratio is also the most frequently used indicator and it provides a very reliable outcome when comparing industrial action in different countries and industries.

The overall time-loss ratios in 1999-2014 in South Africa are presented in Figure 20. Focusing on the ratios derived by only considering the formal sector workers, in general, the time-loss ratio decreased continuously from 1999, before an upward trend took place between 2002 and 2007. The ratio reached 1 051 in 2007. After decreasing dramatically in 2008, it increased again and reached 2 135 by 2010. The ratio decreased abruptly to 278 in 2011 before rising again to 941 in 2014.

**Figure 20: Time-loss ratios, 1999-2014**



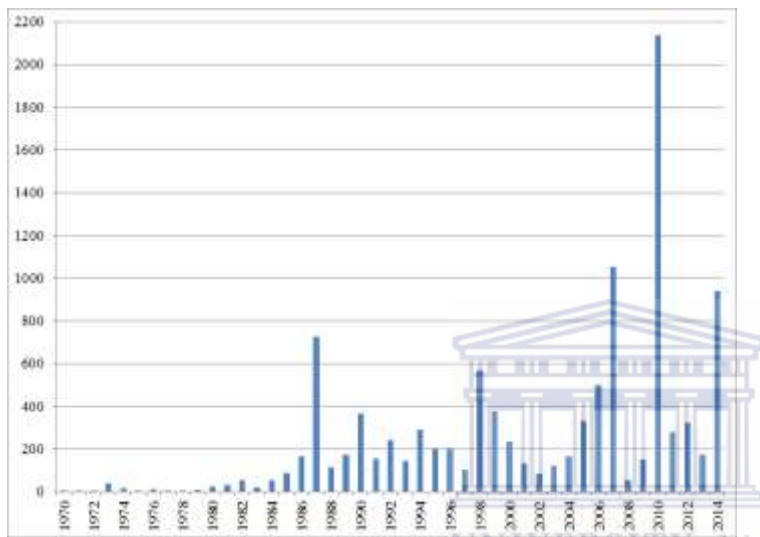
*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

Figure 21 extends the analysis of Figure 20 by adding the 1970-1998 results using the ILO labour database. It can be seen that the time-loss ratio was extremely high in 1987, due to the abovementioned 1986-1987 wild cat strikes. Furthermore, the time-loss ratio of South Africa

<sup>7</sup> This indicator internationally compares strike activities in different countries. The ratio indicates which country is susceptible to strikes when compared to other countries.

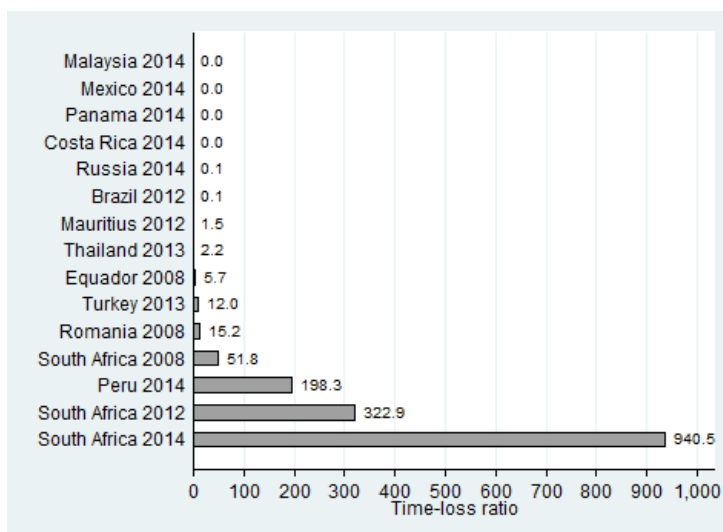
compared to other upper-middle income countries is presented in Figure 22. South Africa is the country with highest time-loss ratio when compared to these countries: the time-loss ratio was very high in South Africa (322.9 in 2012 and 940.5 in 2014), but it was very low in countries like Russia (0.1 in 2014) Mauritius (1.5 in 2012) and Turkey (12.0 in 2013). Even though the 2014 Peru time-loss ratio (198.3) was higher than the South African ratio in 2008 (51.8), it was still very low compared with what happened in South Africa in 2012 and 2014.

**Figure 21: Time-loss ratios (considering formal sector employees only), 1970-2014**



*Source: Own calculations using the data from the ILO labour database and 2003-2014 Industrial Action Reports.*

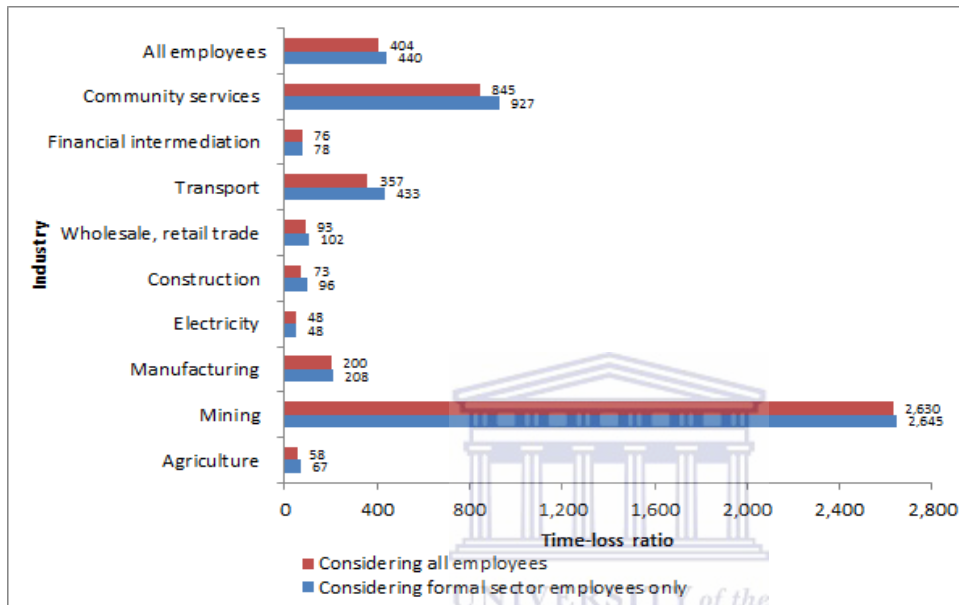
**Figure 22: Time-loss ratios, South Africa vs. other upper-middle income countries**



*Source: Own calculations using ILO labour database.*

Figure 23 presents the average unweighted time-loss ratios by industry in 1999-2014 (the detailed results by industry in each year could be found in Tables A.17 and Table A.18 in the Appendix). The Mining industry was associated with the highest average time-loss ratio (about 2 600), followed by the Community Services industry (close to 1 000). This ratio was the lowest in the Agriculture, Electricity and Finance industries.

**Figure 23: Average time-loss ratios by industry, 1999-2014**

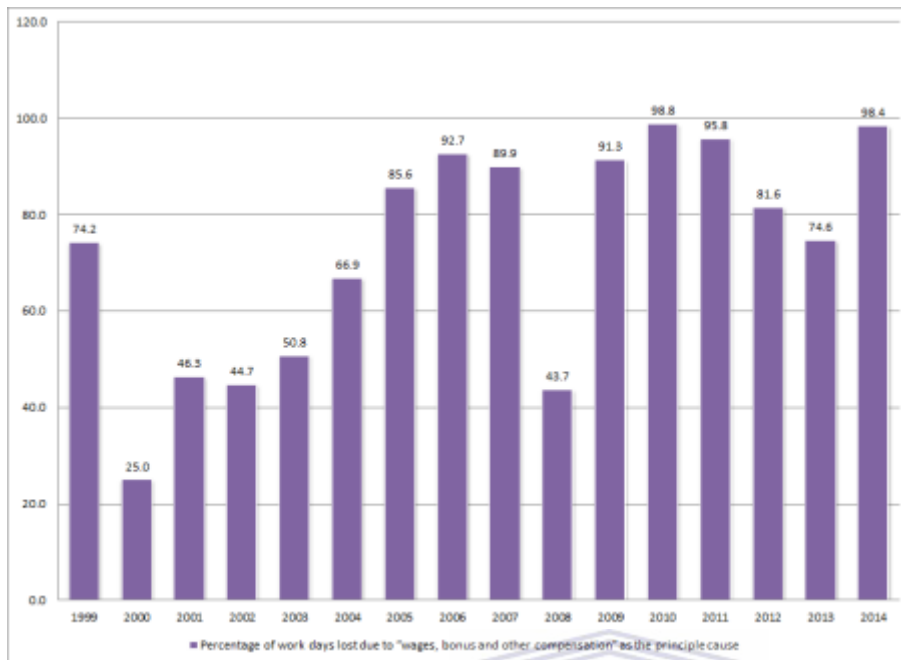


*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

#### 4.2.8 Other results

Figure 24 illustrates the percentage of working days lost due wages, bonus and other compensation (WBC). The number of labour days lost by employees due to WBC was the main reason for strike incidences and it reached its peak in 2010 at 98.8%. Since 2010, the percentage of working days lost due to WBC has decrease significantly from a high of 98.8% to 74.6% in 2013. However, in 2014 strike incidences increased significantly from 74.6% in 2013 to 98.4% in 2014. In addition, ‘working conditions (e.g. hours, health and safety) and ‘socio-economic and political conditions’ are the causes accounting for the second (about 6%) and third (5.5%) highest shares of working days lost respectively.

**Figure 24: Percentage of work days lost due to wages, bonus and other compensation as the principle cause, 1999-2014**



*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

Table 1 reflects the top 5 trade unions accounting for the greatest share of working days lost. The most working days lost in 2006 were caused by trade unions such as SATAWU and SACCAWU who started most of the strike incidents compared to NUM in 2005. The working days lost were round about 1.89 million (45.6%) in stoppages that were fully backed by SATAWU, whereas in 2005 SATAWU accounted for approximately 0.55 million (21.1%) working days lost due to related disputes. SACCAWU resulted in the second highest strike action with 1.31 million (14.6%) working days lost in 2006.

SATAWU dominated the number of workdays lost in 2013 with 25.2%. This was due to the national bus strike, where workers decided to strike for an 18% increase in wages. In contrast NUM and AMCU had more member involvement in strike incidences in 2012. NUM had fewer strike participating members (7.8%) in 2013 compared to 2012 (25.2%). This decrease in membership participation could be due to workers not receiving any wages when participating in strikes or they were scared of losing their jobs (Department of Labour, 2013:21).

**Table 1: Top 5 trade unions accounting for the greatest share of working days lost, 2004-2014**

	No.1	No.2	No.3	No.4	No.5	Other	Total
<b>2004</b>	NUM 33.0	SATAWU 17.9	NEHAWU 17.8	PSA 7.4	NUMSA 6.9	17.0	100.0
<b>2005</b>	NUM 35.2	SATAWU 21.0	SACCAWU 12.1	SAMWU 8.1	FAWU 5.3	18.3	100.0
<b>2006</b>	SATAWU 41.5	SACCAWU 14.6	TAWU 13.8	FAWU 7.8	NUM 5.0	17.3	100.0
<b>2007</b>	NEHAWU 8.6	HOSPERSA 8.6	NUPSAW 8.5	POPCRU 8.5	NATU 8.5	57.3	100.0
<b>2008</b>	SAMWU 33.0	NUM 22.7	SATAWU 17.1	NUMSA 9.1	SACCAWU 2.8	15.3	100.0
<b>2009</b>	NUM 35.2	SACTWU 14.5	SATAWU 8.7	BCAWU 8.7	SAMWU 6.1	26.8	100.0
<b>2010</b>	NEHAWU 18.7	PSA 16.4	SADTU 16.3	POPCRU 10.9	DENOSA 5.5	32.2	100.0
<b>2011</b>	SATAWU 44.6	SOLIDARIY UNION 24.0	NUMSA 9.2	NUM 5.9	SAMWU 4.7	11.6	100.0
<b>2012</b>	NUM 25.2	NUMSA 3.3	FAWU 3.0	SATAWU 1.2	BAWUSA 1.2	66.1	100.0
<b>2013</b>	SATAWU 25.2	NUM 17.4	NUMSA 16.3	TOWU 7.5	AMCU 7.3	26.3	100.0
<b>2014</b>	AMCU 92.2	NUMSA 2.6	NUM 1.4	SAMWU 0.7	FAWU 0.5	2.6	100.0

**Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.**

AMCU:	Association of Mineworkers and Construction Union (AMCU)
BAWUSA:	Building and Allied Workers Union of South Africa
BCAWU:	Building Construction and Allied Workers Union
DENOSA:	Democratic Nursing Organisation of South Africa
FAWU:	Food and Allied Workers Union
HOSPERSA:	Health and Other Service Personnel Trade Union of South Africa
NATU:	National Teachers Union South Africa
NEHAWU:	National Education Health and Allied Workers Union
NUM:	National Union of Mineworkers
NUMSA:	National Union of Metalworkers of South Africa
NUPSAW:	National Union of Public Service and Allied Workers
POPCRU:	Police and Prisons Civil Rights Union
PSA:	Public Servants Association of South Africa
SACCAWU:	South African Commercial, Catering and Allied Workers Union
SACTWU:	Southern African Clothing and Textile Workers' Union
SADTU:	South African Democratic Teachers Union
SAMWU:	South African Municipal Workers Union
SATAWU:	South African Transport and Allied Workers Union
TAWU:	Transport and Allied Workers Union
TOWU:	Transport & Omnibus Workers Union

In 2014, AMCU, NUMSA and NUM dominated in the number of strike participating members, in comparison to SATAWU in 2013. The number of working days lost for each of these three trade union members were 92.2%, 2.59% and 1.40% respectively. These strikes can be related to the mining sector in which AMCU members took part in the work stoppage to demand a R12 500 monthly wage increase. Moreover, NUMSA members demanded a

wage increase of 12% in the steel and engineering industry strike that was caused by metal workers.

#### 4.2.9 Conclusion

The analysis of Section 4.2 highlights the following key findings:

- Unionization increased in absolute terms but decreased in relative terms in 1999-2014;
- Number of strikes was abruptly high in 1987 and 1997, and this number was much lower since 1999;
- Number of workers involved in strikes was particularly higher in 2000 and 2010 (exceeding 1 million);
- Mining industry accounted for more than one-third of total work hours lost due to strikes in 2003-2014, followed by Community Services and Manufacturing industries;
- Number of work days lost due to strikes was abruptly high in 1987, 2007, 2010 and 2014 (exceeding 5 million); Community Services industry accounted for the greatest average share (above one-third) of work days lost due to strikes in 1999-2014, followed by Mining and Manufacturing industries;
- Time-loss ratios were particularly high in 1987, 2007, 2010 and 2014;
- Time-loss ratio in South Africa was much higher, when compared with the ratios of other upper-middle income countries in similar years;
- Wages, bonus and other compensation was the primary cause of work days lost;
- NUM and SATAWAU are the two most active trade unions accounting for the highest share of work days lost.

#### **4.3 Further analysis**

This section will first focus on a simple static analysis that would be conducted to estimate the impact of strike incidences on the GVA. Afterwards, the total earnings forgone would be empirically estimated due to industrial actions, before briefly investigating the econometric relationship between strikes, labour market indicators and economic growth. The results obtained in this study are preliminary and it should be inferred with caution. This is as a result of the limitations of the data (as mentioned earlier) in which it is not possible to demeanor a thorough econometric analysis.

#### 4.3.1 Value of production foregone due to strikes

The nominal mean hourly wage of formal sector employees by industry ( $\overline{w}_i$ ) is derived in Table 2 with the aid of data on mean monthly income ( $\overline{Y}_i$ ) and mean usual weekly work hours ( $\overline{h}_i$ ) by industry, as seen in Tables A.3 and A.4 respectively in Appendix. The total value of production foregone due to strikes in each industry is estimated as the product of work hours lost, based on the assumption that production equals income (refer to Table A.11 in the Appendix), and hourly wage as previously derived in Table 2, that is,  $H_i \times \overline{w}_i$ .

The total value of production foregone is presented in Table 3 in constant 2010 prices; this value was the highest at R12 406 million in the year 2010, followed by 2014 and 2007 with R7 364 million and R3 757 million respectively. In observing the results it is clear that the value foregone was the highest in mining industry in 2014 (7 003 million), followed by the community service industry in 2007 (3 228 million), and 2010 (11 745 million).

**Table 2: Nominal mean hourly wage of formal sector employees by industry, 2004-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]
2004	4.94	31.50	32.30	78.07	20.94	25.03	48.52	33.61	47.13
2005	5.59	31.86	32.18	67.42	21.05	23.21	47.86	35.84	44.80
2006	6.40	35.18	34.95	74.60	24.82	26.00	50.17	43.54	48.99
2007	7.30	39.93	37.97	82.48	27.63	28.39	54.29	48.18	53.81
2008	8.24	48.18	43.17	96.01	31.86	31.71	57.64	51.88	60.05
2009	9.03	55.06	48.62	112.06	38.15	34.40	65.79	57.60	66.16
2010	9.92	60.35	55.13	126.41	47.12	39.12	73.14	64.58	77.94
2011	10.90	68.20	60.63	133.24	50.26	42.08	79.19	71.54	80.61
2012	11.18	74.76	66.51	145.69	56.58	44.56	84.72	74.57	91.53
2013	13.91	81.52	72.38	162.06	61.97	50.91	91.07	82.17	98.37
2014	17.29	84.55	76.83	177.72	66.55	55.71	99.24	87.61	105.55

**Source: Author's own calculations.**

Note: [A]: Agriculture [B]: Mining [C]: Manufacturing  
[D]: Electricity [E]: Construction [F]: Wholesale & Retail  
[G]: Transport [H]: Finance [I]: Community services

**Table 3: Total value of production foregone due to strikes by industry (R in million, 2010 prices), 2004-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	Total
2004	3	583	43	0	0	1	28	15	260	933
2005	7	1 008	102	0	2	45	249	4	189	1 605
2006	3	61	76	21	0	364	66	637	584	1 813
2007	1	256	249	0	6	3	9	5	3 228	3 757
2008	1	42	25	0	4	2	51	8	65	198
2009	2	172	118	0	90	8	123	3	108	624
2010	0	70	167	4	1	99	310	11	11 745	12 406
2011	12	1 695	537	0	8	88	30	1	872	3 241
2012	12	1 229	92	1	4	5	81	1	73	1 497
2013	8	237	221	2	108	20	271	12	103	982
2014	3	7 003	251	18	6	15	15	2	50	7 364

*Source: Author's own calculations.*

Table 4<sup>8</sup> illustrates the total value of production foregone as proportion of the GVA. In viewing the economy as a whole, the GVA proportion was the lowest in 2008 (0.0082%), but it increased significantly in 2010 (0.4973%). However, the results indicate that this GVA proportion by industry surpassed 1% in two years over the whole period from 2005-2014, in the mining industry in 2014 (3.0781%) and community service industry in 2010 (2.1230%).

**Table 4: Total value of production foregone due to strikes as proportion of gross value added by industry, 2004-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	Total
2004	0.0059	0.2387	0.0137	0.0005	0.0000	0.0003	0.0153	0.0039	0.0582	0.0343
2005	0.0117	0.4084	0.0309	0.0007	0.0026	0.0143	0.1287	0.0009	0.0407	0.0607
2006	0.0061	0.0249	0.0216	0.0307	0.0001	0.1091	0.0323	0.1410	0.1212	0.0806
2007	0.0012	0.1052	0.0671	0.0007	0.0077	0.0009	0.0043	0.0010	0.6386	0.1496
2008	0.0009	0.0181	0.0067	0.0000	0.0050	0.0005	0.0225	0.0015	0.0123	0.0082
2009	0.0032	0.0787	0.0348	0.0001	0.0949	0.0021	0.0544	0.0006	0.0199	0.0263
2010	0.0000	0.0304	0.0465	0.0057	0.0009	0.0266	0.1351	0.0021	2.1230	0.4973
2011	0.0186	0.7412	0.1452	0.0000	0.0081	0.0228	0.0125	0.0001	0.1513	0.1299
2012	0.0175	0.5534	0.0243	0.0015	0.0044	0.0012	0.0333	0.0001	0.0123	0.0605
2013	0.0114	0.1027	0.0581	0.0036	0.1047	0.0049	0.1084	0.0021	0.0169	0.0374
2014	0.0043	3.0781	0.0658	0.0265	0.0061	0.0036	0.0058	0.0003	0.0081	0.2708

*Source: Author's own calculations.*

Finally, Table 5 and 6 shows the annual real GVA growth rates with strikes and had strikes not happened, respectively and there was also one remarkable finding that occurred when looking at the results. By using the original real GVA figures as they are (as shown in Table

<sup>8</sup> The proportions derived in this table are estimated with the aid of the values in Table 2 by the equivalent GVA values in Table A.13.



5), from three out of the 10 years under study the mining industry had positive real GVA growth. On the other hand, had strikes not occurred, the mining industry would have only experience four years of positive real GVA growth. The mining industry experienced a negative real GVA growth of -1.41 % in 2014 when strikes took place, however had strikes not taken place the industry could have had a growth rate of 1.52% in this year.

**Table 5: Annual real gross value added growth by industry (%), 2005-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	Total
2005	2.81	1.03	6.20	5.35	11.92	7.05	5.29	5.71	4.16	5.12
2006	-5.46	-0.59	6.44	3.42	10.44	5.96	5.12	9.64	3.70	5.17
2007	2.98	-0.64	5.35	3.42	15.52	5.60	7.51	7.25	4.90	5.41
2008	19.41	-5.33	2.32	-3.54	9.87	1.75	3.50	5.58	5.05	3.29
2009	-1.89	-5.13	-10.63	-1.75	8.54	-1.12	-0.19	1.05	2.06	-1.43
2010	-0.30	5.26	5.91	2.42	0.73	4.43	1.68	1.24	2.08	2.92
2011	1.99	-0.74	3.03	1.53	0.43	4.08	3.46	4.25	4.13	3.21
2012	1.76	-2.91	2.10	-0.36	2.58	3.95	2.42	2.98	2.76	2.24
2013	3.65	3.96	0.82	-0.61	4.56	1.85	2.77	2.55	2.73	2.40
2014	6.86	-1.41	0.11	-1.26	3.62	1.37	3.05	2.36	2.40	1.72

*Source: Author's own calculations.*

**Table 6: Annual real gross value added growth industry had strikes not happened (%), 2005-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	Total
2005	2.81	1.20	6.22	5.35	11.92	7.06	5.41	5.71	4.14	5.15
2006	-5.47	-0.97	6.43	3.45	10.43	6.06	5.01	9.80	3.79	5.18
2007	2.97	-0.56	5.40	3.38	15.53	5.48	7.48	7.10	5.44	5.49
2008	19.41	-5.42	2.25	-3.54	9.87	1.75	3.52	5.58	4.40	3.13
2009	-1.89	-5.07	-10.60	-1.75	8.64	-1.12	-0.16	1.05	2.07	-1.41
2010	-0.30	5.21	5.92	2.42	0.64	4.45	1.76	1.24	4.23	3.41
2011	2.01	-0.03	3.14	1.52	0.43	4.08	3.33	4.25	2.12	2.83
2012	1.76	-3.09	1.97	-0.35	2.57	3.93	2.44	2.98	2.61	2.17
2013	3.64	3.49	0.86	-0.61	4.66	1.86	2.84	2.55	2.73	2.38
2014	6.85	1.52	0.11	-1.24	3.52	1.37	2.95	2.36	2.39	1.95

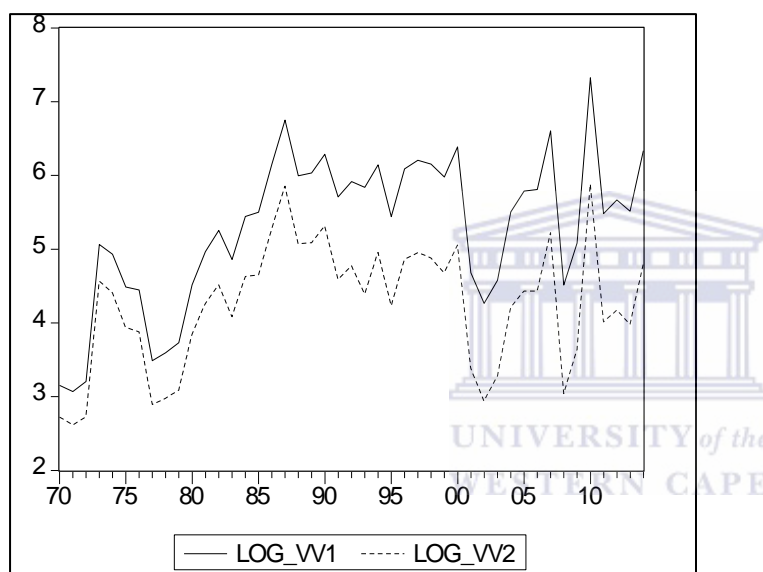
*Source: Author's own calculations.*

#### 4.3.2 Econometric analysis

The relationship between strikes and macroeconomic indicators are examined in this section. First, the trend in the two Van der Velden & Visser (VV) strike indices (refer to Section 3.2) are presented, before showing the coincident business cycle indicator. Afterwards, the trend in the real interest rate indicator is displayed, followed by a statistical relationship between the five macroeconomic indices. Lastly, a multivariate regression is presented on the strike composite indicators.

First, Figure 25 illustrates the trend between the two VV composite strike indicators from 1970-2014. In general the two VV strike indices fluctuated significantly over the whole period. But, there are four years in which the VV strike indicators are particularly high when compared to the other years: 1987, 2007, 2010, and 2014. Therefore, these four years are added later in the regression analysis as dummy variables to account for the abrupt increases in strike incidences during these four years (refer back to Section 4.2 on why strikes were abruptly higher in these years).

**Figure 25: The two Van der Velden & Visser composite strike indices in log terms, 1970-2014**

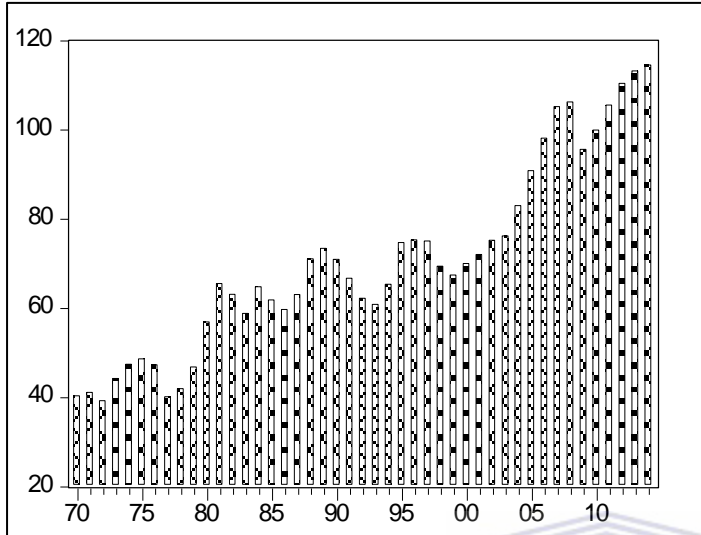


*Source: Author's own calculations.*

Figure 26 shows that in general the coincident business cycle indicator shows an upward trend over the whole period which means the economy experience positive real growth over the 45-year period. However, there are some years in which the coincident indicator values decline and this point towards a recession. For instance, the decline in the early 1990s was due to the political instability caused by the Apartheid era and the international sanctions. The decline in the business cycle coincident indicator value between the periods of 1998 and 1999 was triggered by the Asian Crisis. In 2009 the economy experienced a Global recession and this contributed to the decline of the coincident indicator value during that time. Finally, Figure 27 shows that in some of the earlier years the South African economy was associated with a negative real interest rate. The two years with the lowest real interest rate were 1974 (-4.95%) and 1980 (-12.34%). But, since 1994 the economy has continuously experience

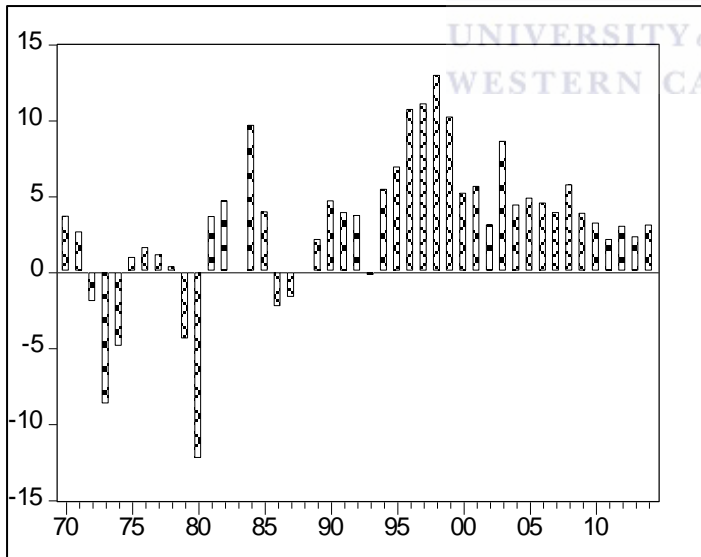
positive real interest rates, and this could be partly attributed to the implementation of inflation targeting by the SARB since 1999.

**Figure 26: Business cycle coincident indicator, 1970-2014**



*Data source: Quarterly Bulletin of the South African Reserve Bank*

**Figure 27: Real interest rate, 1970-2014**



*Data source: Quarterly Bulletin of the South African Reserve Bank*

Table 7 below examines the correlation relationship between these five macroeconomic indices (2010:100):

- Real gross domestic product (GDP);
- Consumer price index (CPI);

- Business cycle: coincident indicator (CI);
- Van der Velden & Visser (VV) strike indicator (I);
- Van der Velden & Visser (VV) strike indicator (II);

**Table 7: Correlation coefficients between the five economic indicators, 1970-2014**

	<b>Real GDP</b>	<b>CPI</b>	<b>Coincident indicator</b>	<b>VV (I)</b>	<b>VV(II)</b>
<b>Real GDP</b>	1.0000	0.9812	0.9760	0.3925	0.1509
<b>CPI</b>		1.0000	0.9366	0.3687	0.1017
<b>Coincident indicator</b>			1.0000	0.4263	0.2204
<b>VV(I)</b>				1.0000	0.9282
<b>VV(II)</b>					1.0000

*Source: Author's own calculations.*

There is a strong and positive correlation between the two VV indices with a correlation coefficient of 0.9282 as seen in Table 7. It appears that the VV (I) strike indicator has a stronger correlation with real GDP, CPI and CI indices in comparison to the VV (II) strike indicator. Moreover, the relationship between the VV (I) index and the business cycle coincident indicator (0.4263) is adequate and positive, and this implies that strikes are procyclical. Conversely, there is a positive and reasonable relationship between the VV (I) index and real GDP at a coefficient of 0.3925, and this relationship suggests that strikes are procyclical.

By focusing on the VV(I) index, Table 8 illustrates the outcome of the Granger causality tests (with two lags), and it is clear from Table 8 that strikes might be procyclical, as the coincident indicator of the business cycle does Granger cause VV (I) index (at alpha = 1%). On the other hand, strikes could lead to inflation in the future, as the VV (I) index results in Granger cause CPI (at alpha = 5%).

**Table 8: Pairwise Granger causality tests (lags = 2)**

Pairwise Granger Causality Tests			
Sample: 1970 2014			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Probability
CPI does not Granger Cause COINCIDENT	43	8.6458	0.0008
COINCIDENT does not Granger Cause CPI		5.7450	0.0066
VV1 does not Granger Cause COINCIDENT	43	0.7468	0.4807
COINCIDENT does not Granger Cause VV1		7.7589	0.0015
VV1 does not Granger Cause CPI	43	4.0236	0.0260
CPI does not Granger Cause VV1		2.2083	0.1238

*Source: Author's own calculations.*

Finally, Table 9 presents four multivariate regressions on two strike composite indicators. The four explanatory variables for the log of indicator (I) and (II) are all statistically significant at 1%: the positive parameters of the business cycle coincident indicator in all regressions indicate that strikes for the whole period are procyclical; the changes in labour legislation dummy variables are positive, meaning these changes were associated with greater strike incidences; the economic transition dummy variable is negative in parameter, and this indicates a significant decline in strike incidences since 1995 due to the new LRA and the advent of democracy; the relationship between real interest rate and strikes is positive, and as a result of this, the workers would be in a better position to demand better wages and working conditions by initiating strikes.

Finally, in regressions [B] and [D], four additional dummy variables were added to account for the years that have extremely high strike incidences (1987, 2007, 2010 and 2014 – refer to the detailed discussion in Section 4.2). It can be seen that after adding these four dummy variables, both the R-squared and adjusted R-squared increased (compared to regressions [A] and [C] respectively), but only the 2010 dummy was statistically significant.

**Table 9: Multivariate econometric analysis on the two strike composite indicators**

	Dependent variable			
	Log of indicator VV(I)		Log of indicator VV(II)	
	[A]	[B]	[C]	[D]
Coincident indicator (-1)	0.0498 <sup>***</sup> (0.0087)	0.0444 <sup>***</sup> (0.0088)	0.0362 <sup>***</sup> (0.0088)	0.0298 <sup>***</sup> (0.0088)
Dummy: Changes in labour legislation (-1)	0.8305 <sup>***</sup> (0.2267)	0.8326 <sup>***</sup> (0.2232)	0.7037 <sup>***</sup> (0.2303)	0.6955 <sup>***</sup> (0.2232)
Dummy: Economic transition since 1995 (-1)	-1.5114 <sup>***</sup> (0.4039)	-1.4233 <sup>***</sup> (0.3992)	-1.5158 <sup>***</sup> (0.4102)	-1.3975 <sup>***</sup> (0.3992)
Real interest rate (-2)	0.0889 <sup>***</sup> (0.0267)	0.0833 <sup>***</sup> (0.0258)	0.0669 <sup>**</sup> (0.0271)	0.0601 <sup>**</sup> (0.0258)
Dummy 1987		0.6200 (0.6706)		0.7857 (0.6706)
Dummy 2007		0.7805 (0.6616)		0.9373 (0.6616)
Dummy 2010		1.6659 <sup>**</sup> (0.6552)		1.7045 <sup>***</sup> (0.6552)
Dummy 2014		0.2538 (0.6800)		0.3393 (0.6801)
Constant	1.8704 <sup>***</sup> (0.5706)	2.163 <sup>***</sup> (0.5706)	1.8989 <sup>***</sup> (0.5795)	2.2490 <sup>***</sup> (0.5706)
Sample size	43	43	43	43
R-squared	0.5377	0.6279	0.3525	0.4946
Adjusted R-squared	0.4891	0.5403	0.2843	0.3757
F-statistic	11.0514	7.1711	5.1707	4.1590
Durbin-Watson statistic	1.8269	1.5525	1.7145	1.4110

**Source: Author's own calculations.**

\*\*\* Significant at 1%    \*\* Significant at 5%    \* Significant at 10%

#### 4.4 Conclusion

The primary cause of strikes was 'wages, bonus and compensation' (WBC) which accounted for 98.4% in 2014. This suggested that workers mostly partake in strike activities for wage related reasons. WBC reached its peak in 2010 at 98.8%. The two industries with the highest involvement in industrial action were Mining and Community Services. The industrial share of working days lost was dominated by the Mining industry in 2012 (82.4%) and in 2014 (93.6%). However, the Community Services industry had the highest share of working days lost in 2007 (85.6%) and in 2010 (91.3%). For the entire period of 1999-2014, the Community Service industry had the highest unweighted industrial share of working days lost (35%), followed by the Mining industry (28.2%).

The number of strikes declined significantly with advent of democracy and the new LRA in 1995 this can be seen by the negative sign of the changes in labour legislation dummy

variable. The results of the Granger causality tests suggest that there is positive and significant relationship between the strike incidence and the business cycle coincident indicator. Conversely, the multivariate econometric analysis indicates that a higher real interest rate leads to a significantly higher strike indicator, because of the positive relationship between the two indicators. Finally, upon conducting a multivariate econometric analysis on the two composite strike indices, it was found that all the explanatory variables are statistically significant; in particular, strikes are procyclical.



## CHAPTER FIVE: CONCLUSION

### 5.1 Introduction

This chapter first discusses a review of the findings of the study. Thereafter, it draws a conclusion based on the findings including possible recommendations for future studies.

### 5.2 Review of findings

Using data from the QESs, OHSs, LFSs, QLFSs, the Department of Labour's Annual Industrial Action Reports as well as the ILO labour database, the study conducted three broad categories of empirical analysis: (1) descriptive statistics on strikes by broad industry category (mainly relying on the 2003-2014 Annual Industrial Action Reports data); (2) a static analysis which estimated the total value of production foregone due to strikes; (3) an econometric analysis to investigate the relationship between business cycles and strikes.

On average the industries that were the most active in strikes during the whole period were the mining, manufacturing and community services. The number of work days and hours lost were particularly high in 1987, 2007, 2010, and 2014. In the year 2010 the number of work days and hours lost increased radically to 20.7 million due to public sector strikes. Also, the productivity and performances of companies as well as the economy as whole could be hugely impacted by the number of work days and hours lost (Department of Labour, 2013).

Using the time-loss ratio as a benchmark indicator to compare strike incidences across different countries, it was found that the time-loss ratio of South Africa is much higher when compared to other upper-middle income countries. This means that South Africa is much more strike prone. In particular, the time-loss ratio was the highest in 1987, 2007, 2010, and 2014. However, the results indicate that the time-loss ratio was the highest in the mining industry, reaching a tremendously high level of 22 720 in 2014. This result could be due to the fact that the mining industry has no bargaining council. Therefore, firms negotiate independently with the Chamber of Mines, because there are no negotiations taking place on a sectoral level.

The primary reasons for strikes were wages, bonus and compensation (WBC). This proposes that most employees partake in strikes to demand greater salary increases to meet their socioeconomic necessities. WBC remained the main trigger for strikes over the period from



2003 to 2014 and it reached its peak in 2010 at 98.8%. On the hand, the two trade unions NUM (placed in the top five 9 out of 11 years under study) and SATAWU (placed in top five in 8 out of 11 years) accounted for the greatest share of working days lost due to industrial action.

After conducting a static analysis on real GVA foregone due to industrial action, it was found that the total value of production foregone due to strikes as a proportion of real GVA aggregate reached a high of 0.50% in 2010 as a result of industrial action. This implies that the results found, upon conducting the static analysis was significant. In particular this proportion was especially high in the mining industry in 2014 and community service industry in 2010. Moreover, the Granger casualty test indicates the underlying relationship between the coincident indicator of the business cycle and the composite strike indicator (this was based on a study by Van der Velden and Visser in 2006). This was derived by considering strike occurrences, number of employees involved and the number of working days lost due to industrial action along with considering the relationship between the strike composite indicator and consumer price index.

Finally, the multivariate econometric analysis suggested that strikes are procyclical and the results are statically significant for the entire period. Also, there was a significant positive relationship between real interest rate and strikes.

### **5.3 Conclusion**

It is not always easy to measure the economic cost of strikes, whereas strikes have both benefits and cost. This study first examined the main concepts and theories on industrial action, before discussing past local and international empirical studies, and based on these studies found a severe research gap. The research gap suggested that there is a lack of in-depth research on the economic impact of strikes upon the South African economy. Afterwards, the descriptive statistics on strikes was examined and it was found that strikes were quite dominant in the mining and community service industries.

One limitation of the study is that it is not possible to conduct a thorough time-series econometric analysis, due to the relatively weaker, less comprehensive strikes data in 1970-1998 from the ILO labour database. Also, it is only possible to conduct a more thorough empirical analysis like those international studies reviewed in Chapter Two if there are

primary survey data available (i.e. firm-level surveys that collect data on strike probability, wages, etc.). Therefore, it was not possible to determine an in-depth analysis on the likelihood of strikes, the length of the strike and the result of strikes.

In order to estimate the economic benefits and cost more precisely, difficult techniques might have to be applied such as conducting a CGE model, but this would entail a study on its own, and therefore it would go beyond the range of this paper. Nonetheless, the ultimate conclusion that can be drawn from this study is that strikes do involve economic cost, and this cost is higher for the mining industry, especially in 2014.



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## APPENDIX

**Table A.1: Unionisation rate (%) by industry, 1997-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All employees
1997	13.09	70.47	48.28	42.64	23.42	28.48	46.99	21.28	52.15	40.55
1998	10.90	73.36	45.04	48.55	19.55	25.13	45.87	23.29	55.92	39.16
1999	16.90	76.30	41.25	53.15	23.72	25.04	43.14	24.77	60.36	40.58
2000	9.25	71.02	38.84	51.19	16.64	18.72	39.08	17.89	59.10	36.98
2001	9.29	79.29	38.47	49.64	22.83	20.95	38.15	23.97	60.95	39.01
2002	8.02	77.32	34.11	50.86	17.00	20.33	37.12	21.69	60.61	36.91
2003	8.43	75.86	37.89	47.71	17.73	20.28	38.77	23.06	56.97	36.89
2004	7.44	78.36	34.89	54.36	12.01	20.23	35.46	21.41	55.07	34.70
2005	10.95	78.66	39.74	55.71	14.76	25.65	36.14	24.48	58.81	37.79
2006	9.35	72.83	36.81	46.69	15.51	22.03	34.96	25.06	54.56	35.04
2007	13.17	76.31	36.83	43.86	11.60	25.15	39.53	26.80	57.93	37.05
2010	7.09	76.05	37.00	53.22	14.14	20.49	39.55	23.04	61.83	36.80
2011	8.24	79.11	34.02	46.90	11.81	20.21	42.08	20.57	60.00	35.53
2012	6.92	80.02	33.78	59.87	12.08	19.78	38.78	20.63	60.45	35.63
2013	7.34	80.97	33.91	60.02	11.31	21.09	37.69	19.05	55.71	34.55
2014	4.50	82.15	36.23	62.77	15.93	20.53	38.71	20.41	56.10	35.33
<i>Average</i>	9.43	76.76	37.94	51.70	16.25	22.13	39.50	22.34	57.91	37.03

*Source: Own calculations using OHS 1999, LFS 2000-2007 September, QLFS 2008-2014 fourth quarter, and Industrial Action Report 2003-2014 data.*

Note: [A]: Agriculture [B]: Mining [C]: Manufacturing [D]: Electricity  
[E]: Construction [F]: Wholesale & Retail [G]: Transport [H]: Finance  
[I]: Community services

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**Table A.2: Industry share (%) of industrial action incidents, 1999-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
1999	7.48	13.08	28.04	1.87	2.80	11.21	8.41	0.93	26.17	100.00
2000	18.75	13.75	20.00	3.75	3.75	7.50	7.50	3.75	21.25	100.00
2001	7.23	8.43	26.51	1.20	6.02	2.41	16.87	0.00	31.33	100.00
2002	2.13	10.64	19.15	2.13	6.38	23.40	8.51	0.00	27.66	100.00
2003	8.06	12.90	22.58	4.84	3.23	12.90	19.35	1.61	14.52	100.00
2004	10.20	18.37	26.53	2.04	0.00	8.16	8.16	4.08	22.45	100.00
2005	5.88	15.69	26.47	1.96	1.96	10.78	13.73	2.94	20.59	100.00
2006	5.05	7.07	9.09	1.01	2.02	7.07	15.15	5.05	48.48	100.00
2007	4.00	22.67	21.33	1.33	4.00	5.33	12.00	4.00	25.33	100.00
2008	3.51	12.28	17.54	0.00	3.51	7.02	12.28	8.77	35.09	100.00
2009	3.92	19.61	15.69	1.96	1.96	7.84	21.57	7.84	19.61	100.00
2010	1.35	22.97	21.62	2.70	2.70	5.41	16.22	12.16	14.86	100.00
2011	7.46	22.39	17.91	4.48	2.99	2.99	20.90	16.42	4.48	100.00
2012	14.14	28.28	6.06	1.01	5.05	3.03	18.18	19.19	5.05	100.00
2013	4.39	21.93	20.18	0.88	2.63	1.75	7.89	29.82	10.53	100.00
2014	6.82	5.68	29.55	2.27	6.82	2.27	6.82	34.09	5.68	100.00
<i>Average</i>	6.90	15.98	20.52	2.09	3.49	7.44	13.35	9.42	20.82	100.00

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

**Table A.3: Mean monthly nominal income (Rands) of formal sector employees by industry, 2004-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]
2004	1 075	6 513	6 388	14 768	4 279	5 034	10 180	6 724	8 681
2005	1 232	6 753	6 547	14 002	4 327	4 819	10 422	7 444	8 384
2006	1 371	7 221	6 912	14 120	4 977	5 259	10 672	8 826	8 942
2007	1 549	8 303	7 456	15 478	5 473	5 677	11 171	9 782	9 810
2008	1 700	9 820	8 313	17 773	6 227	6 419	12 099	10 470	10 908
2009	1 852	11 128	9 179	21 114	7 259	6 924	13 397	11 441	11 858
2010	2 004	12 220	10 418	23 866	8 790	7 790	14 880	12 854	13 953
2011	2 204	13 496	11 510	25 024	9 378	8 363	16 348	14 108	14 528
2012	2 254	14 901	12 520	27 359	10 409	8 886	17 222	14 817	16 427
2013	2 769	16 330	13 659	29 714	11 460	10 095	18 539	16 080	17 457
2014	3 422	16 923	14 511	32 275	12 268	11 024	20 104	17 243	18 589

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

**Table A.4: Mean usual weekly work hours of formal sector employees by industry, 2004-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]
2004	50.20	47.72	45.64	43.65	47.16	46.42	48.42	46.16	42.50
2005	50.80	48.91	46.95	47.93	47.44	47.90	50.25	47.93	43.19
2006	49.43	47.37	45.64	43.68	46.27	46.67	49.09	46.79	42.12
2007	48.94	47.99	45.31	43.30	45.72	46.14	47.48	46.86	42.07
2008	47.64	47.03	44.44	42.72	45.10	46.72	48.44	46.57	41.92
2009	47.33	46.64	43.57	43.48	43.90	46.45	46.99	45.83	41.36
2010	46.62	46.73	43.61	43.57	43.05	45.96	46.95	45.93	41.31
2011	46.67	45.67	43.81	43.34	43.06	45.86	47.64	45.51	41.59
2012	46.52	46.00	43.44	43.34	42.46	46.02	46.91	45.85	41.42
2013	45.94	46.23	43.55	42.31	42.67	45.76	46.98	45.16	40.95
2014	45.68	46.19	43.58	41.91	42.54	45.67	46.75	45.42	40.64

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

**Table A.5: Nature of industrial action (%), 2003-2014**

Year	Strike company only	Picketing	Secondary action	Stay-away/protest	Multi-employer strike	Lockout	All
2003	74.19	6.45	1.61	4.84	8.06	4.84	100.00
2004	48.98	10.20	2.04	14.29	14.29	10.20	100.00
2005	40.20	4.90	1.96	9.80	27.45	15.65	100.00
2006	56.57	10.10	0.00	17.17	11.11	5.05	100.00
2007	50.67	9.33	1.33	8.00	24.00	6.67	100.00
2008	29.82	3.52	1.75	29.82	31.58	3.51	100.00
2009	37.25	9.80	3.92	21.57	9.80	17.65	100.00
2010	48.65	5.41	2.70	2.70	36.49	4.05	100.00
2011	71.64	0.00	5.97	2.99	14.93	4.48	100.00
2012	59.60	0.00	1.01	15.15	16.16	8.08	100.00
2013	71.05	0.00	0.88	3.51	24.56	0.00	100.00
2014	50.00	1.14	1.14	2.27	15.91	29.55	100.00
<i>Average</i>	<i>53.22</i>	<i>5.07</i>	<i>2.03</i>	<i>11.01</i>	<i>19.53</i>	<i>9.15</i>	<i>100.00</i>

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

**Table A.6: Duration of industrial action (%), 2003-2014**

Year	<1 day	1-5 days	6-10 days	11-15 days	16-20 days	21-30 days	31-40 days	40+ days	All
2003	6.45	50.00	9.68	11.29	4.84	6.45	6.45	4.84	100.00
2004	12.24	40.82	10.20	14.29	8.16	6.12	2.04	6.12	100.00
2005	8.80	27.50	21.60	11.80	7.80	7.80	5.90	80.80	100.00
2006	7.90	57.00	14.90	3.50	1.80	5.30	2.60	7.00	100.00
2007	8.90	30.70	35.70	9.70	3.20	5.60	3.20	3.20	100.00
2008	8.50	65.10	9.40	4.70	6.60	1.90	1.90	1.90	100.00
2009	2.20	16.20	49.10	26.60	2.20	1.80	0.50	1.40	100.00
2010	6.20	20.80	44.40	15.70	3.90	4.50	1.10	3.40	100.00
2011	0.50	13.20	52.30	12.90	14.60	3.80	1.20	1.40	100.00
2012	0.00	22.20	38.50	16.40	5.90	9.10	1.70	2.10	100.00
2013	0.00	26.30	15.10	19.80	21.00	14.50	1.10	2.20	100.00
2014	0.00	25.10	3.70	7.40	44.70	10.20	0.90	7.90	100.00
<i>Average</i>	<i>5.14</i>	<i>32.91</i>	<i>25.37</i>	<i>12.84</i>	<i>10.39</i>	<i>6.42</i>	<i>2.38</i>	<i>4.19</i>	<i>100.00</i>

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

**Table A.7: Industrial action by size of establishment (%), 2003-2014**

Year	<50	50-149	150-299	300-499	500-999	1000+	All
2003	14.29	21.43	11.43	11.43	11.43	30.00	100.00
2004	12.50	18.75	16.67	4.17	21.88	26.04	100.00
2005	6.40	21.80	18.30	20.40	21.80	11.30	100.00
2006	7.80	15.90	14.90	12.30	12.30	36.80	100.00
2007	20.20	15.30	12.10	6.50	13.70	32.20	100.00
2008	9.40	9.40	12.30	8.50	18.90	41.50	100.00
2009	23.90	22.50	16.20	11.30	12.60	13.50	100.00
2010	9.00	8.40	16.30	23.60	14.60	28.10	100.00
2011	33.30	25.80	13.00	6.80	7.50	13.50	100.00
2012	30.40	19.30	12.80	9.20	8.70	19.60	100.00
2013	26.40	24.30	15.50	7.70	11.40	14.80	100.00
2014	21.20	19.80	20.70	10.60	7.80	19.80	100.00
<i>Average</i>	<i>17.90</i>	<i>18.60</i>	<i>15.00</i>	<i>11.00</i>	<i>13.60</i>	<i>23.90</i>	<i>100.00</i>

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

**Table A.8: Number of formal sector employees involved in industrial actions by industry, 1999-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
1999	5 819	64 271	52 999	438	12 390	2 245	62 566	120	354 587	555 435
2000	2 221	170 193	63 850	23	17 113	11 761	118 770	10	758 487	1 142 428
2001	806	12 367	32 678	2 126	1 124	45	11 042		30 204	90 392
2002	400	21 647	5 303	16	329	1 363	3 430	0	33 762	66 250
2003	2 958	23 078	18 021	4 576	8 730	14 118	8 840	0	3 200	83 521
2004	3 230	44 922	16 690	20	0	637	1 440	1 963	326 399	395 301
2005	7 554	165 791	55 649	406	4 006	46 634	54 271	2 018	62 962	399 291
2006	2 820	85 396	14 555	6 447	78	63 553	35 723	16 488	25 727	250 787
2007	2 753	161 193	98 839	69	7 052	466	3 470	3 003	332 074	608 919
2008	411	46 911	24 669	0	857	6 454	15 241	999	23 437	118 979
2009	534	27 480	31 027	79	40 716	9 363	31 491	2 850	29 187	172 727
2010	54	12 626	25 663	3 985	233	33 659	36 791	6 495	1 072 307	1 191 813
2011	2 608	47 732	66 042	70	2 734	3 466	5 594	424	74 468	203 138
2012	11 078	138 993	56 324	1 078	2 793	4 170	12 900	160	13 877	241 373
2013	8 417	204 661	21 718	1 458	13 083	1 939	22 331	1 066	22 520	297 193
2014	2 056	74 580	25 641	788	851	1 500	1 224	249	11 677	118 566

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

**Table A.9: Industry share (%) of formal sector employees involved in industrial actions, 1999-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
1999	1.05	11.57	9.54	0.08	2.23	0.40	11.26	0.02	63.84	100.00
2000	0.19	14.90	5.59	0.00	1.50	1.03	10.40	0.00	66.39	100.00
2001	0.89	13.68	36.15	2.35	1.24	0.05	12.22	0.00	33.41	100.00
2002	0.60	32.67	8.00	0.02	0.50	2.06	5.18	0.00	50.96	100.00
2003	3.54	27.63	21.58	5.48	10.45	16.90	10.58	0.00	3.83	100.00
2004	0.82	11.36	4.22	0.01	0.00	0.16	0.36	0.50	82.57	100.00
2005	1.89	41.52	13.94	0.10	1.00	11.68	13.59	0.51	15.77	100.00
2006	1.12	34.05	5.80	2.57	0.03	25.34	14.24	6.57	10.26	100.00
2007	0.45	26.47	16.23	0.01	1.16	0.08	0.57	0.49	54.54	100.00
2008	0.35	39.43	20.73	0.00	0.72	5.42	12.81	0.84	19.70	100.00
2009	0.31	15.91	17.96	0.05	23.57	5.42	18.23	1.65	16.90	100.00
2010	0.00	1.06	2.15	0.33	0.02	2.82	3.09	0.54	89.97	100.00
2011	1.28	23.50	32.51	0.03	1.35	1.71	2.75	0.21	36.66	100.00
2012	4.59	57.58	23.33	0.45	1.16	1.73	5.34	0.07	5.75	100.00
2013	2.83	68.86	7.31	0.49	4.40	0.65	7.51	0.36	7.58	100.00
2014	1.73	62.90	21.63	0.66	0.72	1.27	1.03	0.21	9.85	100.00
"Average"	1.35	30.19	15.42	0.79	3.13	4.80	8.07	0.75	35.50	100.00

*Source: Own calculations using OHS 1999, LFS 2000-2007 September, QLFS 2008-2014 fourth quarter, and Industrial Action Reports 2003-2014 data.*

**Table A.10: Percentage (%) of formal sector employees involved in industrial actions by industry, 1999-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
1999	0.78	13.72	4.20	0.60	4.25	0.18	15.83	0.02	20.33	7.95
2000	0.33	29.15	5.03	0.03	5.09	0.97	29.37	0.00	42.36	15.84
2001	0.12	2.26	2.44	2.29	0.37	0.00	2.81	0.00	1.73	1.26
2002	0.05	3.94	0.38	0.02	0.10	0.12	0.81	0.00	1.88	0.89
2003	0.39	4.21	1.39	5.18	2.46	1.06	2.39	0.00	0.17	1.10
2004	0.57	11.14	1.17	0.02	0.00	0.04	0.36	0.20	16.81	5.12
2005	1.45	40.71	4.01	0.43	0.75	2.90	12.69	0.19	3.32	5.02
2006	0.52	21.63	1.02	5.60	0.01	3.67	8.44	1.46	1.27	3.02
2007	0.45	37.86	6.95	0.08	1.15	0.03	0.69	0.23	14.71	6.72
2008	0.08	14.71	1.55	0.00	0.12	0.35	2.81	0.07	0.91	1.24
2009	0.08	7.97	1.74	0.09	4.82	0.47	5.75	0.19	1.21	1.70
2010	0.01	3.96	1.59	3.84	0.03	1.86	6.93	0.40	44.57	12.31
2011	0.48	13.63	4.09	0.08	0.40	0.18	0.97	0.03	2.73	2.01
2012	1.83	36.94	3.63	1.10	0.40	0.23	2.15	0.01	0.49	2.35
2013	1.44	48.47	1.46	1.18	1.80	0.10	3.53	0.06	0.75	2.77
2014	0.35	17.63	1.70	0.78	0.11	0.07	0.18	0.01	0.38	1.09
<i>Average</i>	<i>0.56</i>	<i>19.24</i>	<i>2.65</i>	<i>1.33</i>	<i>1.37</i>	<i>0.76</i>	<i>5.98</i>	<i>0.18</i>	<i>9.60</i>	<i>4.40</i>

*Source: Own calculations using OHS 1999, LFS 2000-2007 September, QLFS 2008-2014 fourth quarter, and Industrial Action Reports 2003-2014 data.*

**Table A.11: Number of work hours lost (1 000s) due to industrial action by industry, 2003-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
2003	226	2 771	1 710	215	607	1 926	394	1	237	8086
2004	487	7 014	1 051	2	0	23	455	312	3 516	12 861
2005	819	13 768	2 562	3	53	1 283	4 290	77	2 829	25 684
2006	410	941	1 669	127	1	9 729	1 262	11 266	8 437	33 842
2007	92	4 155	5 355	3	182	81	166	88	45 154	55 275
2008	77	744	529	0	146	47	865	132	889	3 429
2009	242	2 872	2 449	0	2 382	198	1 848	54	1 485	11 529
2010	1	1 161	3 026	31	18	2 524	4 239	169	150 685	161 853
2011	1 181	28 428	8 685	0	167	2 195	406	8	11 500	52 571
2012	1 107	19 790	1 391	11	88	115	1 136	8	890	24 534
2013	608	3 631	3 338	26	2 207	458	3 826	163	1 239	15 497
2014	208	104 178	3 967	190	129	329	205	24	589	109 818
<i>Average</i>	<i>455</i>	<i>15 788</i>	<i>2 978</i>	<i>51</i>	<i>498</i>	<i>1 576</i>	<i>1 591</i>	<i>1 025</i>	<i>18 954</i>	<i>42 915</i>

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*



**Table A.12: Industry share (%) of work hours lost due to industrial action, 2003-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
2003	2.79	34.27	21.14	2.66	7.50	23.82	4.87	0.01	2.93	100.00
2004	3.79	54.54	8.18	0.01	0.00	0.18	3.54	2.42	27.34	100.00
2005	3.19	53.61	9.97	0.01	0.20	5.00	16.70	0.30	11.01	100.00
2006	1.21	2.78	4.93	0.38	0.00	28.75	3.73	33.29	24.93	100.00
2007	0.17	7.52	9.69	0.00	0.33	0.15	0.30	0.16	81.69	100.00
2008	2.23	21.69	15.42	0.00	4.26	1.37	25.23	3.86	25.92	100.00
2009	2.10	24.91	21.24	0.00	20.66	1.71	16.03	0.46	12.88	100.00
2010	0.00	0.72	1.87	0.02	0.01	1.56	2.62	0.10	93.10	100.00
2011	2.25	54.08	16.52	0.00	0.32	4.17	0.77	0.01	21.88	100.00
2012	4.51	80.66	5.67	0.04	0.36	0.47	4.63	0.03	3.63	100.00
2013	3.92	23.43	21.54	0.17	14.24	2.96	24.69	1.05	8.00	100.00
2014	0.19	94.86	3.61	0.17	0.12	0.30	0.19	0.02	0.54	100.00
<i>Average</i>	<i>2.20</i>	<i>37.76</i>	<i>11.65</i>	<i>0.29</i>	<i>4.00</i>	<i>5.87</i>	<i>8.61</i>	<i>3.48</i>	<i>26.15</i>	<i>100.00</i>

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

**Table A.13: Real GVA as it is (R million, 2010 prices), 2004-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	Total
2004	56 119	244 180	311 011	62 128	55 647	294 461	183 612	389 889	446 079	2 043 126
2005	57 695	246 687	330 307	65 450	62 280	315 210	193 334	412 149	464 616	2 147 728
2006	54 544	245 224	351 572	67 688	68 780	333 999	203 224	451 896	481 829	2 258 756
2007	56 168	243 662	370 389	70 000	79 455	352 698	218 488	484 675	505 443	2 380 978
2008	67 072	230 663	378 964	67 522	87 300	358 880	226 136	511 716	530 984	2 459 237
2009	65 802	218 830	338 692	66 337	94 759	354 870	225 712	517 114	541 936	2 424 052
2010	65 605	230 350	358 699	67 940	95 453	370 580	229 499	523 526	553 208	2 494 860
2011	66 913	228 646	369 582	68 978	95 860	385 696	237 442	545 802	576 059	2 574 978
2012	68 093	221 990	377 330	68 733	98 329	400 938	243 188	562 042	591 938	2 632 581
2013	70 577	230 772	380 434	68 311	102 811	408 370	249 916	576 368	608 099	2 695 658
2014	75 416	227 521	380 841	67 450	106 531	413 975	257 543	589 969	622 718	2 741 964

*Data source: Quarterly Bulletin of the South African Reserve Bank.*

**Table A.14: Real GVA had strikes not happened (R million, 2010 prices), 2004-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	Total
2004	56 122	244 763	311 054	62 128	55 647	294 462	183 640	389 904	446 339	2 044 059
2005	57 702	247 695	330 409	65 450	62 282	315 255	193 583	412 153	464 805	2 149 333
2006	54 547	245 285	351 648	67 709	68 780	334 363	203 290	452 533	482 413	2 260 569
2007	56 169	243 918	370 638	70 000	79 461	352 701	218 497	484 680	508 671	2 384 735
2008	67 073	230 705	378 989	67 522	87 304	358 882	226 187	511 724	531 049	2 459 435
2009	65 804	219 002	338 810	66 337	94 849	354 878	225 835	517 117	542 044	2 424 676
2010	65 605	230 420	358 866	67 944	95 454	370 679	229 809	523 537	564 953	2 507 266
2011	66 925	230 341	370 119	68 978	95 868	385 784	237 472	545 803	576 931	2 578 219
2012	68 105	223 219	377 422	68 734	98 333	400 943	243 269	562 043	592 011	2 634 078
2013	70 585	231 009	380 655	68 313	102 919	408 390	250 187	576 380	608 202	2 696 640
2014	75 419	234 524	381 092	67 468	106 537	413 990	257 558	589 971	622 768	2 749 328

*Source: Author's own calculations.*

**Table A.15: Number of work days lost (million) due to industrial action by industry, 1999-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
1999	0.09	0.27	0.23	0.00	0.11	0.09	0.44	0.00	1.39	2.63
2000	0.01	0.36	0.13	0.00	0.02	0.10	0.12	0.00	0.92	1.67
2001	0.01	0.23	0.41	0.01	0.01	0.00	0.19	0.00	0.10	0.95
2002	0.00	0.09	0.04	0.00	0.00	0.02	0.00	0.00	0.45	0.62
2003	0.03	0.28	0.20	0.02	0.07	0.25	0.05	0.00	0.02	0.92
2004	0.06	0.54	0.11	0.00	0.00	0.00	0.07	0.04	0.46	1.29
2005	0.10	0.93	0.31	0.00	0.01	0.33	0.55	0.01	0.38	2.63
2006	0.04	0.12	0.20	0.02	0.00	1.27	0.16	1.30	1.03	4.15
2007	0.03	0.54	0.70	0.00	0.05	0.02	0.03	0.01	8.16	9.53
2008	0.01	0.08	0.07	0.00	0.02	0.02	0.11	0.01	0.18	0.50
2009	0.03	0.41	0.32	0.00	0.26	0.02	0.25	0.01	0.22	1.53
2010	0.00	0.36	0.38	0.01	0.00	0.39	0.64	0.02	18.87	20.67
2011	0.02	0.37	0.83	0.00	0.03	0.05	0.05	0.00	1.46	2.81
2012	0.12	2.73	0.19	0.00	0.01	0.01	0.14	0.00	0.11	3.31
2013	0.06	0.52	0.34	0.00	0.25	0.05	0.48	0.02	0.12	1.85
2014	0.02	9.61	0.47	0.01	0.01	0.04	0.03	0.00	0.07	10.26
<i>Average</i>	0.04	1.09	0.31	0.00	0.05	0.17	0.21	0.09	2.12	4.08

*Source: Own calculations using the data from the 2003-2014 Industrial Action Reports.*

**Table A.16: Industry share (%) of work days lost due to industrial action, 1999-2014**

Year	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
1999	3.57	10.15	8.59	0.03	4.31	3.57	16.89	0.01	52.87	100.00
2000	0.63	21.81	7.62	0.08	1.08	6.26	7.29	0.00	55.23	100.00
2001	1.37	24.02	43.28	0.58	0.62	0.01	19.78	0.00	10.34	100.00
2002	0.71	15.36	6.80	0.00	0.51	2.50	0.76	0.00	73.36	100.00
2003	3.13	30.35	22.02	2.41	7.75	27.08	5.30	0.02	1.93	100.00
2004	4.64	42.35	8.17	0.02	0.00	0.29	5.65	2.75	36.12	100.00
2005	3.88	35.49	11.66	0.01	0.39	12.66	20.98	0.40	14.54	100.00
2006	1.05	2.79	4.79	0.47	0.02	30.67	3.96	31.37	24.88	100.00
2007	0.32	5.63	7.30	0.00	0.53	0.19	0.27	0.10	85.65	100.00
2008	1.83	16.59	14.49	0.00	3.10	3.18	21.43	2.63	36.75	100.00
2009	1.95	27.08	20.77	0.00	17.33	1.62	16.56	0.61	14.08	100.00
2010	0.00	1.75	1.86	0.04	0.02	1.91	3.10	0.07	91.25	100.00
2011	0.57	13.20	29.43	0.00	1.00	1.79	1.91	0.03	52.06	100.00
2012	3.73	82.43	5.70	0.04	0.31	0.40	4.08	0.03	3.27	100.00
2013	3.49	27.94	18.58	0.17	13.55	2.56	25.84	1.11	6.76	100.00
2014	0.21	93.64	4.55	0.14	0.10	0.39	0.25	0.03	0.69	100.00
<i>Average</i>	1.94	28.16	13.48	0.25	3.16	5.94	9.63	2.45	34.99	100.00

*Source: Own calculations using the data from the 2003-2014 Industrial Action Report.*

**Table A.17: Time-loss ratios by industry – including all employees, 1999-2014**

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
1999	103.49	561.09	167.54	11.03	264.20	67.30	969.67	0.44	753.27	338.66
2000	11.44	606.99	92.95	13.82	33.31	75.76	249.43	0.02	482.25	203.93
2001	15.51	415.64	290.36	59.12	12.95	0.08	405.69	0.00	53.79	119.92
2002	4.63	170.51	29.38	0.19	7.12	12.15	9.63	0.00	241.66	76.98
2003	32.98	507.42	150.36	246.47	143.57	173.59	107.02	0.19	8.90	112.46
2004	84.49	1 347.46	70.95	2.03	0.00	2.46	154.28	35.58	230.93	154.40
2005	164.17	2 278.97	210.40	3.92	13.11	189.40	1 059.58	9.29	189.70	299.68
2006	67.26	291.94	132.56	167.40	1.20	688.76	328.54	1 123.53	490.56	458.49
2007	43.21	1 247.04	470.65	3.61	63.98	9.61	45.79	7.29	3 422.64	980.07
2008	12.32	238.88	38.76	0.00	15.53	7.10	151.61	8.29	71.41	44.84
2009	51.73	1 293.04	188.65	0.44	282.64	12.12	379.59	5.44	83.23	143.91
2010	0.18	1 129.42	231.66	82.40	4.62	188.21	966.39	10.03	6 887.68	1 969.15
2011	26.22	1 056.73	488.74	0.81	33.99	22.97	75.49	0.60	506.74	255.78
2012	183.26	7 212.18	117.67	14.91	12.27	6.31	182.96	0.55	36.38	297.30
2013	96.64	1 212.88	218.74	26.01	272.34	20.58	598.35	11.14	39.33	156.46
2014	30.86	22 515.85	299.43	139.84	10.89	17.00	30.14	1.69	21.80	852.87
<i>Average</i>	<i>58.02</i>	<i>2 630.38</i>	<i>199.92</i>	<i>48.25</i>	<i>73.23</i>	<i>93.34</i>	<i>357.14</i>	<i>75.88</i>	<i>845.02</i>	<i>404.06</i>

*Source: Own calculations using OHS 1999, LFS 2000-2007 September, QLFS 2008-2014 fourth quarter, and Industrial Action Reports 2003-2014 data.*

**Table A.18: Time-loss ratios by industry – including formal sector employees only, 1999-2014**

	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	All
1999	124.77	568.88	178.76	11.53	388.61	77.20	1122.04	0.46	795.79	375.81
2000	15.32	623.91	100.24	14.25	53.74	86.31	301.15	0.02	515.08	231.58
2001	19.28	418.32	307.63	59.94	19.49	0.09	479.95	0.00	56.32	132.40
2002	5.59	172.16	30.33	0.19	9.73	13.22	11.06	0.00	251.57	83.18
2003	38.23	508.96	156.58	251.20	200.69	186.72	131.95	0.20	9.22	121.38
2004	104.81	1 350.11	73.70	2.04	0.00	2.61	180.01	36.39	239.23	166.70
2005	195.74	2 290.08	220.45	4.01	19.06	206.96	1 289.11	9.60	201.55	330.13
2006	80.53	293.66	139.70	168.00	1.73	735.64	389.16	1 155.22	511.07	499.27
2007	49.72	1 260.55	488.95	3.85	82.69	10.02	51.34	7.60	3 614.09	1 051.40
2008	17.54	258.76	45.38	0.00	22.45	8.60	196.41	9.17	70.72	51.84
2009	46.54	1 198.65	177.46	0.54	313.35	12.42	461.70	6.19	89.13	150.43
2010	0.22	1 132.69	239.21	74.11	4.74	217.74	1 206.26	9.45	7 842.08	2 135.49
2011	29.41	1 057.58	511.38	0.81	40.52	25.74	92.43	0.63	536.02	278.16
2012	203.76	7 251.65	121.69	15.18	14.46	7.17	224.84	0.58	38.48	322.86
2013	110.60	1 221.99	230.72	26.15	343.98	23.36	754.95	11.69	41.79	172.10
2014	35.71	22 719.58	310.14	143.97	14.06	19.47	36.47	1.77	23.31	940.48
<i>Average</i>	<i>67.36</i>	<i>2 645.47</i>	<i>208.27</i>	<i>48.48</i>	<i>95.58</i>	<i>102.08</i>	<i>433.05</i>	<i>78.06</i>	<i>927.22</i>	<i>440.20</i>

*Source: Own calculations using OHS 1999, LFS 2000-2007 September, QLFS 2008-2014 fourth quarter, and Industrial Action Reports 2003-2014 data.*