Gordon Institute
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Influence of strike action on South Africa's credit rating by global rating agencies.

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ABSTRACT

The growing importance of Credit agency rating in the economic indicators for a country necessitates investigating the impact of various indicators on credit agency ratings. South Africa is a country which has experienced an increase in prolonged, violent and unprotected strike action. This study aimed to determine the impact of this labour relations action on the country's credit ratings over the last 15 years and the consequent related economic factors. Credit rating agencies do not specifically identify strike actions as a key indicator nor do they indicate which indicators dictate the outcome of the ratings granted. Twelve indicators were measured using a quantitative approve of hypothesis and statistical modeling. The study used the interrelated database of The Department of Labour, The PRS Group, Stats SA and studies by Hammer, Kogan, & Lejeune as well as the published indicators of Standard & Poor's, Moodys and Fitch. This study further used the scatter plots and t - tests to determine the relationship between the indicators and strike action. These were correlated using Pearson's correlation theory in order to substantiate the findings of the scatter plot and t – test. Strike action was found to have an effect on the ratings granted. Eight of the twelve indicators correlated negatively with ratings of Standard & Poors indicating that if strike action increased ratings would downgrade. Strike action plays a fundament role in the outcome of ratings granted. This is due to the effect strike action has on the driving indicators. Wages lost during strike action has a 99% correlation with the fluctuation of ratings granted. Ratings determining interest rates and the amount of foreign direct investment into South Africa. With the results as indicated, South Africa's government needs to re-evaluate the significance of strike action as a legal for of resolution and the parameters dictating it. Alternative means need to be explored that supports the growth of South Africa for it to transition from a developing country into an advanced economy.

KEYWORDS

Credit rating agency; South Africa; strike action; indicators; relationships; number of strikes per year; wages lost.

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Masters of Business Administration at Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorization and consent to carry out this research.

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Craig W Cock Date

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CHAPTER 1: INTRODUCTION TO RESEARCH PROBLEM.

South Africa is a country which is currently trying in transitioning process from a third world country to a first world country, from a country heavily dependent on commodities, to a consumer and service driven economy. Most recently the country has been faced with high levels of prolonged violent strikes with significant impact on its socio economic political landscape. Despite amendments to the Labour Relations Act of 1998. The country is faced with questions as to how best to position its growth and whether the countries National development plan positions it to becoming a first world country. It is widely suggested that the countries propensity to be challenged by violent and prolonged strike action has impacted negatively on its economic performance, and investor confidence has been negatively influenced. It has become necessary to investigate the relationship between strike action and the ratings granted by credit rating agencies are one of those changes that need to be understood.

The impact of credit ratings on the economy of a country is significant since the volume of trade, influx of investment and cost of capital is determined by the grade of the rating issued. Credit ratings are dictated by a number of indicators which are evaluated and published by companies such as Standard & Poor's, Moody's and Fitch to sovereign countries of the world. P.L. Hammer, A. Kogan and M.A. Lejeune have identified twelve indicators that show a 95.5% correlation between ratings granted and the indicators facilitating the movements of ratings. The movements of those indicators in any country dictate the outcome of the interest rate at which the country borrows capital. Strike action plays a dramatic role in the outcome of indicators within South Africa. By deduction strike action could have a strong relationship with the current drop in South Africa's credit rating.

Credit rating agencies (CRA's) do not publicly announce how they allocate weightings to each of the criteria required to validate both the initial rating and the upgrades or downgrades of the country in question (Mellios & Paget-Blanc, 2006; Ozturk, 2014). It is suggested that the effects of prolonged violence due to strike action in South Africa have resulted in a downgrade of the government bond rating in September 2012 (+BBB to BBB) and June 2014 (BBB to –BBB) (South Africa: Business Forecast Report, 2015; The PRS Group, 2013)

as sited by Standard and Poor's in their reports. An important question which arises is how much of an impact strike action, within South Africa, has on its foreign currency rating through the evaluation of credit rating agencies.

A number of indicators have been identified by scholars as key determinants of credit ratings. These are: Gross domestic product per capita, external debt, level of economic development, default history, real growth rate and inflation rate (Alfonso, Gomes, & Rother, 2011; Alfonso, 2003; Canuto, Dos Santos, & Porto, 2012; Mellios & Paget-Blanc, 2006). Have identified a number of other indicators have been added and removed by other academics which show a closer correlation to the credit rating agencies outcomes for each country. In particular, the following indicators have been identified to be more representative with a correlation of 99.1% : Gross domestic droduct per capita, inflation rate, trade balance, export growth rate, international resources, fiscal balance, debt to gross domestic product, political stability, government effectiveness, corruption, exchange rate and financial depth and efficiency (Hammer, Kogan, & Lejeune, 2011).

Investigation of the economic relationships between the indicated drivers and labour action in all sectors for both protected and unprotected strike action will further aid understanding of strike action in the weightings allocated by credit rating agencies. This will provide grounds for further studies. The relevance of strike duration, frequency, the perception of foreign direct investors (FDI), credit rating agencies and government response will be taken into consideration.

The prolonged violent strike in the South African Platinum Mining Industry (23rd January 2014 to 24th June 2014) appeared to have resulted in a downgrade from BBB to –BBB on the 13th of June 2014 as per Standard & Poor's (South Africa: Business Forecast Report, 2015; The PRS Group, 2013).

South Africa as a resource driven economy is highly dependent on its labour market. Strike action will thus have a big role to play in its economy and political stability (South Africa: Business Forecast Report, 2015).

Richard and Frank (1996) suggested that a strong correlations exist between cost of capital/financial markets in general and ratings granted by credit rating agencies which makes the effects of strike action so important (Richard & Frank, 1996).

Studies such as by Depken, La Fountain and Butters (2007) have shown relevant relationships between qualitative as well as quantitative variables and fluctuations in credit ratings (Depken, LaFountain, & Butters, 2007). Effectively bridging the gap between economic indicators/political stability and credit ratings.

Political stability and its relationship with credit risk are at the core of the concept (Hammer *et al*., 2011). The question is how the one effects the other and to what extent as suggested by (Mellios & Paget-Blanc, 2006). The level of strike action in a country is one of the many components that dictate political risk. In a South African context the weighting it carries is important to establish as a resource-based economy.

The impact of credit rating agencies and their ratings have a fundamental impact on the lending and borrowing of capital capacity of a country. It is critical to monitor the effects of what affect that rating has and to what degree it can affect the country in question. South Africa as developing economy needs to understand the repercussions of strike action on its economy and ratings.

Background.

The right to strike has been recognised as an intrinsic right to freedom of association and the right to organise as established by the International Labour Organisation, Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87) (ratified by South Africa in 1996) (Department of Labour, 2013).

On the 27 April 1994 South Africa held its first democratic elections leaving apartheid behind with the expectation of a bright united future. Change was implemented within government and society as new legislation and policies were put in place to facilitate transformation. In addition to a number of policies implemented, the Labour Relations Act of 1998 was promulgated (The Presidency, 2014). This Act determines how employees should conduct a legal strike and how employers can implement a lockout (The Presidency, 2014).

The Platinum Mining Industry strike was one of many factors held accountable for the downgrade of South Africa's foreign currency rating to a –BBB by Standard & Poor's. There

is a need to explore the relationship between strikes and the ratings by foreign currency by credit rating agencies.

Research problem

Over the past 21 years of democracy strike action has increased both in duration of the strike and frequency (Department of Labour, 2013). This has had an effect on the economy of South Africa and the perception of Global Agencies of South Africa (South Africa: Business Forecast Report, 2015).

The warnings issued by credit rating agencies as per their CreditWatch policy (Hammer *et al*., 2011) has necessitated a study into the impact of strike action on the credit ratings granted. On the 13th of June 2014 Standard & Poor's issued its reasoning for the downgrade to South Africa's rating status in its RatingsDirect publication. The first cause cited was the prolonged strike action in the platinum mining sector in addition to a low internal and external demand, which was contracting the GDP. This is a direct indication of how credit rating agencies perceive strikes and how it affects their outcome on ratings. A potential downgrade of South African's foreign currency rating was legitimatized to be related to the impacts of the five month long Platinum Strike (South Africa: Business Forecast Report, 2015; Depken *et al*., 2007; The PRS Group, 2013).

Although credit rating agencies do not disclose the weightings granted to each component of their evaluation of a country, fields of analysis are indicated (Mellios & Paget-Blanc, 2006).

The weighting granted to each single event within a country's economy, political environment and fiscal position differs from country to country. Depending on the country a different weighting will be allocated to each of the indicators to eventually derive the country's credit rating. (Ozturk, 2014) For example, South Africa's risk rating could be heavily dictated by the recurrence of strike action and the extent it potentially holds in damaging the country's economy. A lot of weight due to the nature of South Africa's government and policies will therefore be placed on strike action. (South Africa: Business Forecast Report, 2015).

A country's Competitive Risk Exposure is a combination of the findings of both the credit rating agencies and Political Risk Analysis (PRA) (Alfonso *et al*., 2011). Foreign Direct

Investment is heavily dependent on the CRA's evaluation (South Africa: Business Forecast Report, 2015). All three major credit rating agencies evaluate risk in their respective fields on a quantitative basis. However, not all future prospects can purely be evaluated on economic quantitative results. This has been highlighted by the findings on Hong Kong (Richard & Frank, 1996). If Hong Kong's credit rating was purely based on the quantitative results, then its evaluation could be rated three notches higher than indicated. The rating at that time was fundamentally based on Hong Kong's political instability in 1996 (Richard & Frank, 1996).

Evidence identifying the problem.

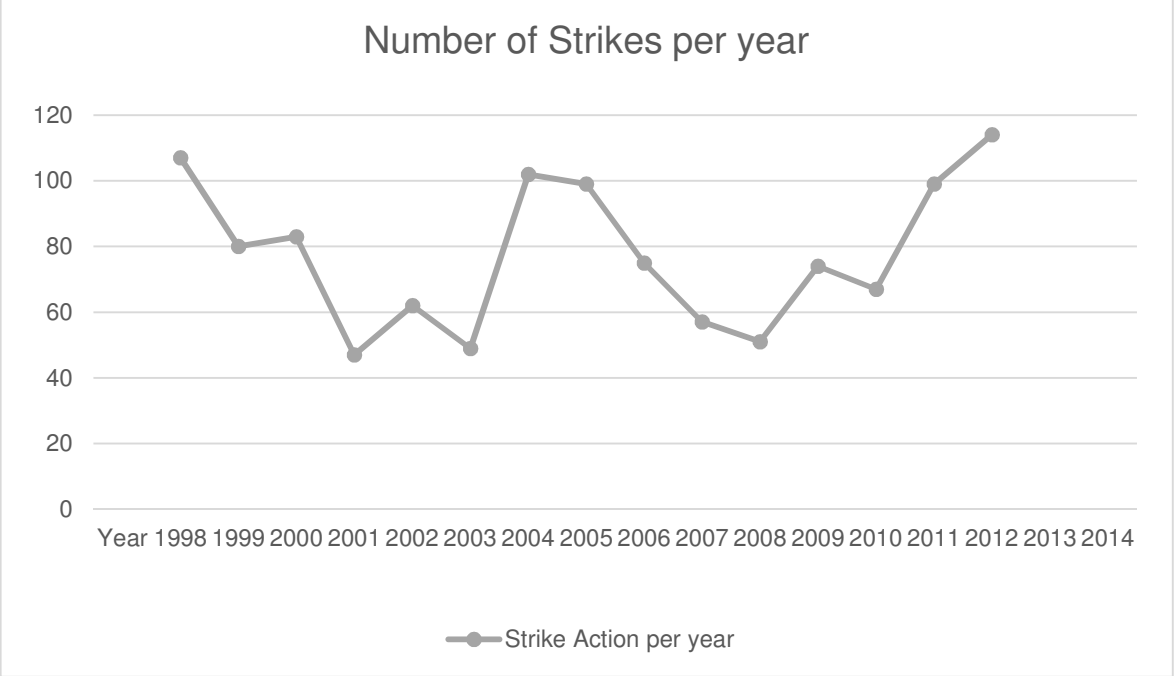
For a number of years, South Africa has experienced a healthy increase in its Gross Domestic Profit. As indicated in Figure 1, South Africa experienced a positive trend in its GDP between 1994 and 2008. During this period South Africa experienced a 4.5% growth year-on-year. In 2008 the world experienced a major financial crisis as reflected in Figure 1.

Figure 1: Growth Domestic Product. South Africa 1994-2014

Source: Statistics South Africa

From 2009 to 2014, South Africa did not regain its previously experienced trending growth rate and is currently one of the worst performing countries within the developing continent of Africa. This corresponds with a steep increase in industrial action from 2009 to 2014 as shown in Figure 2.

Figure 2: Number of strikes per year



Source: Department of Labour (1999 to 2013)

During the above mentioned period of growth in the GDP, there was initially an upgrade of South Africa's foreign currency from BB on the 3rd of October 1994, to the pinnacle of +BBB on the 1st of August 2005. The rating remained there until the first downgrade experienced under South Africa's new democratic government on the 12th of October 2012. This downgrade, issued by Standard & Poor's, correlated with an increase in strike action during the period 2009 to 2014 (Department of Labour, 2013).

This period culminated in the Platinum Strike which prompted the warning of a downgrade by Standard and Poor's to -BBB status. This was subsequently put into effect on the 13th

June 2014. One of the reasons cited for this downgrading was the political instability and the Platinum Strike's effect on the economy (South Africa: Business Forecast Report, 2015).

Relevance of this topic.

Ratings granted by the credit rating agencies have a bearing on the level of foreign direct investment (FDI) and portfolio risk within a country (South Africa: Business Forecast Report, 2015; Canuto *et al.*, 2012). Certain countries, pension funds and companies can only invest in Government Bonds with certain specified minimum ratings e.g. AAA (Standard & Poor's Rating Criteria). South Africa requires an increase in Foreign Direct Investment to sustain growth which will reflect in South Africa's Gross Domestic Product (GDP).

Taken literally, strike action needs to reduce in order for foreign direct investment to increase and thus for share prices, both domestically and internationally, to stabilize. This stabilization will allow for better growth of the GDP. It should be noted that changes in the market generate moments of speculation, which can have either a positive or a negative effect. (Hill & Faff, 2010). The impact of strikes needs to be understood in the context of improving sustainable growth. Without investment into South Africa the required development in all industries could not be sustained.

Research Purpose.

Strike action is a key operating risk. This constitutes an operational risk as the prevention of operations within any business will cause costs to exceed revenue over a period of time. These effects at a micro level will eventually have repercussions on the macro economy of South Africa (Canuto *et al.*, 2012). Unprotected strikes or prolonged and violent strikes impact business sustainability. The increase in unprotected strikes and work stoppages in convention of the Labour Relations Act regulations have negative financial implication on business. (South Africa: Business Forecast Report, 2015). When strikes are not conducted in the way indicated in the Labour Relations Act, this prevents a business from operating in a sustainable manner.

Prolonged strike action and/or unprotected strike action are likely to result in retrenchments which in turn translate into unemployment inevitably implying a decrease in the country's GDP. This lowering of the GDP negatively impacts growth. (South Africa: Business Forecast Report, 2015). Growth will decline and bond rates and foreign currency ratings will be downgraded to the point where South African bonds and foreign currency ratings will become "Speculative Grade". With a Speculative Grade Bond rating, South African bonds have a higher tendency to default due to credit events (Gaillard, 2014). This is one of many scenarios that can unfold in relation to the several different credit rating agencies criteria as indicated above (Alfonso et al., 2011; Alfonso, 2003; Canuto *et al.*, 2012; Hammer *et al.*, 2011; Mellios & Paget-Blanc, 2006).

The Labour Relations Act of South Africa plays a fundamental role as a guideline to neutralize conflict within South Africa (Bendix, 2010). Studies have shown that conflict is ingrained within the workplace and therefore needs to be managed (Bendix, 2010). Strike action is a means of managing the conflict that exists (Bendix, 2010). The Labour Relations Act facilitates such management and specifically strike action in this context (The Presidency, 2014). There is a place for strike action within a democratic society; however, it needs to be effectively managed.

Strike action can potentially be a large driver or contributor to a downgrade of South Africa's credit rating and therefore needs to be understood. Understanding the direct correlation between strikes and the credit ratings might assist in increased efforts to implement proactive preventative actions to minimize the impact on the economy and the subsequent creditworthiness. There is a need to facilitation faster growth within the country and globally (Alfonso et al., 2011).

The downgrade of a country's credit rating has a large implication on the cost of capital. At the time of an upgrade or downgrade the markets become extremely volatile (Hill & Faff, 2010). The value of the relevant currency can fluctuate and inflation can rise or fall (Hill & Faff, 2010). The borrowing of capital becomes more expensive. Money supply is dependent on the rate granted to government bonds which is directly related to the grading given by credit rating agencies.

Government bonds and foreign currency ratings are issued to facilitate the supply of currency into a country (Hill & Faff, 2010). Strike action thus has a major repercussion on the sustainability of a country and could effectively cause a downward spiralling effect of

that country's economy. Additional strikes result in further economic downturn, which in turn precipitates more strikes, thus perpetuating this cycle. This effect is defined by the Theory of Collective Action. The theory states that during times of "plenty" industrial action increases and during times of "none" industrial action is reduced (Olson, 2002). When less fortunate people continue to suffer, despite observing other people becoming richer during periods of growth, the potential for uprising occurs. (Olson, 2002).

Theoretical need for the study

The effects of strike action and the weight it carries with credit rating agencies' is unknown; but a potential relationship does exist, as indicated by the rise in strike action and the observed decrease in GDP and downgrading of South Africa's credit rating globally (Depken *et al.*, 2007). CRA's, unlike political rating agencies (PRA's), are fundamentally quantitative evaluators (Depken *et al.*, 2007). No correlation is made between the ratings allocated by CRA's and the severity of a strike action in any country. Strike action has been cited as the dominant reason for downgrades by CRA's (Depken *et al.*, 2007).

Strike action affects economic indicators, which in turn play a part in the evaluation by CRA's. Political stability is one of the CRA's dominant measured drivers and it needs to be considered in terms of how much of a bearing this has in a South African context.

No literature can be found to directly correlate the severity of strike action with CRA ratings. However, an evaluation has been conducted between corruption and ratings granted by CRA's (Depken *et al.*, 2007).

Particular to this study is an analysis of the relationship between the gravity of strike action in a South African context and the ratings granted by credit rating agencies.

CHAPTER 2: LITERATURE REVIEW.

Credit Rating Agencies.

The purpose of credit rating agencies is to identify the level of risk a potential investor could experience when investing into a country or company. This is done by gathering all the required historic and current indicators from both financial and political fields and presenting them in an easy to use format that facilitate a single result. This result places all sovereign countries in relation to each other in terms of the same benchmark using one scale. The diverse number of indicators and political variables used to substantiate one single outcome points to a potentially sensitive and large algorithm used by the credit rating agencies (Hammer *et al.*, 2011).

Ratings allocated to countries or companies are not substantiated by CRA's (Mellios & Paget-Blanc, 2006; Ozturk, 2014). Agencies such as Standard and Poor's, Moody's and Fitch Ratings do not announce the reasons for, or criteria used to validate, their decision of an upgrade or downgrade. Only the final result of the rating granted to that country is known (Hammer *et al.*, 2011).

Standard and Poor's Moody's and Fitch Ratings use different rating scales as indicated in Table 1 (Kaminsky & Schmukler, 2002).

Table 1: Linear transposition of rating scale

Description	Credit Rating Agencies			
	Standard & Poor's	Moody's	Fitch Ratings	
Investment Rating	AAA	Aaa	AAA	Highest Quality
	AA+	Aa1	AA+	High Quality
	AA	Aa2	AA	
	AA-	Aa3	AA-	
	A+	A1	A+	Strong payment capacity
	A	A2	A	
	A-	A3	A-	
	BBB+	Baa1	BBB+	Adequate payment capacity
	BBB	Baa2	BBB	
	BBB-	Baa3	BBB-	

Speculative Rating	BB+	Ba1	BB+	Likely to fulfil obligations
	BB	Ba2	BB	
	BB-	Ba3	BB-	Ongoing uncertainty
	B+	B1	B+	
	B	B2	B	
	B-	B3	B-	
Default Rating	CCC+	Caa1	CCC+	Currently vulnerable to default or in default.
	CCC	Caa2	CCC	
	CCC-	Caa3	CCC-	
	CC	Ca	CC	In bankruptcy or default
	C		C	
	SD	C	DDD	
	D		DD	
			D	

Source: Standard & Poor's, Moody's and Fitch Ratings

The role of credit rating agencies is of great importance in terms of how investors move in and out of all aspects of the money market (Hammer *et al*., 2011). Investor's opinions are largely dictated by the relevant ratings granted to each country or company by the CRA's (Hammer *et al*., 2011; Richard & Frank, 1996). An understanding of both the economic and political components used to derive the said ratings is fundamental. (Hammer *et al*., 2011). Studies have been conducted to understand how ratings are compiled for both countries and companies (Depken *et al*., 2007; Richard & Frank, 1996).

Risk

As highlighted in the executive summary of the Institute of Risk Management's 2015 annual report, the Association of Mineworkers and Construction Union stopped the strike action that lasted 5 months on the 29th of July 2014. (Country reports: South Africa, 2015). This strike involved 80 thousand demonstrators resulting in a 25% loss in mining production and a downgrade from all three leading credit rating agencies. The net effect as stated by all credit rating agencies was a reduction of 0.6% of South Africa's GDP.

The following factors are currently South Africa's top ten risks and are expected to play a major role for next two years. The Institute of Rick Management South Africa identified the following 10 key risk factors (The Institute of Risk Management South Africa, 2015).

1. Corruption or increasing corruption.
2. Structurally high unemployment or underemployment.
3. The failure or shortfall of critical infrastructure.
4. Profound political and social instability.
5. Major escalation in organised crime and illicit trade.
6. Escalation in large-scale cyber-attacks.
7. Failure of major financial mechanisms or institutions.
8. Severe income disparity.
9. Mismanaged urbanisation.
10. Massive incidence of data fraud / theft.

Political and social instability has been recognized as the fourth biggest risk facing South Africa both now and in the future (The Institute of Risk Management South Africa, 2015).

Country Risk

The world is becoming a smaller place in the sense that data is becoming more readily available. This globalization is becoming more and more prevalent especially in relation to the world economy. Financial information is becoming standardized and internationalized which facilitates a greater scope of potential investment possibilities (Hammer *et al.*, 2011) With this comes new risks and the need for greater understanding of more data to make the educated investments required (Hammer *et al.*, 2011). This scenario applies to companies much as it would to countries. The full extent of the potential risk an investor is dealing with when looking to invest his money into a country is required. To aid this, companies such as Standard and Poor's (S&P's), Moody's and Fitch Ratings publish their ratings to indicate to the world the creditworthiness or scale of risk an investor would be exposed to when investing in that country. The risk of credit default is highlighted and standardized across the world. As defined by Alfonso, "country credit risk ratings, are a condensed assessment of a government's ability and willingness to repay its public debt both in principal and in interest

on time" (Alfonso, Gomes, & Rother, 2007). Eliasson states that country credit risk ratings indicate the "risk of a national government's defaulting on their obligations" (Eliasson, 2002a).

With direct relation to the South African context which is defined as an emerging market; political risk, exchange rate risk and the extent of corruption play a greater role in the ratings granted when compared to developed countries (Hammer *et al.*, 2011).

The impact of credit ratings

The ratings calculated and granted by country credit risk rating agencies have a direct influence on the interest rate. The interest rate dictates the cost at which countries can obtain credit from the international financial markets. As seen in the figure below; the greater the rating granted, the lower the interest rate allocated, the cheaper one's repayment of debt (Hammer *et al.*, 2011). This can be seen in South Africa currently with the country being just above junk status (speculative grade) as of the 13th of June 2014. South Africa's borrowing has become more expensive.

The credit risk rating of a country also affects the potential for foreign direct investment into individual companies (Ferri, Liu, & Stiglitz, 1999; Hammer *et al.*, 2011). This is due to the proverbial "credit risk ceiling" created by the country's rating grade (Hammer *et al.*, 2011). Businesses and banks generally follow the trend of the rating allocated to the country. It is rare to find a bank or business with a better rating than the country in which it is located (Durbin & Ng, 2005; Eliasson, 2002b; Mora, 2006).

In addition to the effects listed above, investors (individuals and governments) are governed as to whom they can invest in. The extent of the risk the investor is allowed to take is dictated by the grading that the country has been issued. This places a massive divide between high income and low income countries (Ferri *et al.*, 1999). In effect this means that the majority of high income countries are not allowed to invest in low income countries or in those with a rating below a certain point. Banks, located in their respective countries, be they high or low income countries, are affected differently. Banks within low income countries are highly dependent on the rating allocated by the credit rating agencies, whereas the banks in high income areas are not affected (Hammer *et al.*, 2011; Kaminsky & Schmukler, 2002; Larrain,

Reisen, & von Maltzan, 1997). This creates an environment where a country potentially cannot grow unless a country of a higher income bracket takes a large risk and invests in that low income bracket country. This creates a scenario of segregation which allows for the discrimination between the two types of income countries. The low income country will, in effect, need to create an environment of minimum to no risk for countries of high income to consider direct investment.

Credit risk rating bias

It has been identified that certain country risk rating agencies have regional bias (Ul Haque, Mathieson, & Mark, 1997). European and Asian countries are favoured over African countries due to investors holding favour towards Europe and Asia (Ul Haque *et al.*, 1997). This therefore allows speculation that specific countries could be evaluated differently depending on their current state of affairs or political policies, more so than other countries. For example, could South Africa's culture, political policy and current state of affairs in relation to strike action allow that component to hold greater weight when evaluating ratings?

Credit rating agencies have been scrutinized as to the validity of their methods in light of the credit crises of 2008 affecting American and European regions (Ozturk, 2014). This spawned the investigation of potential bias between high-income countries and credit rating agencies (Lagner & Knyphausen-Aufseß, 2012). The potential for bias towards high income countries over low income countries exists. In addition, the bias of ratings granted to countries or companies that pay credit rating agencies for the relevant ratings also has an influence on the outcome of their rating (South Africa: Business Forecast Report, 2015).

Political risk and stability

Political risk is defined as the risk of potential changes in the political stability of that country or chance of political change. This is monitored and evaluated by investors looking to invest in said country. Examples of such changes are the election of a new government, new

monetary and foreign policies or military coups. Political risk, otherwise known as geopolitical risk, plays an influential role in foreign direct investment and investment returns.

Political stability, which is an indicator of the fiscal depth and efficiency of a country, contributes to the outcome of the rating granted (Hammer *et al.,* 2011).

Political stability plays a very important role in the volume per capita income of a country. This allows academics the opportunity to study the potential incomes generated from the Tax base if strikes were reduced and managed correctly or substituted with an alternate approach (Richard & Frank, 1996). This has a correlation with the unemployment rate within the country. South Africa currently has an unemployment rate of 24%, which in effect means that the country is potentially losing 24% of its Tax base income. This in turn will affect a number of other indicators positively, political stability being one of them. The capabilities of a country with 0% unemployment are profound.

Political risk of a country is evaluated by a number of organizations such as: Oxford Analytica, Maplecroft, Business Monitor International, Country Risk Solutions, Economist Intelligence, Eurasia Group and The PRS Group. Political risk groups do not have any direct bearing on the credit risk ratings granted by companies such as Standard & Poor's and Moody's due to the fact that they monitor their own indicators, but credit rating agencies do take political factors into account when granting their rating of a country.

Political factors play a large role in how sovereign governments are rated by credit rating agencies. Riots and political instability are taken into account when determining ratings (Mellios & Paget-Blanc, 2006). This is where the potential connection between strike action and ratings exist.

Political risk plays a much larger role, as indicated in emerging markets and the following components make up political variables (Hammer *et al.*, 2011):

- Anti-governmental demonstrations (N. U. Haque, Kumar, Mark, & Mathieson, 1998)
- Armed conflicts (or riots) (Brewer & Rivoli, 1990; Cook & Hebner, 1993; N. U. Haque et al., 1998)
- General strikes (N. U. Haque *et al.*, 1998)
- Social stability (Cook & Hebner, 1993)
- Stability of labour (Mauro, 1993)

This risk type evaluates the sovereign's capability to repay its debt due or to create turmoil in the foreign exchange market. The rating granted to political risk assists in the evaluation of sovereign, currency and banking risk.

As published by the CFA 2014 Global Market Sentiment Survey, Political Instability is seen as the number one risk to the future of South Africa and the reason for no to little growth (The Institute of Risk Management South Africa, 2015).

Strike Action

Downgrades of ratings have been correlated to times of crises (Hill & Faff, 2010). Standard and Poor's have been proven to be more proactive with regard to the rating of a country once a crisis has occurred (Hill & Faff, 2010). What needs to be defined is the extent of the crisis as well as what constitutes a crisis. What size strike will constitute a crisis in the eyes of the credit rating agencies?

Foreign direct investment has a clear correlation with credit ratings and therefore makes the repercussions of strike action so much more important for South Africa's future growth (Richard & Frank, 1996). Credit ratings are effectively economic indicators summarized for the benefit of the investor (Richard & Frank, 1996). Effects of strikes on economic indicators can be evaluated over the duration of the strikes. Relationships can be deduced.

The following is a good example of a correlation between a political indicator and ratings granted by the credit rating agencies. For every unit decrease in corruption an equivalent improvement will be experienced in the rating granted to the country in question (Depken *et al.,* 2007). This study facilitates the relationship between one political indicator and the credit rating agencies' evaluation. It is possible to set up relationships with each economic indicator and to relate it back to the creditworthiness of the country. This in effect calculates the cost of strikes through their impact on creditworthiness (Depken *et al.*, 2007).

Strike action has been cited in many of Moody's and Standard and Poor's reports as being the reason for a downgrade or forecasting that strikes are the result of a reducing GDP or GDP that will not grow and develop (Standard & Poor's, 2013).

Moody's in September 2012 and Standard and Poor's in October 2012 cited strike action in the mining sector to be one of the main contributing factors that resulted in downgrades being awarded. This was due to an unstable political environment and breakdown in labour relations (Standard & Poor's, 2013).

Unemployment combined with slow per capita income growth makes South Africa more susceptible to strike action and an unstable political environment. This all has bearing on the Sovereign and political risk of South Africa (Standard & Poor's, 2013).

Strike action over the 2012 period in a number of sectors created downward pressure on the rand. In this case, labour unrest was the reason for increased risk being placed on the currency of South Africa causing it to drop in value (Standard & Poor's, 2013).

Mining and manufacturing are defined as key industries within South Africa's potential to sustain high levels of growth within its GDP. Therefore strikes within those industries have a major impact on the GDP and the economic growth of the country.

2013's automotive strike resulted in another year of nominal growth of the gross domestic product of South Africa (Standard & Poor's, 2014).

In 2014 South Africa was again downgraded by Standard and Poor's who cited strike action as a main contributor. The strike in question was within the mining industry, specifically the platinum mining sector. This contributed to a 0.6% loss in GDP in 2014 (Standard & Poor's, 2014).

As highlighted by the Institute of Risk Management South Africa, increased strike action is one of South Africa's greatest threats (The Institute of Risk Management South Africa, 2015). As published by the Department of Labour's latest annual industrial action report, South Africa have lost $6.6 billion to 2012 and an addition $6.7 billion in 2013 (Department of Labour, 2013).

Currently South Africa is experiencing "load shedding" due to the lack of electrical capacity on the South African power grid. Madupi and Kusile Power stations are currently under construction to facilitate this need. South Africa's economy is under pressure due to this shortfall which is affecting the mining and manufacturing industry dramatically. Strike action has been identified as one of the six greatest contributors to why the required power stations within South Africa have not being completed on time. This labour unrest has effected the growth of South Africa.

Evaluation Variables

Country risk rating agencies or credit risk agencies recognize that both economic and political components of a country play a role in the country's risk and potential default on its debt (Bourke & Shanmugam, 1990). The following two questions make both components (economic/financial and political) worth monitoring from a creditworthiness perspective.

1. From a financial and economic point of view is the country capable of paying its debt if declared bankrupt? Will the country in question sustain its economy by not taking on more debt if in a state of bankruptcy? Credit rating agencies will therefore monitor all financial, fiscal and economic indicators to substantiate ratings and forecast required risk ratings of that country.
2. With reference to the political component, is the country making the cognitive decision to not pay its debt deliberately based on political reasoning? This stems from political processes and country parameters. For example, has the government been overthrown, is there potential for a political uprising? Thus is there an imminent riot or crises? This justifies the evaluation and monitoring of political indicators from a credit risk rating point of view.

Since it is unknown exactly which indicators are used to substantiate the ratings from both a financial/economic and political side there is room for speculation (Hammer *et al.*, 2011; Reinhart, 2002). The two schools of thought regarding indicators used by the country risk rating agencies, or credit rating agencies, are as follows.

1. Only economic indicators are required to facilitate an accurate understanding of why ratings change and are as indicated (N. U. Haque *et al.*, 1998).
2. Both political and economic factors and indicators have a bearing on the ratings granted and how they change (Brewer & Rivoli, 1990).

Indicators facilitating a 95.5% correlation level with the actual S&P's and Moody's ratings are as follows (Hammer *et al.*, 2011):

- Gross domestic product per capita (Alfonso, 2003; Alfonso *et al.*, 2011; Bennell, Crabbe, Thomas, & Gwilym, 2006; Bissoondoyal-Bheenick, 2005; Bissoondoyal-Bheenick, Brooks, & Yip, 2006; Erb, Harvey, & Viskanta, 1996; Feder & Uy, 1985; Larrain *et al.*, 1997; Monfort & Mulder, 2000; Remolona, Scatigna, & Wu, 2008).

Gross domestic product per capita is one of the most profound and influential indicators when determining ratings and the fluctuation thereof. GDP specifies the magnitude of the economy. It is a total measure/value of all products, goods and services within the boundaries of the country. This is measured over a year and is represented in terms of the US dollar. Gross domestic product is the only economic standard compared across the world. Gross domestic product per capita represents the GDP per person residing in the boundaries of that country. Gross domestic product per capita is an indication of average income per person within that country (Moody's, 2013).

GDP is the value of final goods and services within a country and strike action has a direct effect on the output of final goods and the offering of services. During a period of strike action, the following are examples of effects: mines are stopped from producing platinum, busses are stopped from delivering the required workers to their place of work and power stations are prevented from being constructed on time to supply the required power to facilitate industry. Each of the three examples given has additional repercussions thus further damaging the economy. Not only does it affect the companies themselves but also prevents the companies from paying wages, which in turn affects the rate of spending within the economy. This prevents the economy from being stimulated thus not allowing it to grow.

The GDP of South Africa dropped by 0.6% in the first quarter of 2014 which corresponded with the 6.5% year-on-year reduction of mining production and then the Platinum strike which took place on the 23rd of January 2014 (Standard & Poor's, 2014)

- Inflation rate (IR) (Aylward & Thorne, 1998; Baek, Bandopadhyaya, & Du, 2005; Bennell et al., 2006; Bissoondoyal-Bheenick, 2005; Bissoondoyal-Bheenick et al., 2006; Cantor & Packer, 1996; Erb et al., 1996; N. U. L. Haque, Kumar, Mark, & Mathieson, 1996; Larrain et al., 1997; Monfort & Mulder, 2000; Noy, 2008; Ul Haque et al., 1997).

Inflation is otherwise known as Consumer Price Index (CPI), which is measured over a year period and is represented by the percentage change. CPI is determined by the change in price index of frequently consumed goods. Due to the origin of CPI it is also used to dictate

the level at which wages or salaries are increases. Inflation/CPI is not consistent across all countries since it is based on the price of goods within that country and not necessarily the intrinsic cost of the goods in question. This becomes extremely relevant to credit rating agencies during Hyperinflation. Hyperinflation occurs when where month to month inflation is greater than 50%. This is the majority of the time related to economic crises such as uncontrolled fiscal spending by the government, central bank monetization of government debt and a strike of an extended nature in a critical industry or sector.

- Trade balance (TB) (Easton & Rockerbie, 1999).

Trade balance is a figure that is calculated by subtracting the total imports of the country from the total exports of the country. Total exports – Total imports = Trade balance. Strike action in critical areas of the supply chain could affect the outcome of the trade balance (Moody's, 2013).

- Exports' growth rate (EGR) (Feder & Uy, 1985; N. U. L. Haque *et al.*, 1996; Monfort & Mulder, 2000; Noy, 2008; Ul Haque *et al.*, 1997).

Exports' growth rate (EGR) is one of many indicators that reflect economic growth annually. Exports' growth rate is not adjusted for inflation. This indicator contributes to the gross domestic product of a country (Moody's, 2013).

EGR is a good indicator of the direction and rate at which an economy is growing. In the case of first world countries the expected rate is 2 to 5%. Whereas countries with a developing economy, such as South Africa, should be experiencing rates of 10% until such time as it matures into a developed country.

There is a correlation between gross domestic product and export growth rate.

- International reserves (RES) (Aylward & Thorne, 1998; Baek et al., 2005; Cantor & Packer, 1996; Easton & Rockerbie, 1999; Feder & Uy, 1985; N. U. L. Haque *et al.*, 1996; Hu, Kiesel, & Perraudin, 2002; Lee, 1993; Monfort & Mulder, 2000; Ul Haque *et al.*, 1997).

International reserves are used to back debt or to supply new money to the economy. Gold or a specific currency can be used as backing. In the majority of all cases the dollar is used but the Euro or any other stable strong currency can be used.

- Fiscal balance (FB) (Bennell *et al*., 2006; Bissoondoyal-Bheenick, 2005; Cantor & Packer, 1996; Cook & Hebner, 1993; Larrain *et al*., 1997; Lee, 1993; Monfort & Mulder, 2000).

Fiscal balance is calculated from the following variables: tax revenue, income of assets sold and government spending.

(Tax Revenue + Assets Sold) – Government Spending = Fiscal Balance

Negative fiscal balance reflects a fiscal deficit which indicates that the expenses of the country are exceeding the income whereas a positive fiscal balance or fiscal surplus indicates that the country is being profitable.

- Debt to GDP (DGDP) (Aylward & Thorne, 1998; Brewer & Rivoli, 1990; Cook & Hebner, 1993; Feder & Uy, 1985; N. U. L. Haque et al., 1996; Hu *et al*., 2002; Lee, 1993; Ul Haque *et al*., 1997).

The ratio of a country's debt to what it can immediately produce clearly indicates the country's ability to repay outstanding debt to a credit rating agency.

Nonetheless this indicator is not a true reflection of the country's economic position; in that, if the country can maintain the payments on the interest of the debt, without incurring additional debt, the debt to gross domestic product will be deemed stabile.

If however, the ratio is too high, which indicates that the country will battle to pay the required interest, then in that case the country will require additional debt at a higher interest rate to repay its original debt. This dangerous spiralling could result in the country defaulting on its debt and the country being issued the lowest grade by the credit rating agencies. The higher the debt to gross domestic product ratio, the greater the possibility that a country defaulting on its obligations.

- Political stability (PS) (Alfonso, 2003; Brewer & Rivoli, 1990; Citron & Nickelsburg, 1987; Cook & Hebner, 1993; Feder & Uy, 1985; Lee, 1993; Manasse, Roubini, & Schimmelpfennig, 2003; Mauro, 1993; Remolona *et al*., 2008; Rivoli & Brewer, 1997).

Political stability speaks directly to the power and strength of the government. The relationship between the government and its citizens is of great importance and needs to be based on trust and honour. The way this is measured is by the frequency and extent of

violence, riots and terrorist attacks within the country. The more the citizens associate themselves with their country, the greater the state of stability.

- Government effectiveness (GE) (Hammer *et al.*, 2011)

This measure is compiled by the World Bank and is one of six used by credit rating agencies. The variables facilitating this index are a combination of: the quality of public service, the government that provides it, the standard of personnel providing the service and the reliability of the government with respect to their policies and procedures. These are only a few of many measures used to generate these results. The index used ranges from -2.5 to 2.5, with the highest rating of 2.5 representing an extremely efficient government, one of high maturity and alertness.

- Corruption (COR) (Mauro, 1993; Remolona *et al.*, 2008).

Corruption is a measure of untoward behaviour; the acceptance of bribes, money under the table to influence outcomes, swaying ballots in the required favour. All spring from unethical behaviour. The level of corruption is measured in each country, which determines the trustworthiness of the country in question.

- Exchange rate (ER) (Hammer *et al.*, 2011)

Real effective exchange rate and exchange rate are two indicators that operate at a country level across the world. The price competitiveness of each country can be evaluated by the difference in exchange rate. Imports and exports are affected by the fluctuations in the exchange rate and the ability to trade. Countries with a high exchange rate would prefer exporting goods and minimizing imports.

Speculation plays a substantial role in how the markets react to the increases or decreases in the ratings. For example if the exchange rate is believed to be hyped or inflated, this could warrant the understanding of an imminent drop in value which could result in a currency crisis. Perception is of vital importance in the market. This begs the question as to what perception strike action in South Africa creates in the market.

Exchange rates are compiled by indicators like GDP, inflation, interest rate and unemployment which dictates supply and demand of that currency which creates relationships between countries. Trade configurations of all countries play a part, for example, exploiting of export and import volumes. Other factors that dictate the rate are the

costs and prices used in international trade, export price, manufacturing good's price, consumer price and wholesale price. All of which are affected by strike action. The greater the delay in manufacturing, the greater the risk of losing the relevant contract or of an increase in manufacturing costs. This relates back to the exchange rate which has been identified as one of the indicators dictating the ratings granted by CRA's.

JP Morgan and the International Monetary Fund are two institutions that calculate the exchange rates for a number of countries. JP Morgan's exchange rate is based on GDP whereas the International Monetary Fund's exchange rate is based on the consumer price index.

Strike action is extremely influential as to how the rand is perceived and thus the exchange rate thereof (Standard & Poor's, 2013; Standard & Poor's, 2014).

- Financial depth and efficiency (FDE) (Hammer *et al.*, 2011)

Financial depth and efficiency is an indicator that represents the ratio between domestic credit offered by banks to the country in question and the gross domestic product of that country. GDP plays a role as a standalone indicator for the credit rating agencies but also as a component of the other indicators identified.

This is a reflection of the country's accessibility to finance for both the government and private sector (Hammer *et al.*, 2011).

As mentioned, each credit rating agency has a list of variables that determine the outcome of the rating. The weightings of those indicators are not specified. Several fundamental economic drivers have been identified (Alfonso *et al.*, 2011; Alfonso, 2003; Mellios & Paget-Blanc, 2006; Richard & Frank, 1996).

Per capita income has a strong relationship with a good credit rating (Alfonso, 2003; Richard & Frank, 1996). The majority of all countries with a high-income per capita ratio fall within the Aa/AA rating as a minimum (Richard & Frank, 1996). Because of the strength of this indicator the root causes of a good per capita rating needs to be understood. The size of the tax base of a borrowing country plays a fundamental role (Richard & Frank, 1996). The larger the tax base, the more capital a country can gather to repay debt, which in turn lowers the risk of the country defaulting on its bond (Richard & Frank, 1996).

Each of the indicators used by the credit rating agencies can be broken down into the fundamental economic indicators and compared to the repercussions of the strikes, which in turn have a larger or smaller effect on the rating.

Credit ratings are constant within all Sovereign Countries (Richard & Frank, 1996). Economic indicators have a direct relationship with the fluctuations in ratings (Richard & Frank, 1996). This supports the validity of the rating made.

Data

Sovereign ratings of bonds have remained the same since the 1920's (Gaillard, 2014). Large volumes of data over a vast number of years can be used to establish the relationship as indicated by Gaillard (Gaillard, 2014).

The number of strike days can also be taken as an indicator compared to the twelve economic indicators identified. How many days of strike action would it take to facilitate a downgrade?

The ratings granted by credit rating agencies are based on foreign currency debt (Trevino & Thomas, 2001). Foreign currency country ratings are extremely sensitive due to the nature of the foreign currency debt that needs to be addressed as a priority. External debt is of greater importance and risk than local debt due to the potential fluctuations in the local currency. Foreign currency ratings take both economic conditions and political risk into account (Cantor & Packer, 1996). For this reason only foreign currency risk ratings will be used.

Standard and Poor's and Moody's have published fluctuations in the ratings granted to South Africa. Moodys and Standard & Poor's dictate majority market share of the three rating agencies. Only Standard and Poor's ratings will be taken into account due to access to data, speed at with they respond to fluctuations in financial indicators and that they are majority market holders globally.

Data on all indicators pertaining to the required research has been gathered from Standard and Poor's, IMF, The PRS Group and The World Bank. All of the strike action data has been

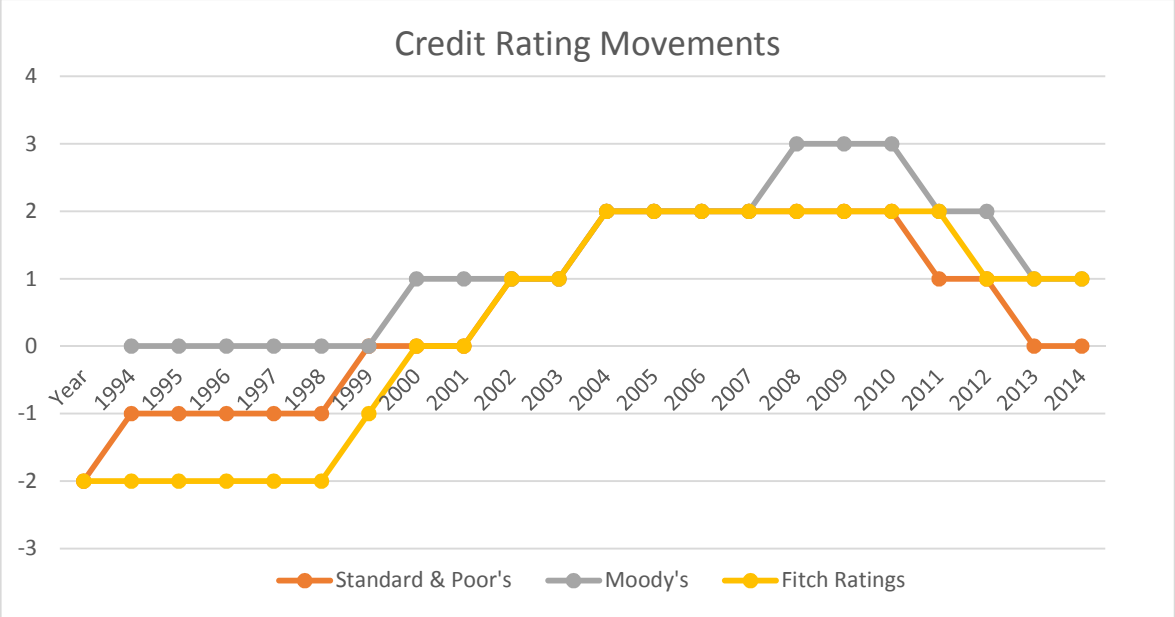
collected from Statssa and annual reports of the Institute of Risk Management South Africa and The Department of Labour.

Table 2: Rating movements of South Africa.

	Ratings Movement between 1994 and 2014 with in South Africa						
	Description	Credit Rating Agencies					
Key		Standard & Poor	Date	Moody's	Date	Fitch Ratings	Date
9	Investment Rating	AAA		Aaa		AAA	
8		AA+		Aa1		AA+	
7		AA		Aa2		AA	
6		AA-		Aa3		AA-	
5		A+		A1		A+	
4		A		A2		A	
3		A-		A3	16th July 1009	A-	
2		BBB+	1st August 2005	Baa1	11th Jan 2015 and 27th Sep 2012	BBB+	25th August 2005
1		BBB	7th May 2003 and 12th Oct 2012	Baa2	29th November 2001	BBB	2nd May 2003 and 10th June 2013
0		BBB-	25th Feb 2000 and 13th June 2014	Baa3	30th May 1995	BBB-	27th June 2000
-1	Speculative Rating	BB+	20th November 1995	Ba1		BB+	19th May 200
-2		BB	3rd October 1994	Ba2		BB	22nd September 1994
-3		BB-		Ba3		BB-	
-4		B+		B1		B+	
-5		B		B2		B	
-6		B-		B3		B-	
-7	Default Rating	CCC+		Caa1		CCC+	
-8		CCC		Caa2		CCC	
-9		CCC-		Caa3		CCC-	
-10		CC		Ca		CC	
-11		C				C	
-12		SD		C		DDD	
-13		D				DD	
-14						D	

Source: Standard and Poor's, Moody's and Fitch Ratings

Figure 3: Movement of ratings in relation to each credit rating agency



Source: Standard and Poor's, Moody's and Fitch Ratings

As shown in figure 3, Standard and Poor's can be seen to have a quicker response time when evaluating economic and political fluctuations. This reaction time is possibly due to the constant issuing of warnings prior to the event of the crisis.

Fitch follows Standard and Poor's outcome by +/- a year, whereas Moody's appears to stand independently of Standard and Poor's and Fitch. All three agencies follow the trend regarding the 2008 financial crises, but what is interesting to note is how South Africa's drop in gross domestic product correlates visually with the increase in strike action from 2009 to 2014 as seen in figures 1 and 2.

On a yearly basis, the Department of Labour publishes the Industrial Action Annual Report. All relevant and required statistics are made available to the general public (*Annual Industrial Action Report 2003.*2003; *Annual Industrial Action Report 2004.*2004; *Annual Industrial Action Report 2005.*2005; *Annual Industrial Action Report 2006.*2006; *Annual Industrial Action Report 2007.*2007; *Annual Industrial Action Report 2008.*2008; *Annual Industrial Action Report 2009.*2009; *Annual Industrial Action Report 2010.*2010; *Annual Industrial Action Report 2011.*2011; *Annual Industrial Action Report 2012.*2012; *Annual Industrial Action Report 2013.*2013). This data was gathered and collated in a usable form.

Chapter 3: Research proposition

This chapter describes the research questions and hypotheses that this study is aiming to answer and test. The objective of this empirical research is to address the research problem and aim of this study. The aim is to determine the impact of strike action on ratings granted.

The literature review in Chapter two clearly articulated the importance of the rating achieved by a country and the nature and severity of strike action in South Africa.

Standard & Poor's, Moody's and Fitch Ratings hold 95% of the market share regarding credit rating agencies. With the majority of that 95% held by Standard & Poor's and Moody's. The power of the two credit rating agencies is of a global nature and significantly powerful within the economy of each country.

Within a South African context, strike action plays a critical part of the country's perception. The role of strikes impact the ratings. This is evident in the remarks published by the RatingDirect publication for each of the last three downgrades issued to South Africa (Standard & Poor's, 2014). Strike action has the power to bring major corporations to a standstill and initiate change within South Africa.

The objective of this research paper is to explore the potential relationship between strike action and credit ratings granted by credit rating agencies.

The following research questions and hypotheses arise to substantiate the topic in question:

1. How the number of strikes affect those factors and indicators which ultimately dictate the rating given? What is the relationship between strike action and ratings granted in the context of the rating agencies? Are the fluctuations of ratings granted to South Africa by Standard & Poor's directly correlated to the number of strikes experienced per annum?
    a. H1: Strike Action (number of strikes per year) has a negative influence on credit ratings granted.
2. How do political risk ratings fluctuate in relation to the credit ratings of the country? Political risk ratings granted to South Africa by The PRS Group are directly compared to the rise and fall of the credit ratings of South Africa. This is to identify any relationship that could potentially exist between credit and political ratings.
    a. H2.1: Political Risk rating has a negative influence on Credit Ratings granted.

   b. H2.2: Corruption levels have a negative influence on Credit Ratings granted.

3. Does the number of strikes per annum have a direct effect on the indicators which affect the credit rating granted? H3.1 to H3.12 will facilitate the hypothesis between each of the 12 indicators as listed and the number of strikes experienced per annum.
   a. H3.1: Strike action has a negative influence on GDP per capita.
   b. H3.2: Strike action has a negative influence on inflation rate.
   c. H3.3: Strike action has a negative influence on trade balance.
   d. H3.4: Strike action has a negative influence on exports growth rate.
   e. H3.5: Strike action has a negative influence on international reserves.
   f. H3.6: Strike action has a negative influence on fiscal balance.
   g. H3.7: Strike action has a negative influence on government debt to GDP.
   h. H3.8: Strike action has a negative influence on political stability/risk.
   i. H3.9: Strike action has a negative influence on government effectiveness.
   j. H3.10: Strike action has a negative influence on corruption.
   k. H3.11: Strike action has a negative influence on exchange rate.
   l. H3.12: Strike action has a negative influence on financial depth and effectiveness.
   m. H3.13: Statistical modelling using Pearson correlations between indicators. Is there an impact on specified indicators as a result of wages lost due to strike action?

In order to answer H3.13, Pearson's correlation method was used between specified indicators and ratings granted as indicated in Table 3 below.

Table 3. Pearson correlation

Item 1	
1	$-1 \leq r_{xy} \leq +1$ (2 Indicators)
2	An $\lvert r_{xy} \rvert$ of 1 denotes a strict linear relationship (2 Indicators)
3	The larger the value of r_{xy}, the better the prediction of Y on the basis of X (12 Indicators)
4.	If X gives a good description of variation in Y, than $S_{y'}$ should be approximately equal to S_y (2 Indicators)

Furthermore, the model was designed to examine the extent of the impact of wages lost due to strike action on credit rating and GDP per capita. The two propositions below formed some of the basic building blocks used as the theory of descriptive regression analysis.

Each sub-item requires a number of propositions for its solution. Sub-item H3.13 for the GDP per capita and S&P's credit rating, requires the following propositions:

R^2 gives the proportion of variance explained in Y by linear regression on X

The greater the proportion of variance explained on the basis of a regression model, the better the predictions yielded by that model

Chapter 4: Research methodology.

This section of the study describes the method of research and methodology employed to answer the research questions and test the hypotheses discussed in the previous chapter. It also outlines the relevant population, units of analysis, sampling methods and measuring techniques applied in the study, the ethical issues considered and also highlight the potential limitations of the method applied.

Research design

To address the research questions

Twelve indicators have been identified as the most influential dictators of how credit rating agencies vary their ratings granted. The effects of strike action on these twelve indicators have been compared statistically. The relationships between these indicators and strike action have then been compared to how the ratings of a country fluctuate. Political risk rating will facilitate the benchmark required.

The research study was conducted with a quantitative approach. Credit rating agencies such as Moody's and Standard & Poor's base their perception of a country on numerical data from both the economic/finance sector and political status of that country (Moody's, 2013).

The approach taken as indicated by The Research Onion were be as follows (Saunders & Lewis, 2012). The research philosophies applied during the period of this study were done of realism and positivism. This was chosen due to the structured method this study was conducted in and the understanding that objects within the study exist separately from our knowledge of their being.

A deductive approach was selected due to the fact that a theoretical proposition was being tested. The research strategy was designed to facilitate this study and therefore supports a deductive study.

The research is of an exploratory and descriptive nature. Exploratory since the study is discovering new insights thus allowing the topic to be viewed differently. Descriptive in that

the study is representing the repercussions of events between 1999 and 2013 which is supported by reanalysis of existing data and historical analysis.

The research strategy applied was experimental to a point, but applicable to a proposition and not a hypothesis. This theory is built from a number of assumptions which supports a research proposition.

To support the type of data gathered a mono method statistical approach was chosen over a longitudinal period from 1999 to 2013.

Population

To facilitate the requirements set out by the topic of the study secondary data has been collected from a population of credit rating agencies. The following populations apply:

1. All three credit rating agencies indicated dictate 95% of the ratings market globally.
2. The financial and political indicators published by credit rating agencies (Standard & Poor's, Moody's and Fitch Ratings) and political risk groups (BMI Research, Country Risk Solutions, Economist Intelligence Unit, Eurasia Group, Maplecroft, Oxford Analytica, and The PRS Group).
3. Strike action globally.

South Africa has been identified as the country in question out of all the countries rated by credit rating agencies due to the nature of the topic.

The following indicators are published by Moody's and Standard & Poor's:

1. Economic Indicators

   In total there are 17 indicators published for each country. The indicators used to facilitate South Africa's rating are not known nor is the weighting thereof. The following indicators are listed:

   a. Nominal GDP (US$ Bill.)
   b. Population (Mil.)
   c. GDP per capita (US$)

d. GDP per capita (Purchasing Power-Parity basis, US$)
e. Nominal GDP (% change, local currency)
f. Real GDP (% change)
g. Inflation (CPI, % change Dec/Dec)
h. Unemployment Rate (%)
i. Gross Investment/GDP
j. Gross Domestic Saving/GDP
k. Nominal Exports of Goods and Services (% change, US$ basis)
l. Nominal Imports of Goods and Services (% change, US$ basis)
m. Real Exports of Goods and Services (% change)
n. Real Imports of Goods and Services (% change)
o. Net Exports of Goods and Services/GDP
p. Openness of the Economy
q. Government Effectiveness

2. Government Finance Indicators

The indicators listed below give the credit rating agencies a good understanding of the government's financial health.

a. General Government Revenue/GDP
b. General Government Expenditure/GDP
c. General Government Financial Balance/GDP
d. General Government Primary Balance/GDP
e. General Government Debt (US$ Bill.)
f. General Government Debt/GDP
g. General Government Debt/General Government Revenue
h. General Government Interest Payment/General Government Revenue
i. General Government Foreign Currency & FC-Indexed Debt/General Government Debt

3. External Payments and Debt

What the world perceives the country to be like. The indicators listed below define the relationships the country has with the world.

a. Nominal Exchange Rate (local currency per US$, Dec)
b. Real Effective Exchange Rate (% change)
c. Relative Unit Labour Costs (2005 = 100)
d. Current Account Balance (US$ Bill.)
e. Current Account Balance/GDP
f. External Debt (US$ Bill.)
g. Public Sector External Debt/Total External Debt
h. Short-term External Debt/Total External Debt
i. External Debt/GDP
j. External Debt/Current Account Receipts
k. Interest Paid on External Debt (US$ Bill.)
l. Amortization Paid on External Debt (US$ Bill.)
m. Net Foreign Direct Investment/GDP
n. Net International Investment Position/GDP
o. Official Foreign Exchange Reserves (US$ Bill.)
p. Net Foreign Assets of Domestic Banks (US$ Bill.)

4. Monetary, External Vulnerability and Liquidity Indicators
    a. M2 (% change, Dec/Dec)
    b. Monetary Policy Rate (% per annum, Dec 31)
    c. Domestic Credit (% change, Dec/Dec)
    d. Domestic Credit/GDP
    e. M2/Official Foreign Exchange Reserves
    f. Total External Debt/Official Foreign Exchange Reserves
    g. Debt Service Ratio
    h. External Vulnerability Indicator
    i. Liquidity Ratio
    j. Total Liabilities due BIS Banks/Total Assets Held in BIS Banks
    k. "Dollarization" Ratio
    l. "Dollarization" Vulnerability Indicator

The financial indicators as defined above have a global outcome for each country, which is published. The rating is indicated as shown in Table 1 with an arrangement of alphabetic letters. The letters are grouped into Investment Ratings, Speculative Ratings and Default Ratings indicating the current state of the country's rating in relation to all other countries in the world. Within the population of all countries rated, only South Africa was chosen.

All strike related data was collected from the Industrial Action Annual Report. All data within in this population was utilized in every sector. Within the Industrial Action Annual Report high volumes of data are supplied and discussed. The following are published:

1. Number of strikes
2. Working days lost due to strike action
3. Working hours of production lost
4. Number of workers involved
5. Wages lost due to strike action
6. Main cause of strike action
7. Nature of strike action (picketing, stay away or lockout)
8. Number of strikes in a particular duration of time.

Sample

The sample chosen out of the population as indicated is comprised of economic, fiscal, governmental and external indicators. The indicators were dictated by the findings of P.L. Hammer, A. Kogan and M.A. Lejeune in their paper titled "Reverse-engineering country risk ratings: a combination non-recursive model" (Hammer *et al.*, 2011). The reason for this list was due to the 95% correlation achieved between past ratings and forecast ratings. The following variables where indicated:

1. Gross domestic product per capita
2. Inflation rate
3. Trade balance
4. Export growth rate
5. International reserves
6. Fiscal balance

7. Debt to GDP
8. Political stability
9. Government effectiveness
10. Corruption
11. Exchange rate
12. Financial depth and efficiency.

All of the above mentioned data is published by Moody's in the Moody's Statistical Handbook Country Credit (Moody's, 2013). The movements of the identified indicators that credit rating agencies monitor in relation to the ratings granted can identify a direct relationship. If a change in the indicators occurred due to strike action and the ratings re-acted. This would highlight that there is a strong quantitative relationship between the variables.

As for the ratings granted and how they fluctuate, this information is made available publically by RatingsDirect which is a Standard and Poor's publication (Standard & Poor's, 2014). This has been gathered for all changes in South Africa's history for Moody's, Fitch and Standard & Poor's. This publication also indicates the main reasons for the downgrade or upgrade granted.

Standard & Poor's was selected out of the three credit rating agencies for two reasons. The first being the fact that they own the majority of the market share. Secondly, Standard & Poor's are known to be the quickest reacting credit rating agency in relation to fluctuations in financial and political indicators. This facilitated a more accurate relationship between data variables.

The number of strikes per annum and wages lost due to strike action, as published by the Department of Labour, were used as the two indicators due to the nature of the topic.

The statistical evaluation was conducted over the period commencing in January 1999 and ending in December 2013. The reason for this was due to the restricted number of publications of the Industrial Action Annual Report by the Department of Labour. The first publication of this report was in 2003 and the information within the report only spanned to 1999. The most recent publication is 2013. Therefore, the data available only spans between 1999 and 2013.

Sampling method

The sampling method that is being used in the research is the convenience-sampling method. Convenience sampling is when the sample is drawn for the convenience of the researcher. The aim of the research was to look at the data for the period 1994 until current initially, however due to some limitations on the availability of data; most of the analysis was done for the period 1999 until 2013.

Research instrument

The SAS Software and Excel data Analysis functions were used to analyse the data. The purpose of the data analysis was to identify the relationship between variables and also determine the significance of each relationship among the variables. An assumption of Equal Variances is assumed in order to make an appropriate decision as to which test to use.

Data collection

Secondary data has been collected from a number of sources to substantiate a potential relationship between strike action within South Africa and credit ratings received. Data was gathered from annual reports and financial publications. The data was captured manually into Excel, which corresponded with statistical programs such as SAS Software. Indicators and ratings granted were cross-referenced between databases to ensure error free data. The following sources where used:

1. Industrial Action Annual Report. 2003 to 2013 (*Annual Industrial Action Report 2013.*2013) (http://www.labour.gov.za/DOL/)
2. Moody's Statistical Handbook (Moody's, 2013).
3. Standard & Poor's Country Risk Service (Standard & Poor's, 2013).
4. International Monterey Fund, database (http://www.imf.org/data)
5. The World Bank database (http://data.worldbank.org/)

6. Statistics South Africa, database (http://www.statssa.gov.za/)
7. Trading Economics, database (http://www.tradingeconomics.com/)

For the purpose of this study the credit ratings of South Africa have been represented numerically as indicated in Table 2 and Figure 3. This was done by allocating a numeric value to each rating category published by each credit rating agency. This is in increments of 1 as displayed.

In addition to the above-mentioned secondary data sources a large number of peer reviewed journals were used to give a global sense of the data over the full period from 1999 to 2013. The data collection process was dictated to be the extent of the data available. Data pertaining strike action was only available from 1999 as per The Department of Labour.

All data collected was orientated over a financial year. Indicators related to strike action were compared to results of financial indicators for the equivalent year. For example:

- Number of strikes per year
- GDP of 1999
- Wages lost due to strike action per year.

Regarding the validity of data collected subject selection bias did not exist for the data gathered for both the financial or strike action indicators. Both sets of data are not intended for any other research other than them just being indicators of a citron criterial. In the case of external validity only one credit rating agency was used. Standard & Poor's ratings granted to South Africa where the only ratings compared to relevant indicators (Saunders & Lewis, 2012).

Reliability of the data was substantiated by conducting over lapping tests on the same date using a variety of statistical methods. Similar relationships were founded between all methods indicating the reliability of data collected.

Research Strategy

A deductive research approach is followed in this study. Various tests are conducted to assess the relationship between strike action and credit ratings granted, as well as other

indicators or factors that influence credit ratings granted. Data was gathered and cleaned, analysed and used the results to determine if the hypothesis proposed are supported or not.

Deductive research approach is associated with the positivism paradigm. Deductive research allows the researcher to establish a hypothesis by using theory. A variety of data and information is collected by the researcher to confirm or reject the hypothesis, to resolve issues and to explain the relationships between variables. The various steps of using the deductive approach are: development of theory, hypothesis, observation through data and information and then confirmation. The deductive research approach is based on the general idea to reach at the specific situation and it is linked with the positivism paradigm (Saunders, Lewis & Thornhill, 2009).

As is commonly accepted, the positivists' approach to scientific discovery is also related to their conception of methodology; they adopt the hypothetic-deductive method. According to this method, the generation of new knowledge claims is irrelevant for their justification; new knowledge claims are justified by deriving testable consequences from them and by comparing these with observation (Meheus, 1999).

In positivism studies, the researcher is independent from the study and there are no provisions for human interests within the study. Generally, studies usually adopt a deductive approach (Crawther & Lancaster, 2008). Moreover, positivism relates to the fact that the researcher needs to concentrate on facts (Collins, 2008).

Process of data analysis

In this research report the strength of a possible relationships between indicators, strike action and ratings granted by Standard and Poor's are tested in order to determine the weighting they carry by constructing and interpreting the results.

Inferential analysis and relevant techniques are used to address the hypothesis with the purpose of answering the research question and to confirm the findings. An approach of testing, based on the sample evidence, whether or not the claims that are made relate to the variables used which are valid or not.

Pearson correlations were calculated to assess the strength and the direction of the relationship between indicators. The pre-analysis data checks were done to also determine if there are possible perfect relationships among explanatory indicators prior to running a regression model.

Furthermore, potential perfect relationships or multi-collinearity were identified among some variables which can have an effect on the model. In an effort to address the multi-collinearity, step-wise regression was used in order to eliminate indicators that have perfect relationships.

We report that the ordinary least squares estimate of the coefficient on GDP per Capita and S&P's credit rating was run. To obtain the estimates, the step-wise regression was run. Thus, the coefficients reported are estimates of how much Wages Lost due to strike action increases when each explanatory variable changes by one unit. This approach is based on the assumption that the distance between cut points is one unit of Wages lost due to strike action.

In terms of selection bias, the Wages lost due to strike action in a country clearly depends on the unpredictable event of strike actions. Also, a country receives a rating from Standard and Poor's only if it requests so, thus the set of rated countries including South Africa may not be a random sample of all countries. If other countries are less likely to request credit ratings, or if countries request ratings when they are becoming less corrupt, then we may underestimate the effect of corruption on credit ratings if we do not control for selection bias.

However, selection bias is likely to be small for two reasons: Firstly, Standard and Poor's has never stopped rating a country once it starts. Secondly, South Africa can raise capital either by issuing bonds or by borrowing from banks. Almost all countries that make use of bonds have a sovereign credit rating. Thus, the decision on whether or not to be rated is likely to be driven by capital needs rather than by corruption.

Limitations of method

Limitations to this study will be the reliability of the data gathered from reports published by entities that haven't been reviewed by a third party. The availability of required quantitative information could also play a significant role.

This study is only based on the ratings granted by Standard & Poor's, which does not take all three of the major credit rating agencies into account. Standard & Poor's bias is therefore not removed.

The effects of strike action only play a small role within all the indicators. This study takes a very broad overview of the relationship that could potentially exist. Relationships are substantiated using t and f tests over a short period of time which does not facilitate a truly representative relationship. If taken over a longer period of time this relationship would facilitate a stronger correlation.

Due to the size of this study only the numbers of strikes per annum were taken into account. The financial implication and duration of the strikes were not taken into account. This is potentially a topic to be handled by another thesis.

All comparisons are made between number of strikes per year and the fluctuations in credit ratings. This limits the study dramatically since this might not be the correct strike indicator although wages lost due to strike action were also considered. An example would be the number of hours lost due to strike action and the effects or relationship that might exist.

The topic is broad and required additional research at lower levels with smaller units of time.

Chapter 5: Results.

The aim of this study is to identify and substantiate a relationship between strike action and the relevance it has on fluctuations in ratings granted to South Africa.

Chapter five reveals the results of the quantitative approach taken in this study using a number of statistical methods. Hypothesise indicated in Chapter 3 are explored using the methodology proposed in Chapter 4.

In this report each hypothesis was tested and the findings then represented using scatter plots, correlation coefficients, F – tests and t – tests as well as Pearson Correlations. Strengths of the relationships between variables were investigated and interpreted.

Each rating granted, as shown in Table 1, has a numeric value of one as indicated in Figure 3. With this taken into account the credit ratings of South Africa have been represented graphically. This also facilitates the statistical analysis of the ratings granted to numeric variables.

Hypothesis 1.

Figure 4. Scatter Plot of S&P's Credit Rating and Number of Strikes per year

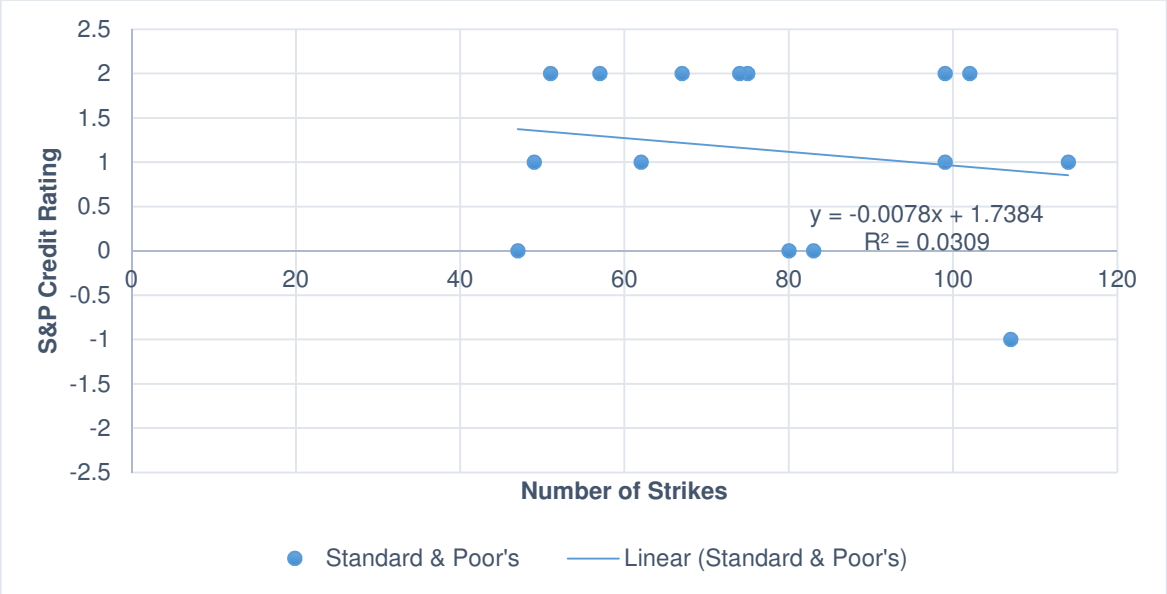


Figure 4 above graphically displays both the nature and the strength of the relationship between S&P's credit ratings and strike action. The pattern seen in Figure 4 is evidence that there is a weak or negative relationship between S&P's credit ratings and strike action if the two indicators are examined directly.

Correlation Coefficient r = -0.1757

Interpretation of Slope Coefficient b_1 = -0.0078

For every additional strike per year, the S&P credit rating does decrease by -0.0078 which is slightly lower. This coefficient indicates that the number of strikes experienced per annum do carry weight with the ratings granted by S&P's therefore supporting the null.

Table 4: F – Test H1

H_0 $\sigma^2_1 = \sigma^2_2$ $\sigma^2_1 / \sigma^2_2 = 1$

H_1 $\sigma^2_1 \neq \sigma^2_2$ $\sigma^2_1 / \sigma^2_2 \neq 1$

F-Test Two-Sample for Variances

	Number of strikes	*Standard & Poor's*
Mean	77,73333333	0,55
Variance	499,7809524	1,839473684
Observations	15	20
Df	14	19
F	271,6977996	
P(F<=f) one-tail	8,07835E-19	
F Critical one-tail	2,255613902	

Since the p-value << 0.5, we reject H_0 at a 5% level of significance. Therefore, in conclusion the researcher will use the test which assumes unequal variances since the above results lead us to make such decision as we reject the Null hypothesis of equal variances.

Table 5: t -Test H1

t-Test H1

H_0: $\mu_1 - \mu_2 = 0$

H_1: $\mu_1 - \mu_2 < 0$

t-Test: Two-Sample Assuming Unequal Variances

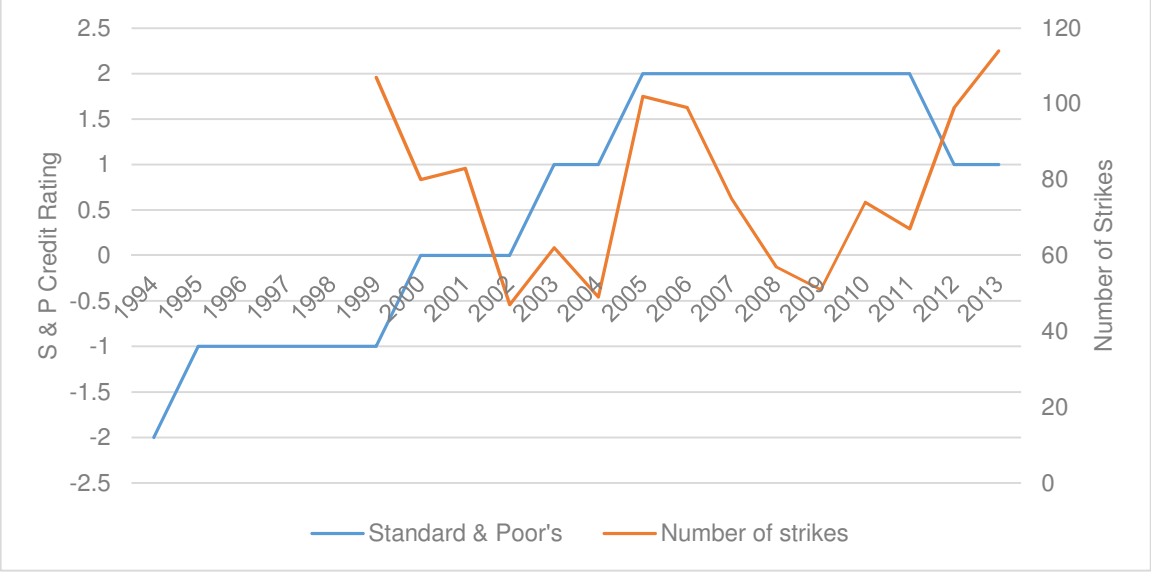
	Number of strikes	*Standard & Poor's*
Mean	77,73333333	0,55
Variance	499,7809524	1,839473684
Observations	15	20
Hypothesized Mean Difference	0	
Df	14	
t Stat	-13,35305747	
P(T<=t) one-tail	1,17322E-09	
t Critical one-tail	-1,761310136	
P(T<=t) two-tail	2,34643E-09	
t Critical two-tail	2,144786688	

The test statistic is 13.35

But since the p-value << 0.5, we reject the null at 5% level of significance.

In conclusion, we have sufficient statistical evidence to conclude that credit rating granted is negatively influenced by the strike action which corresponds with the above results.

Figure 5. Plot of S&P's Credit Rating against Strike Action

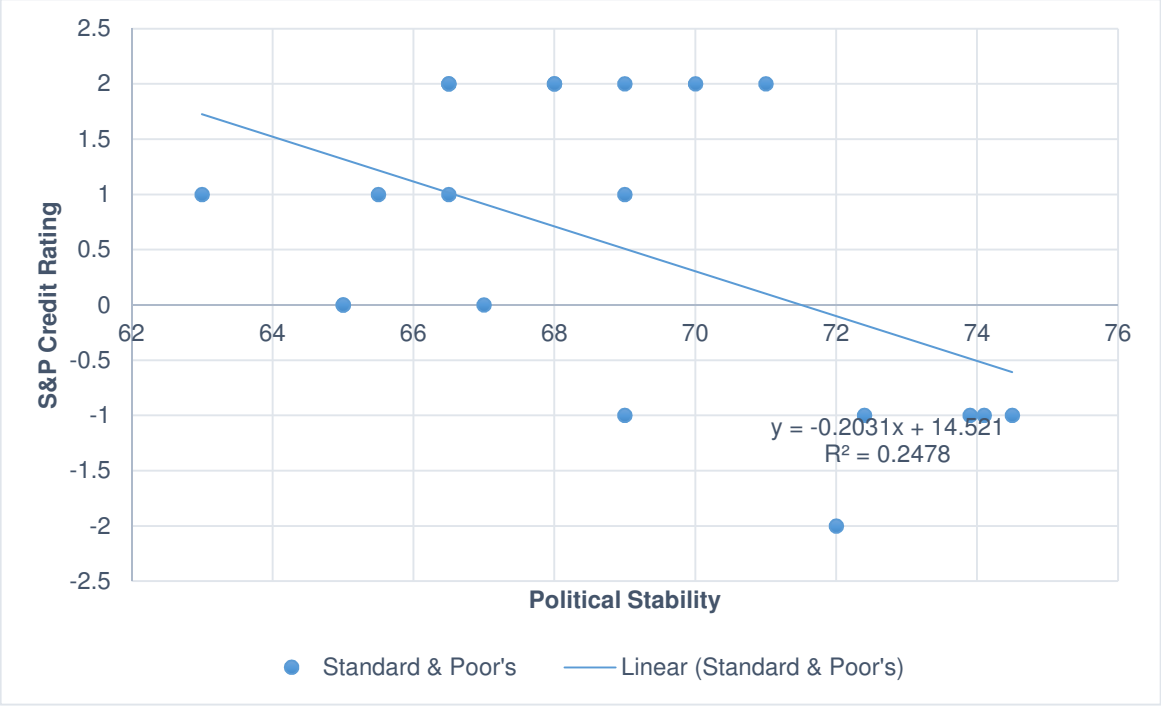


Source: Department of Labour and S&P's

Figure 5 displays fluctuations in credit ratings granted by Standard & Poor's in relation to number of strikes per year.

Hypothesis 2.1

Figure 6. Scatter plot of Political Stability and S&P's Credit Rating



Correlation Coefficient r = -0.49779

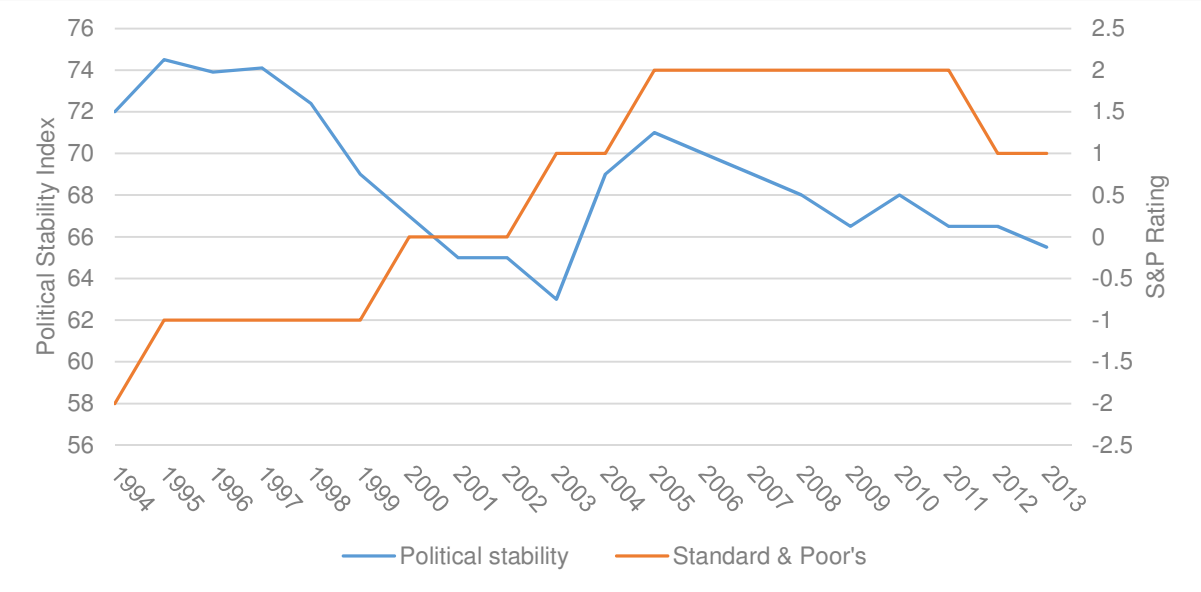
Interpretation of Slope Coefficient b_1 = -0.2031

For every increase in numeric value of Political Stability, the Credit rating will decrease by 0.2031. It must be understood the higher your rating numerically with Political Stability the worse the country is perceived.

Statistical conclusion

Figure 6 above displays both the nature and the strength of a relationship between Political Stability and strike action. The pattern shown in Figure 6 is evidence that there is a negative relationship between political stability and the credit rating if the two indicators are examined directly. The correlation confirms the relationship to be of negative impact.

Figure 7. Comparison of Political Risk to S&P Ratings



Source: The PRS Group and S&P's

Political stability speaks directly to the power and strength of the government. The way this is measured against number of strikes is by the frequency and extent of violence, riots and terrorist attacks within the country. The higher the level with which the citizens associate themselves with their country the greater the state of stability.

Table 6: t – test H2

H_0: $\mu_1 - \mu_2 = 0$

H_1: $\mu_1 - \mu_2 < 0$

t-Test:Two-Sample Assuming Unequal Variances

	Political stability	*Standard & Poor's*
Mean	68,795	0,55
Variance	11,05207895	1,839473684
Observations	20	20
Hypothesized Mean Difference	0	
Df	25	
t Stat	-85,00279829	
P(T<=t) one-tail	1,31208E-32	
t Critical one-tail	-1,708140761	
P(T<=t) two-tail	2,62417E-32	
t Critical two-tail	2,059538553	

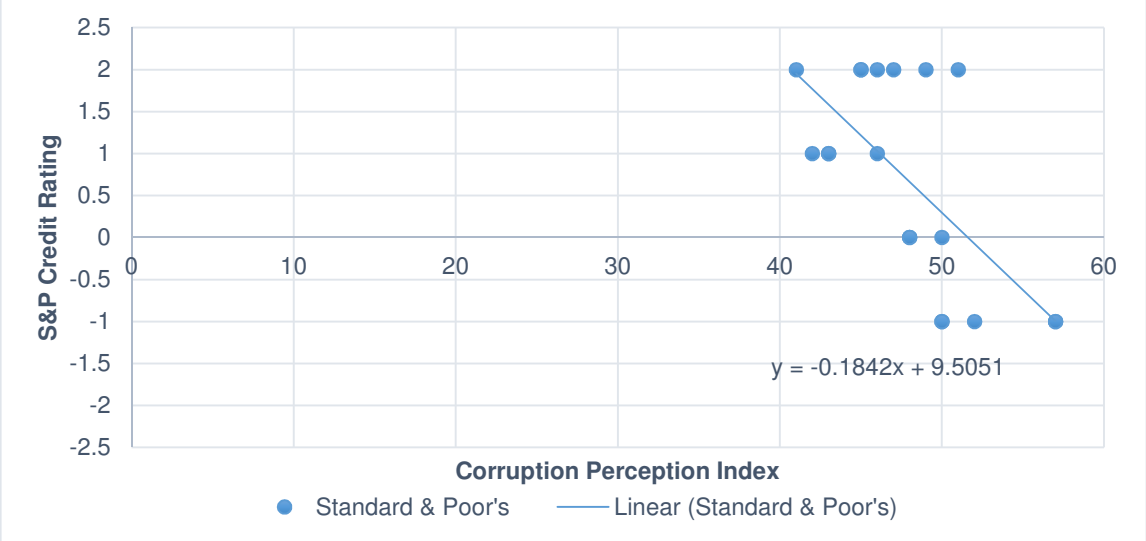
The test statistic is -85,003, and the Critical value is 1.708.

The p-value << 0.5, we reject the null at 5% level of significance.

There is sufficient evidence that political stability has a negative influence on credit rating granted.

Hypothesis 2.2

Figure 8. Scatter plot of S&P Rating and Corruption Perception



Correlation Coefficient r = -0.66078

Interpretation of Slope Coefficient b_1 = -0.1842

For every increase in the Corruption Perception Index, the credit rating will decrease by 0.1842.

Statistical conclusion

Figure 8 displays a negative relationship between corruption index and credit rating. This negative relationship seems to be weak, as indicated by a correlation coefficient above.

Hypothesis 3.1

Figure 9. Scatter plot of GDP per Capita and Strike Action

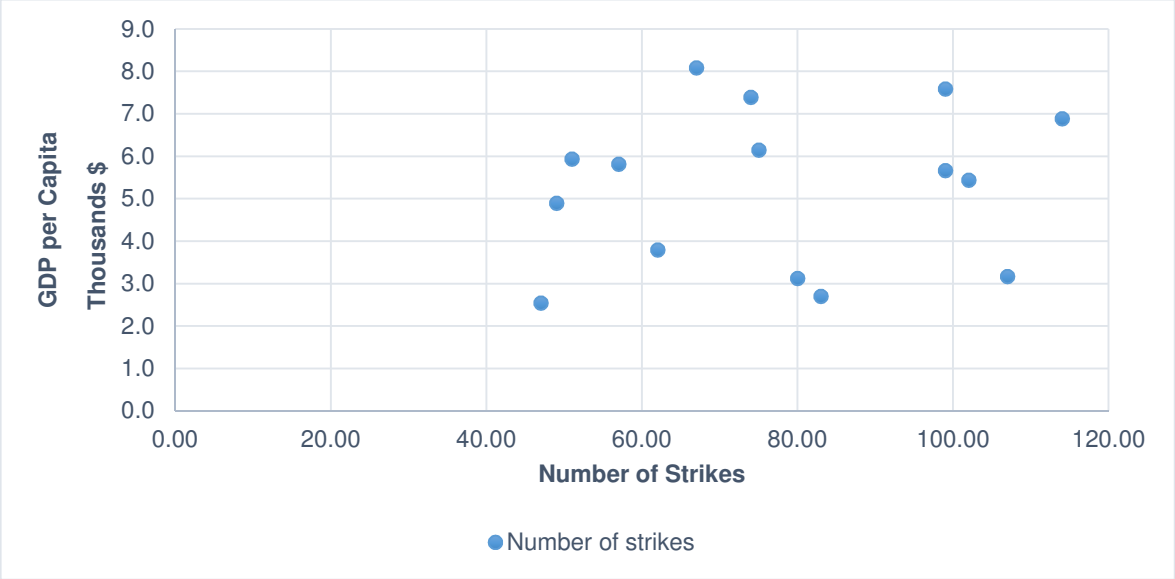


Figure 9 displays an unclear relationship between GDP per capita and strike action with dispersions. The relationship between these indicators is expected to be negative since the number of strikes will affect the production per person; however, it is interesting to note that correlation coefficient is indicating a weak positive correlation coefficient. This could be a result of insufficient data and the fact that it is not all the industries that become affected during strike actions.

Table 7: F – Test H3

H0 σ21 = σ22 σ21 / σ22 = 1

H1 σ21 ≠ σ22 σ21 / σ22 ≠ 1

F-Test Two-Sample for Variances

	Number of strikes	*Gross domestic product per capita (US $)*
Mean	77,73333333	4854,53265
Variance	499,7809524	3083080,995
Observations	15	20
df	14	19
F	0,000162104	
P(F<=f) one-tail	0	
F Critical one-tail	0,416659941	

Since the p-value << 0.5, we reject H0 at a 5% level of significance. Therefore, in conclusion the researcher will use the test which assumes unequal variances since the above results leads us to make such decision as we reject the Null hypothesis of equal variances.

Table 8: t – Test H3

H_0: $\mu_1 - \mu_2 = 0$

H_1: $\mu_1 - \mu_2 < 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Gross domestic product per capita (US $)*
Mean	77,73333333	4854,53265
Variance	499,7809524	3083080,995
Observations	15	20
Hypothesized Mean Difference	0	
df	19	
t Stat	-12,16501357	
P(T<=t) one-tail	1,02823E-10	
t Critical one-tail	1,729132812	
P(T<=t) two-tail	2,05647E-10	
t Critical two-tail	2,093024054	

The t statistic is -12.16. And since the t statistic is less than the critical value, we have overwhelming evidence that the number of strikes have a significant negative influence on the GDP per Capita at a 5% level of significance.

Figure 10. Scatter Plot of Days lost per Worker & GDP per Capita

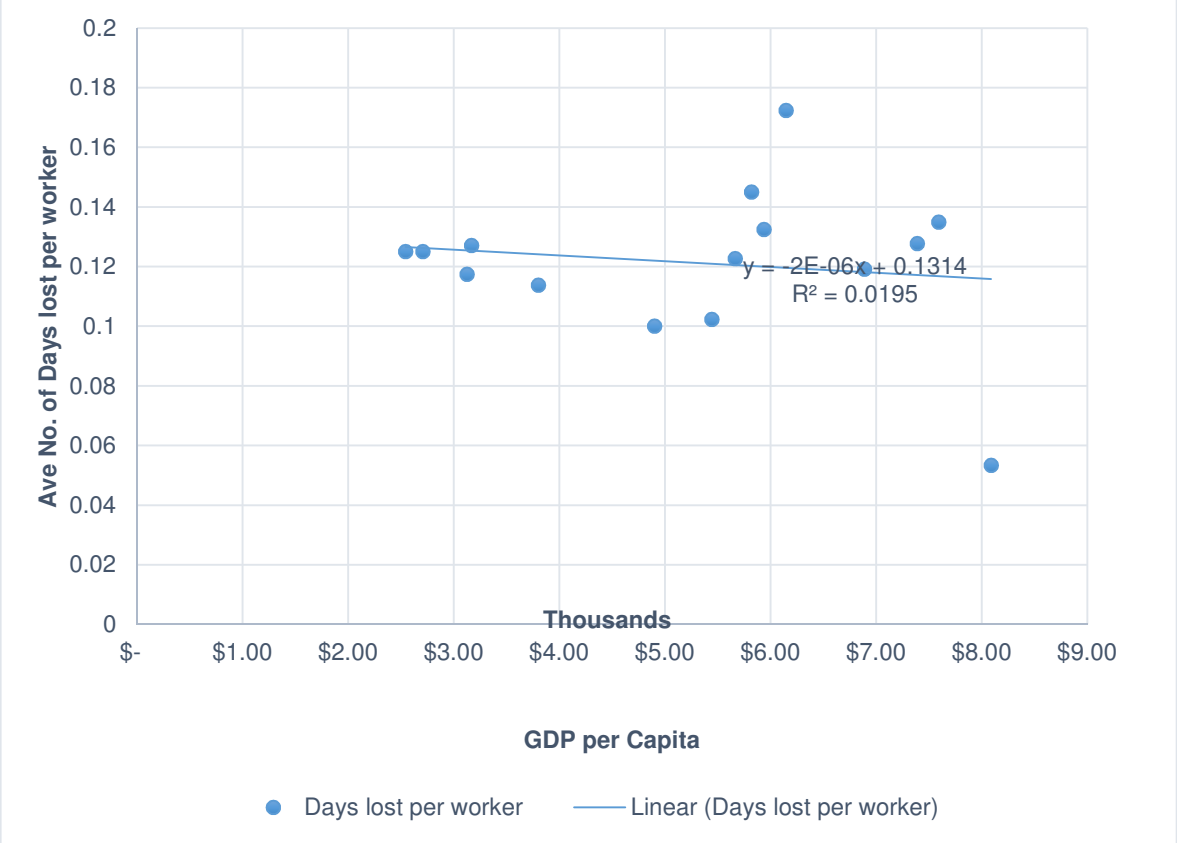
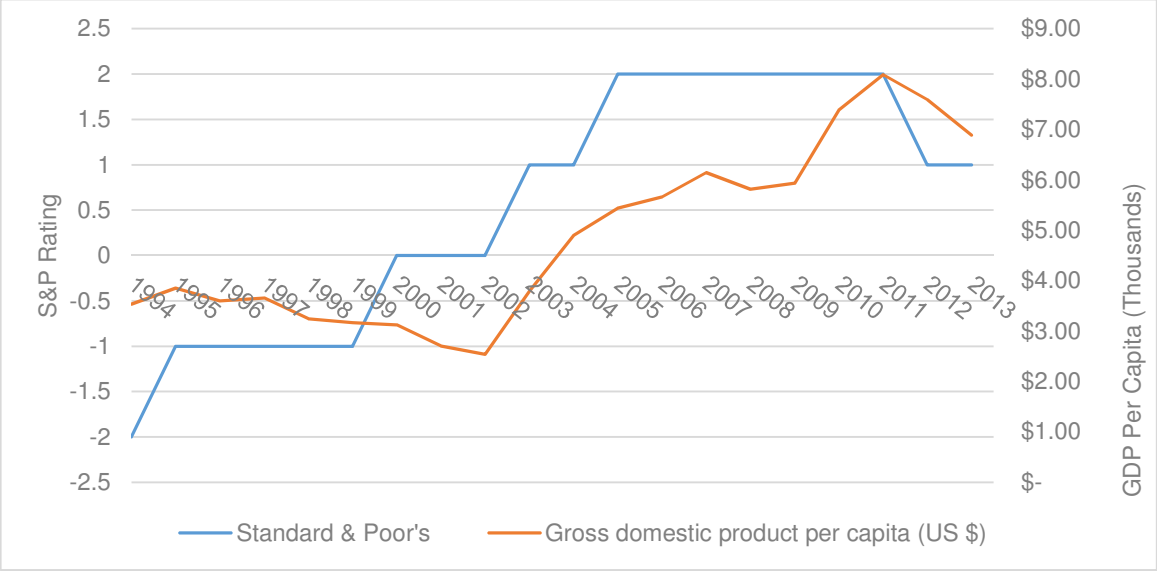


Figure 10 above graphically displays both the nature and the strength of a relationship between days lost per worker and GDP per Capita. The pattern shown in Figure 10 is evidence that there is a negative relationship between days lost per worker and the GDP per capita if the two indicators are examined directly.

Interpretation of Slope Coefficient b1 = -0.000002

For every unit increase of the days lost per worker, GDP per capita will decrease by 0.000002.

Figure 11. Plot of GDP per capita against S&P Rating



Source: World Bank and S&P

The figure 11 displays that there has been some indication of potential trend between GDP per capita and S&P's rating from 1998 until 2011.

Hypothesis 3.2

Figure 12. Scatter Plot of Inflation rate and Strike Action

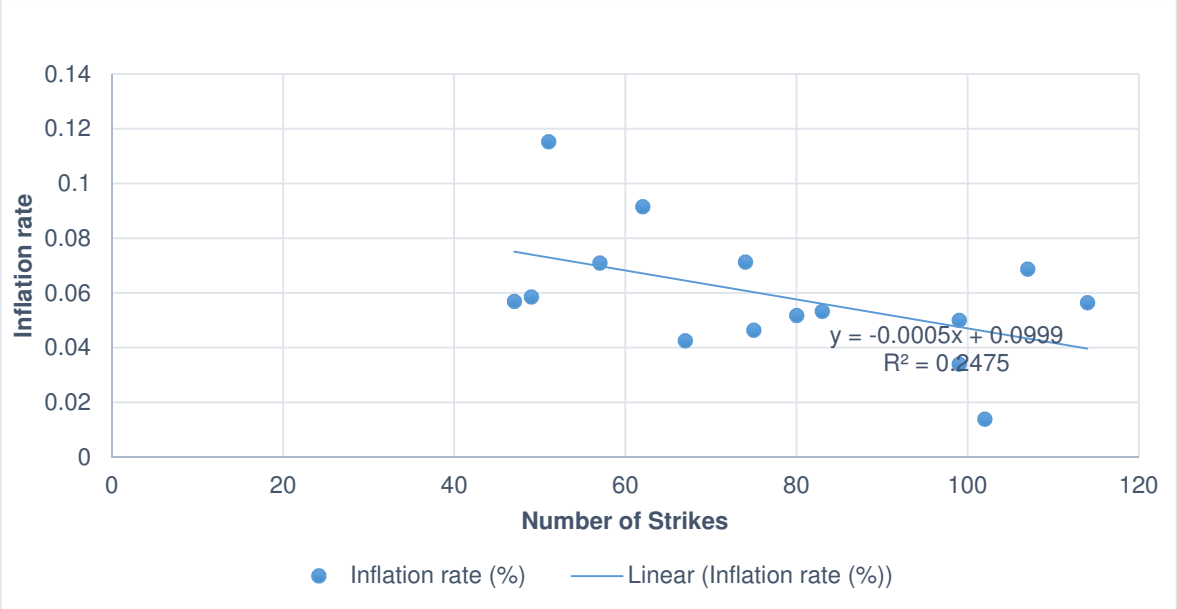


Figure 12 displays a negative relationship between inflation rate and strike action with moderate dispersions. The negative relationship is also indicated by a correlation coefficient below. The negative relationship appears to be moderate.

Correlation Coefficient r = -0.30955

Interpretation of Slope Coefficient b1 = -0.0005

For every unit increase in strike action, Inflation rate will decrease with -0.0078 which is slightly lower, however this indicated coefficient is evidence that strike action carries some moderate weighting on inflation.

Table 9: t – Test H4

H_0: $\mu_1 - \mu_2 = 0$

H_1: $\mu_1 - \mu_2 < 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Inflation rate (%)*
Mean	77,73333333	0,063775925
Variance	499,7809524	0,000530572
Observations	15	20
Hypothesized Mean Difference	0	
df	14	
t Stat	13,45570437	
P(T<=t) one-tail	1,06163E-09	
t Critical one-tail	1,761310136	
P(T<=t) two-tail	2,12327E-09	
t Critical two-tail	2,144786688	

The t statistic is 13.46. And since the t statistic is greater than the critical value, we have overwhelming evidence that the number of strikes have a significant negative influence on inflation rate at a 5% level of significance.

Hypothesis 3.3

Figure 13. Scatter Plot of Trade Balance and Strike Action

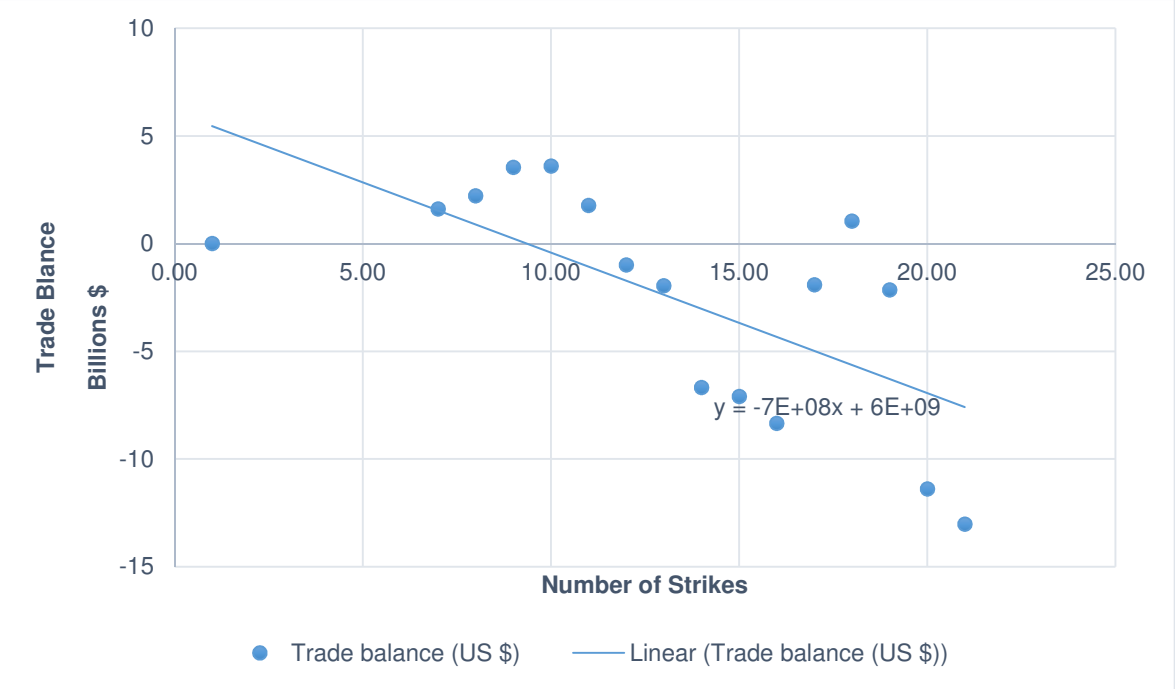


Figure 13 above displays both the nature and the strength of a relationship between trade balance and strike action. The pattern shown in Figure 13 is evidence that there is a non-linear significant negative relationship between trade balance and strike action if the two indicators are examined directly.

Correlation Coefficient r = -0.402068

Interpretation of Slope Coefficient b1 = -7E+08

For every unit increase in strike action, the trade balance will decrease with $700 000 000.00 which is much. The above-indicated coefficient is evidence that strikes carry some moderate significant weighting which impact the trade balance negatively as the correlation also confirms.

Table 10: t – Test H5

H_0: $\mu_1 - \mu_2 = 0$

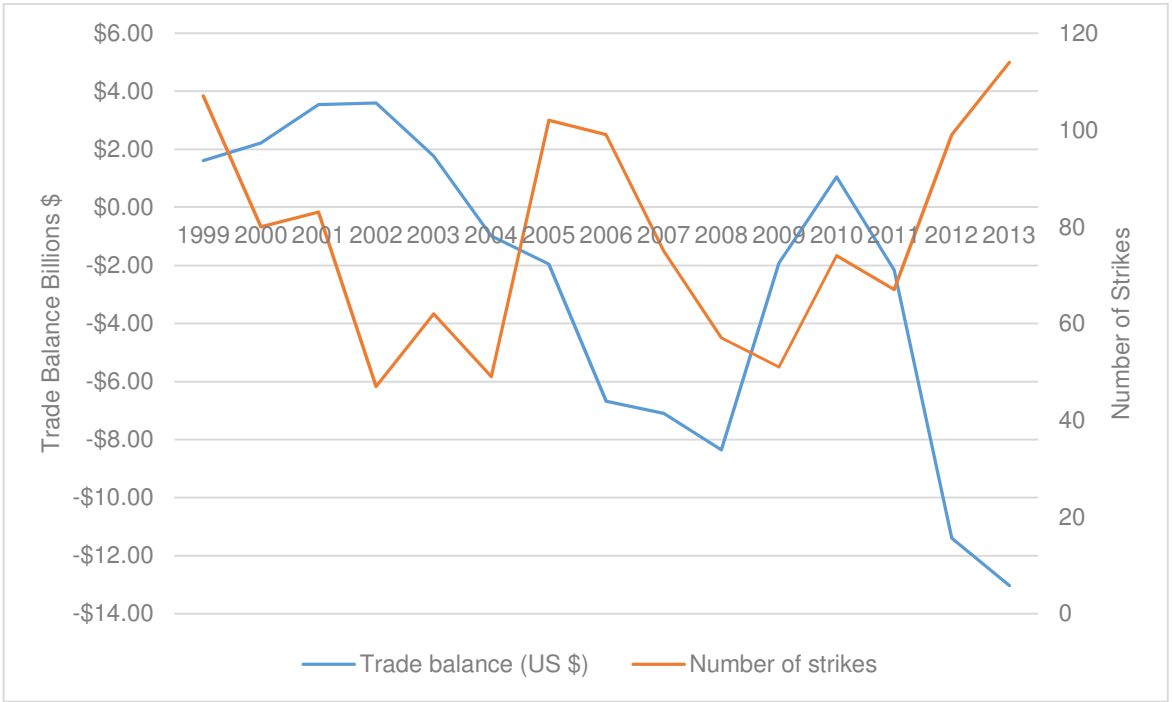
H_1: $\mu_1 - \mu_2 < 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Trade balance (US $)*
Mean	77,73333333	-2652493334
Variance	499,7809524	2,9204E+19
Observations	15	15
Hypothesized Mean Difference	0	
df	14	
t Stat	1,900986179	
P(T<=t) one-tail	0,039045028	
t Critical one-tail	1,761310136	
P(T<=t) two-tail	0,078090057	
t Critical two-tail	2,144786688	

The t statistic is 1.9. And since the t statistic is greater than the critical value, we have overwhelming evidence that the number of strikes have a significant negative influence on the trade balance at a 5% level of significance.

Figure 14. Plot of Trade Balance against Strike Action



Source: Department of Labour and World Bank, IMF

Figure 14 above graphically displays fluctuations in trade balance against strike action which need some further exploratory analysis.

Hypothesis 3.4

Figure 15. Scatter Plot of Export' Growth rate and Strike Action

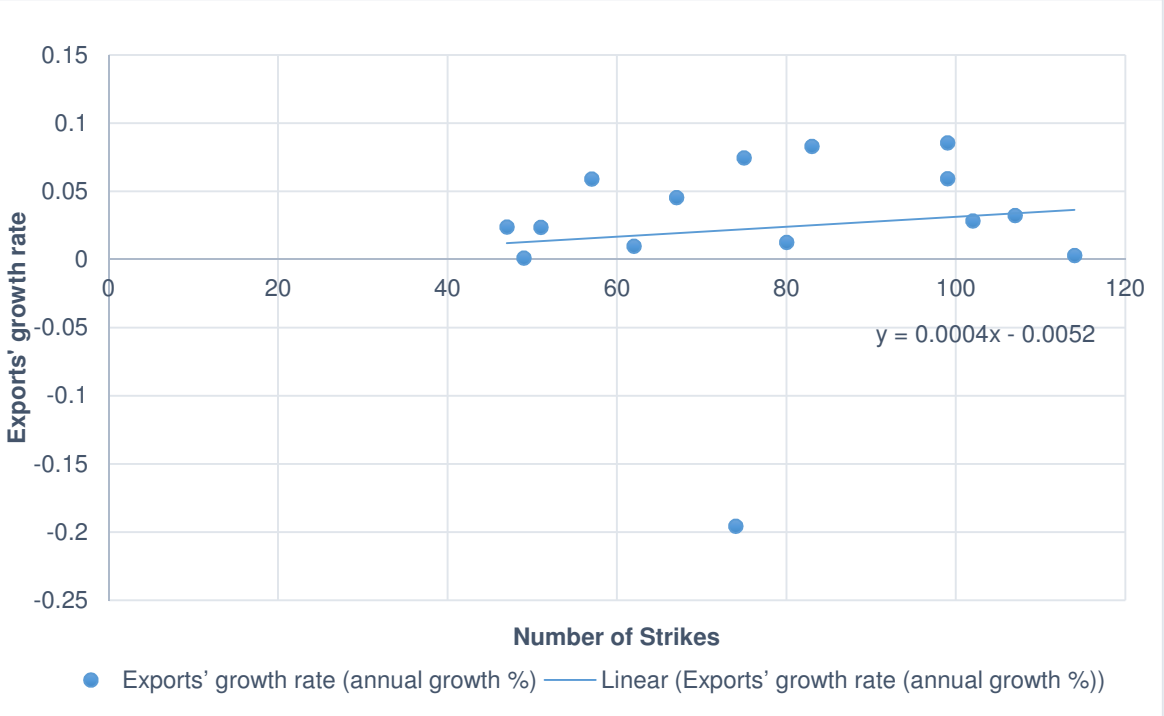


Figure 15 displays a moderate positive relationship between exports' growth rate and strike action with moderate dispersions which is questionable. The positive relationship is also indicated by a correlation coefficient below. This could be indicating that since South Africa mostly exports natural resources which are not yet processed, some sectors become affected during strike actions while others do not. The graph also indicates the presence of a potential outlier.

Correlation Coefficient r = 0.409348

Interpretation of Slope Coefficient b1 = 0.0004

For every unit increase in strike action, export growth rate will increase with 0.0004 which is moderate. This indicated coefficient is evidence that strikes carry some moderate weighting on exports' growth rate which is significant.

Table 11: t – Test H6

H_0: $\mu_1 - \mu_2 = 0$

H_1: $\mu_1 - \mu_2 > 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Exports' growth rate (annual growth %)*
Mean	77,73333333	0,032410282
Variance	499,7809524	0,003773051
Observations	15	20
Hypothesized Mean Difference	0	
df	14	
t Stat	13,4611055	
P(T<=t) one-tail	1,05608E-09	
t Critical one-tail	1,761310136	
P(T<=t) two-tail	2,11217E-09	
t Critical two-tail	2,144786688	

The t statistic is 13.46. Since the t statistic is greater than the critical value, we have overwhelming evidence that the number of strikes have a significant positive influence on the exports growth rate at a 5% level of significance, which is debatable.

Hypothesis 3.5

Figure 16. Scatter Plot of official foreign exchange reserves and strike action

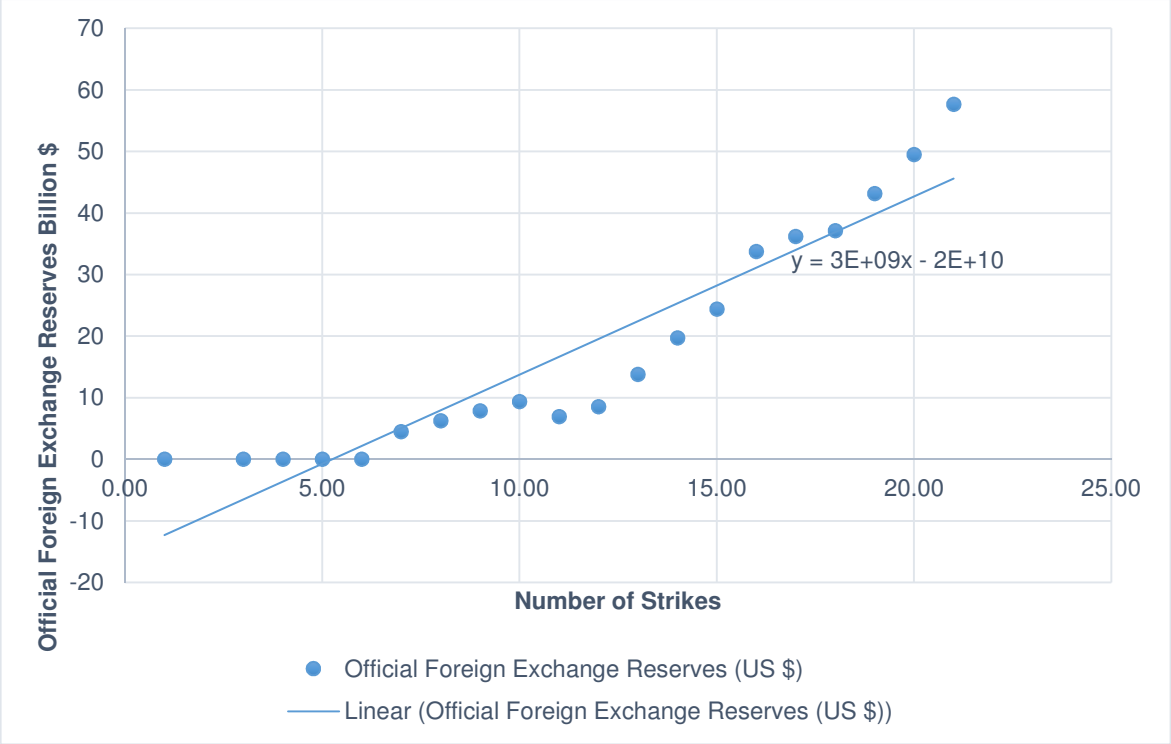


Figure 16 above displays both the nature and the strength of a relationship between foreign exchange reserves and strike action. The pattern shown in Figure 16 is evidence that there is a strong positive relationship between official foreign exchange reserves and strike action if the two indicators are examined directly.

Correlation Coefficient r = 0.199769

Interpretation of Slope Coefficient b1 = 3E+09

For every unit increase in strike action, the official foreign exchange reserves will increase with $3 000 000 000.00 which is significant. The above-indicated coefficient is evidence that strike action carries some weak positive weighting which impacts the official foreign exchange reserves as the correlation also confirms.

Hypothesis 3.6

Figure 17. Scatter Plot of Fiscal Balance and Strike Action

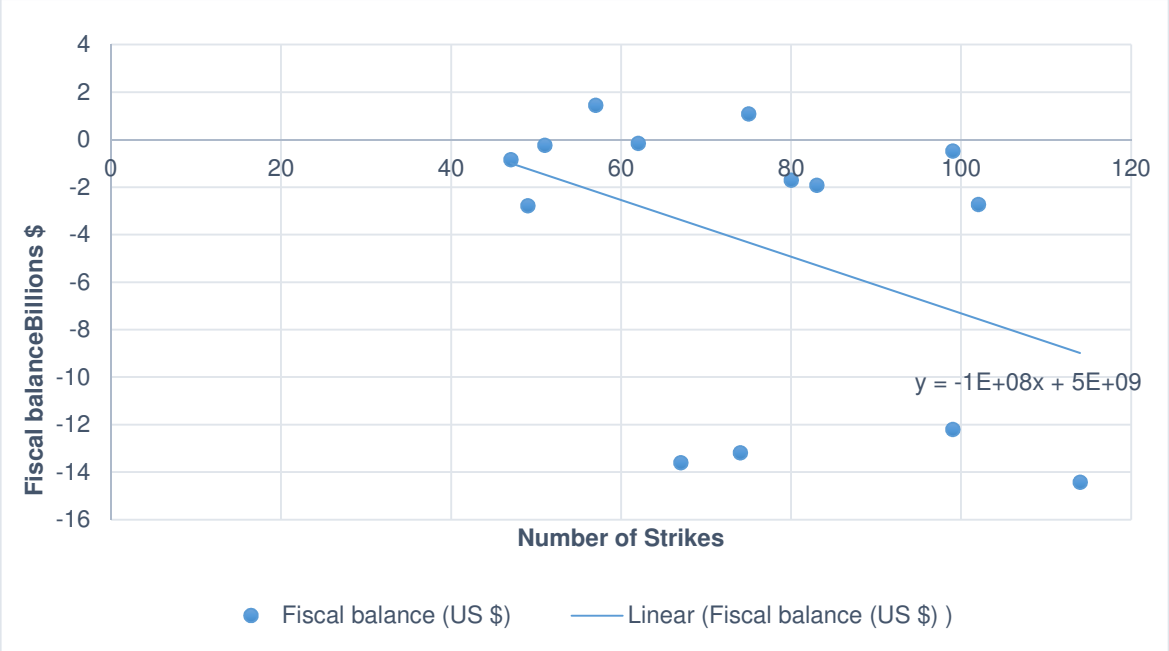


Figure 17 above graphically displays both the nature and the strength of a relationship between fiscal balance and strike action. The pattern shown in Figure 17 is evidence that there is no clear relationship between fiscal balance and strike action if the two indicators are examined directly. The correlation below confirms that there is no relationship between the two indicators.

Correlation Coefficient r = 0

Interpretation of Slope Coefficient b1 = -1E+08

For every unit increase in strike action, the fiscal balance will decrease with $1 00 000 000 which is slightly small. The above indicated coefficient is evidence that strikes carry some weak negative weighting which impact the fiscal balance as the correlation also confirms.

Table 12: t – Test H8

H_0: $\mu_1 - \mu_2 = 0$

$H_1: \mu_1 - \mu_2 > 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Fiscal balance (US $)*
Mean	77,73333333	-5122973333
Variance	499,7809524	4,11213E+19
Observations	15	15
Hypothesized Mean Difference	0	
df	14	
t Stat	3,094099275	
P(T<=t) one-tail	0,003962363	
t Critical one-tail	1,761310136	
P(T<=t) two-tail	0,007924726	
t Critical two-tail	2,144786688	

The t statistic is 3.09. And since the t statistic is greater than the critical value, we have overwhelming evidence that the number of strikes have a significant positive influence on Fiscal balance at a 5% level of significance.

Hypothesis 3.7

Figure 18. Scatter Plot of Government Depth to GDP and Strike Action

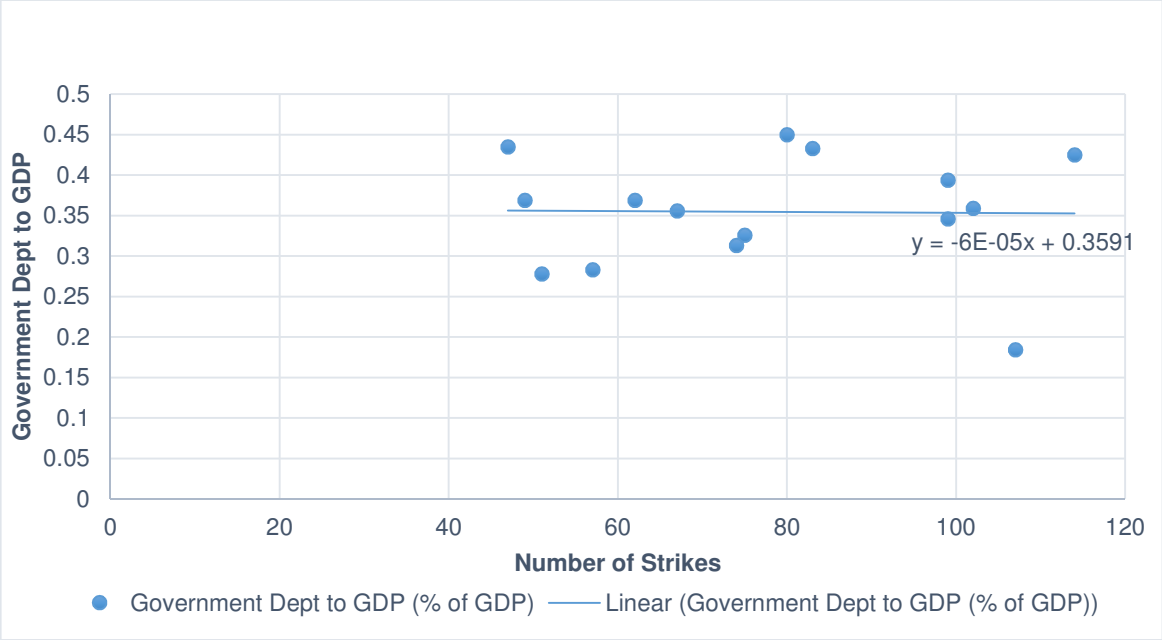


Figure 18 above graphically displays both the nature and the strength of a relationship between Government debt to GDP and strike action. The pattern shown in Figure 18 is evidence that there is no clear relationship between Government debt to GDP and strike action if the two indicators are examined directly. However, the correlation seems to indicate a moderate positive relationship.

Correlation Coefficient r = 0.375995

Interpretation of Slope Coefficient b1 = -6E-05

For every unit increase in strike action, Government Debt to GDP will decrease with 0.00006, of which it is an insignificant figure. The above indicated coefficient is evidence that strike action carries some weak negative weighting which impact the fiscal balance as the correlation also confirms.

Table 13: t – Test H9

H_0: $\mu_1 - \mu_2 = 0$

H_1: $\mu_1 - \mu_2 > 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Government Debt to GDP (% of GDP)*
Mean	77,73333333	0,320061943
Variance	499,7809524	0,009148148
Observations	15	20
Hypothesized Mean Difference	0	
df	14	
t Stat	13,4112179	
P(T<=t) one-tail	1,10854E-09	
t Critical one-tail	1,761310136	
P(T<=t) two-tail	2,21707E-09	
t Critical two-tail	2,144786688	

The t statistic is 13.41. And since the t statistic is greater than the critical value, we have overwhelming evidence that the number of strikes have a significant positive influence on Government debt to GDP at a 5% level of significance. Further investigation need to be done on the above indicators.

Hypothesis 3.8

Figure 19. Scatter Plot of Political Stability and Strike Action

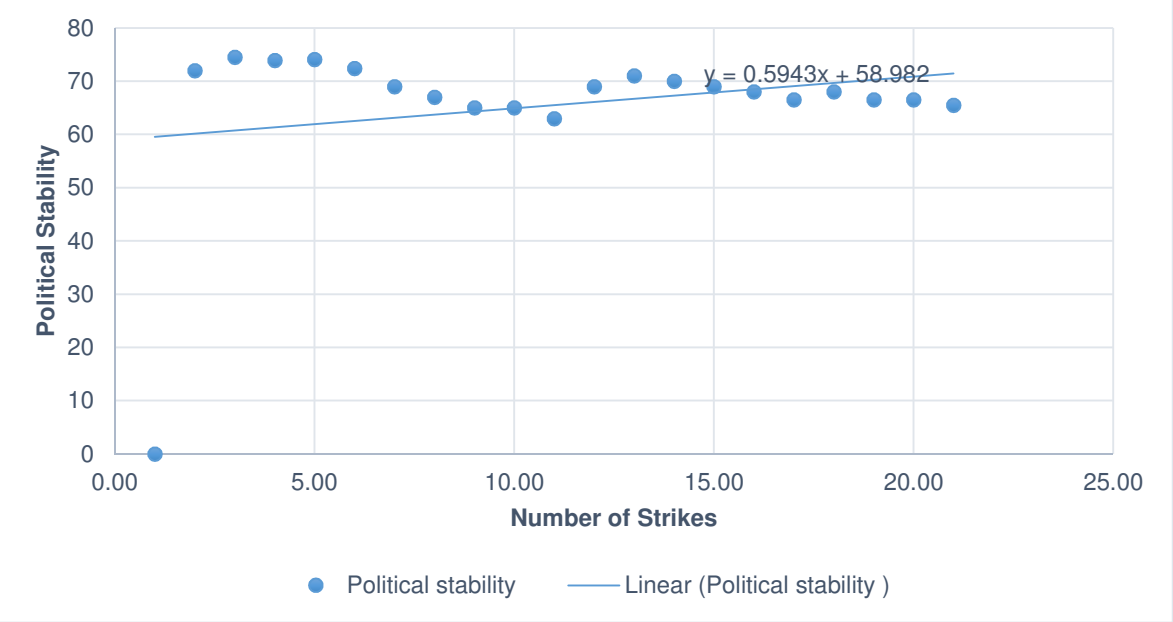


Figure 19 displays a non-linear positive relationship between political stability and strike action with moderate dispersions which is subject for debate. The positive relationship is also indicated by a correlation coefficient below. The graph also indicates the presence of a potential outlier.

Correlation Coefficient r = 0.296074

Interpretation of Slope Coefficient b1 = 0.5943

For every unit increase in strike action, political stability will increase with 0.5943. The above indicated coefficient is evidence that strike action carries a weaker weighting on political stability which needs further investigation as it could be questionable.

Table 14: t – Test H10

H_0: $\mu_1 - \mu_2 = 0$

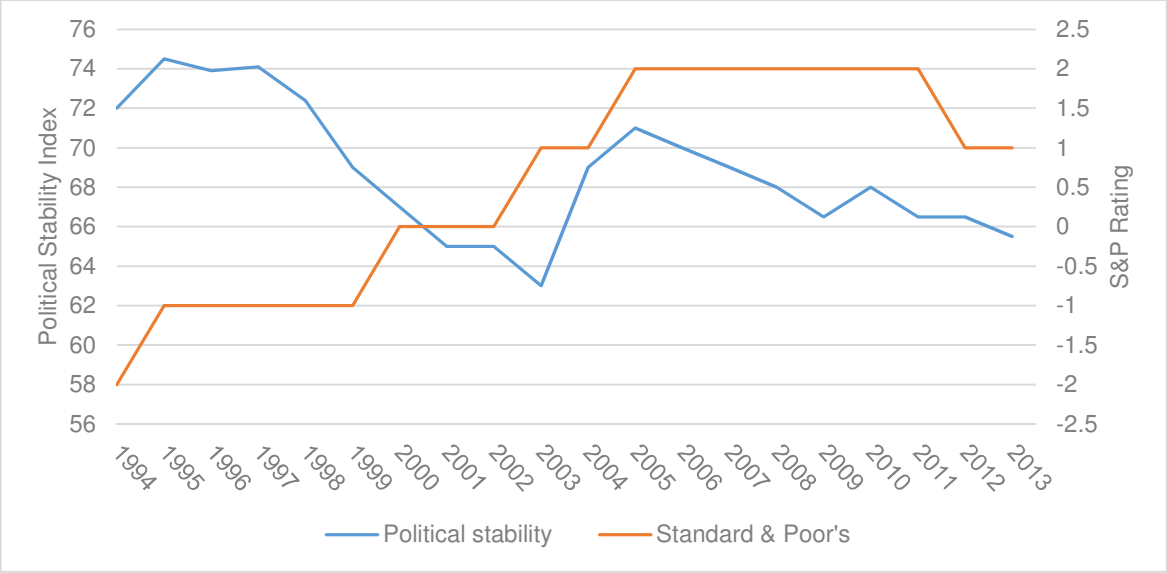
H_1: $\mu_1 - \mu_2 > 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Political stability*
Mean	77,73333333	68,795
Variance	499,7809524	11,05207895
Observations	15	20
Hypothesized Mean Difference	0	
df	14	
t Stat	1,53582027	
P(T<=t) one-tail	0,073434867	
t Critical one-tail	1,761310136	
P(T<=t) two-tail	0,146869733	
t Critical two-tail	2,144786688	

The t statistic is 1.536. And since the t statistic is greater than the critical value, we have overwhelming evidence that the number of strikes have a significant positive influence on Political Stability at a 5% level of significance.

Figure 20. Comparison of Political Stability to S&P Ratings



Source: The PRS Group and S&P's

Hypothesis 3.9

Figure 21. Scatter Plot of Government Effectiveness and Strike Action

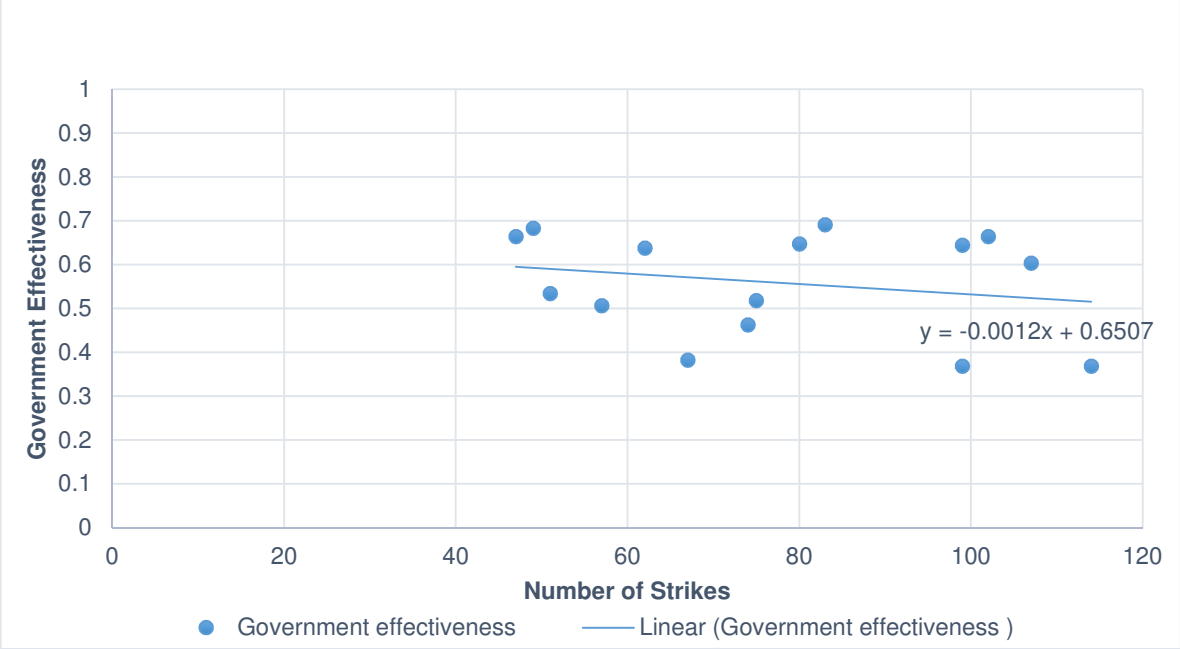


Figure 21 above graphically displays both the nature and the strength of a relationship between government effectiveness and strike action. The pattern shown in Figure 21 is evidence that there is a negative relationship between government effectiveness and strike action if the two indicators are examined directly.

Correlation Coefficient r = -0.1949389

Interpretation of Slope Coefficient b1 = -0.0012

For every unit increase in strike action, Government effectiveness will decrease slightly with -0.0012. The above-indicated coefficient is evidence that strike action carries some moderately significant weighting which impacts the trade balance negatively as the correlation confirms.

Table 15: f – Test H11

H0	$\sigma 21 = \sigma 22$	$\sigma 21 / \sigma 22 = 1$
H1	$\sigma 21 \neq \sigma 22$	$\sigma 21 / \sigma 22 \neq 1$

F-Test Two-Sample for Variances

	Number of strikes	*Government effectiveness*
Mean	77,73333333	0,575908253
Variance	499,7809524	0,021247513
Observations	15	18
df	14	17
F	23521,85687	
P(F<=f) one-tail	1,41188E-33	
F Critical one-tail	2,328952023	

Since the p-value << 0.5, we reject H0 at a 5% level of significance. Therefore, in conclusion the researcher will use the test which assumes unequal variances since the above results leads us to make such a decision as we reject the Null hypothesis of equal variances.

Table 16: t – Test H11

$H_0: \mu_1 - \mu_2 = 0$

$H_1: \mu_1 - \mu_2 < 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Government effectiveness*
Mean	77,73333333	0,575908253
Variance	499,7809524	0,021247513
Observations	15	18
Hypothesized Mean Difference	0	
df	14	
t Stat	-13,36674959	
P(T<=t) one-tail	1,15763E-09	
t Critical one-tail	-1,761310136	
P(T<=t) two-tail	2,31527E-09	
t Critical two-tail	2,144786688	

The t statistic is -13.36. And since the t statistic is greater than the critical value, we have overwhelming evidence that the number of strikes have a significant negative influence on Government effectiveness at a 5% level of significance.

Hypothesis 3.10

Figure 22. Scatter Plot of Corruption Perception Index and Strike Action

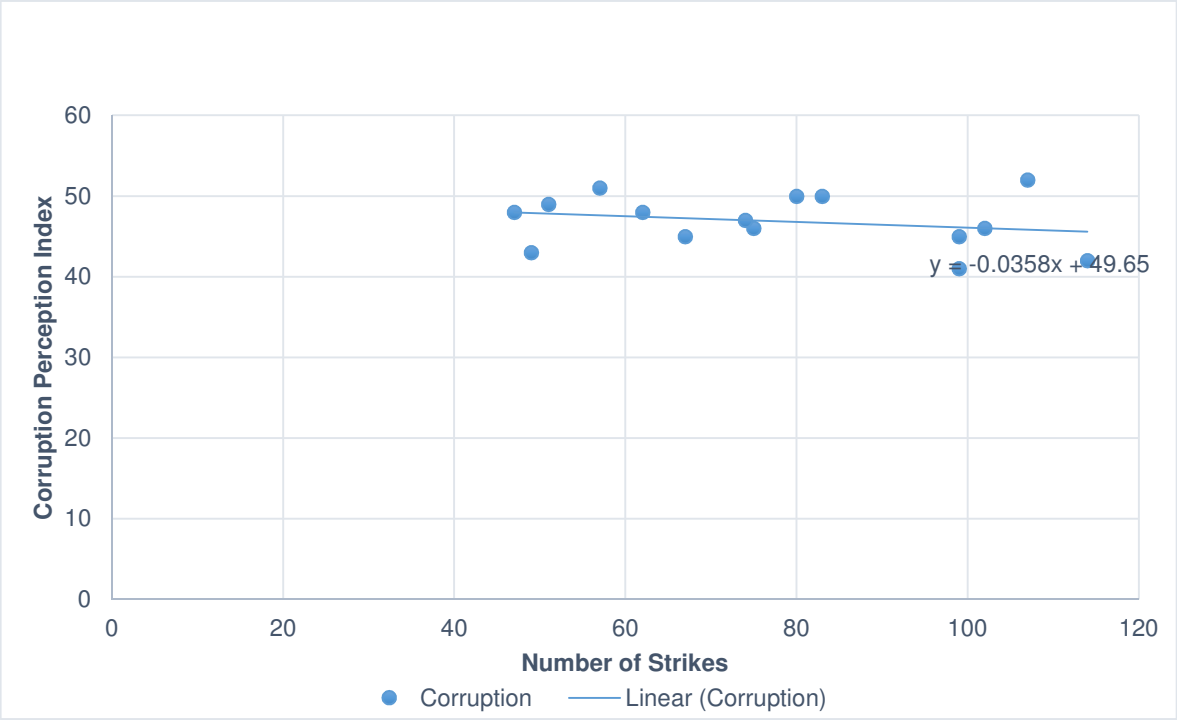


Figure 22 displays a negative relationship between corruption index and strike action. The relationship seems to be negative. This negative relationship seems to be weak, as indicated by a correlation coefficient below.

Correlation Coefficient r = -0.14504

Interpretation of Slope Coefficient b1 = -0.0358

For every unit increase in strike action, corruption will decrease with -0.0358 which is slightly lower, however this indicated coefficient is evidence that strike action carries a smaller weighting on corruption.

Table 17: t – Test H12

H_0: $\mu_1 - \mu_2 = 0$

H_1: $\mu_1 - \mu_2 > 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Corruption*
Mean	77,73333333	47,89473684
Variance	499,7809524	20,0994152
Observations	15	19
Hypothesized Mean Difference	0	
df	15	
t Stat	5,089170116	
P(T<=t) one-tail	6,66519E-05	
t Critical one-tail	1,753050356	
P(T<=t) two-tail	0,000133304	
t Critical two-tail	2,131449546	

The t statistic is 5.08. And since the t statistic is greater than the critical value, we have overwhelming evidence that the number of strikes have a significant positive influence on Corruption at a 5% level of significance.

Hypothesis 3.11

Figure 23. Scatter Plot of Exchange rate and Strike Action

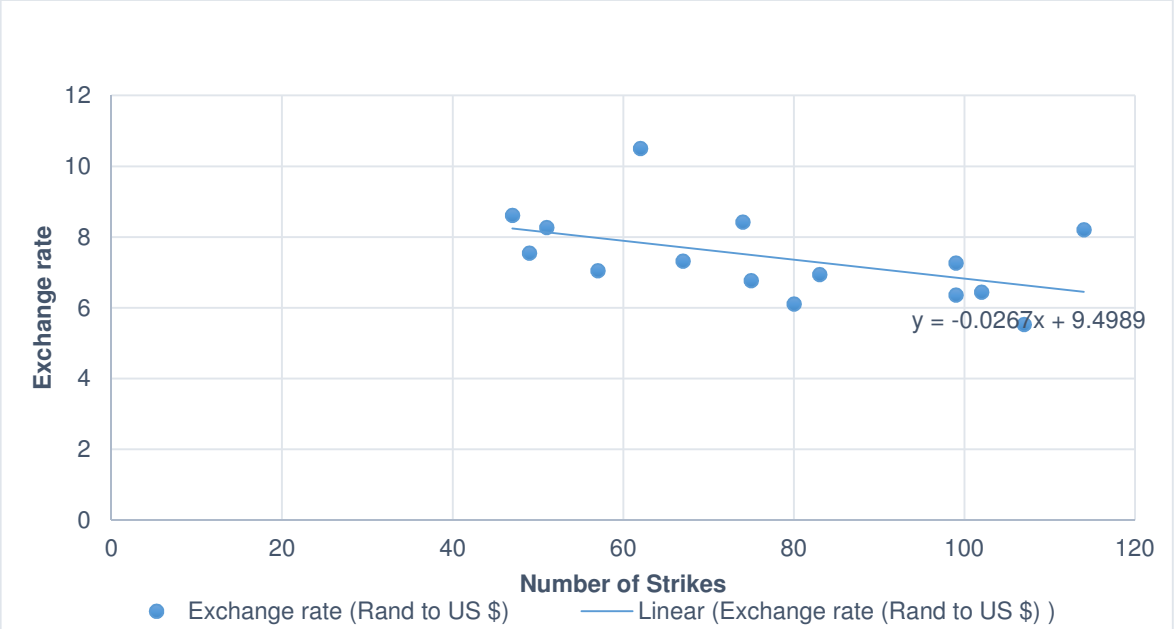


Figure 23 above graphically displays both the nature and the strength of a relationship between exchange rate and strike action. The pattern shown in Figure 23 is evidence that there is an unclear non-linear relationship between exchange rate and strike action if the two indicators are examined directly. The correlation confirms the relationship to be of negative impact.

Correlation Coefficient r = -0.21740

Interpretation of Slope Coefficient b1 = -0.0267

For every unit increase in strike action, exchange rate will decrease with 0.0267. The above indicated coefficient is evidence that strikes carry some significant weighting which impact the exchange rate negatively.

Table 18: t – Test H13

H_0: $\mu_1 - \mu_2 = 0$

H_1: $\mu_1 - \mu_2 < 0$

t-Test: Two-Sample Assuming Unequal Variances

	Number of strikes	*Exchange rate (Rand to US $)*

Mean	77,73333333	7,217198889
Variance	499,7809524	2,551964531
Observations	15	18
Hypothesized Mean Difference	0	
df	14	
t Stat	-12,19052039	
P(T<=t) one-tail	-3,81953E-09	
t Critical one-tail	1,761310136	
P(T<=t) two-tail	7,63906E-09	
t Critical two-tail	2,144786688	

The t statistic is -12.19. And since the t statistic is greater than the critical value, we have overwhelming evidence that the number of strikes have a significant negative influence on exchange rate at a 5% level of significance.

Hypothesis 3.12

Figure 24. Scatter Plot of Financial depth, efficiency and Strike Action

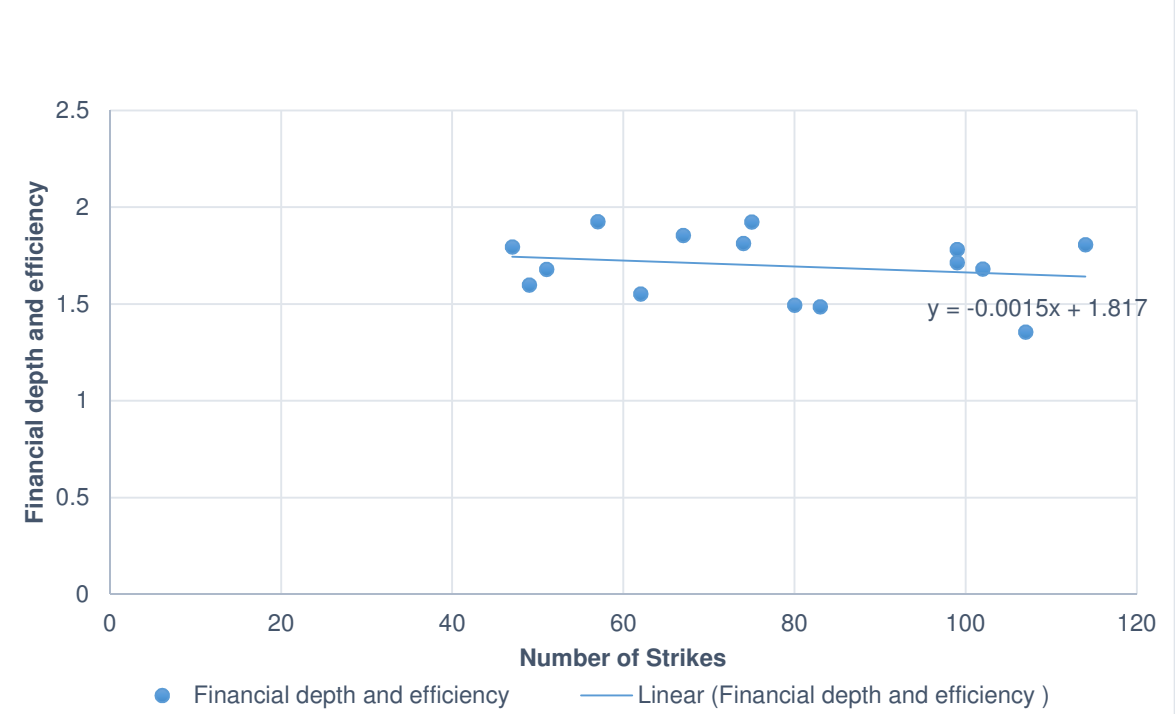


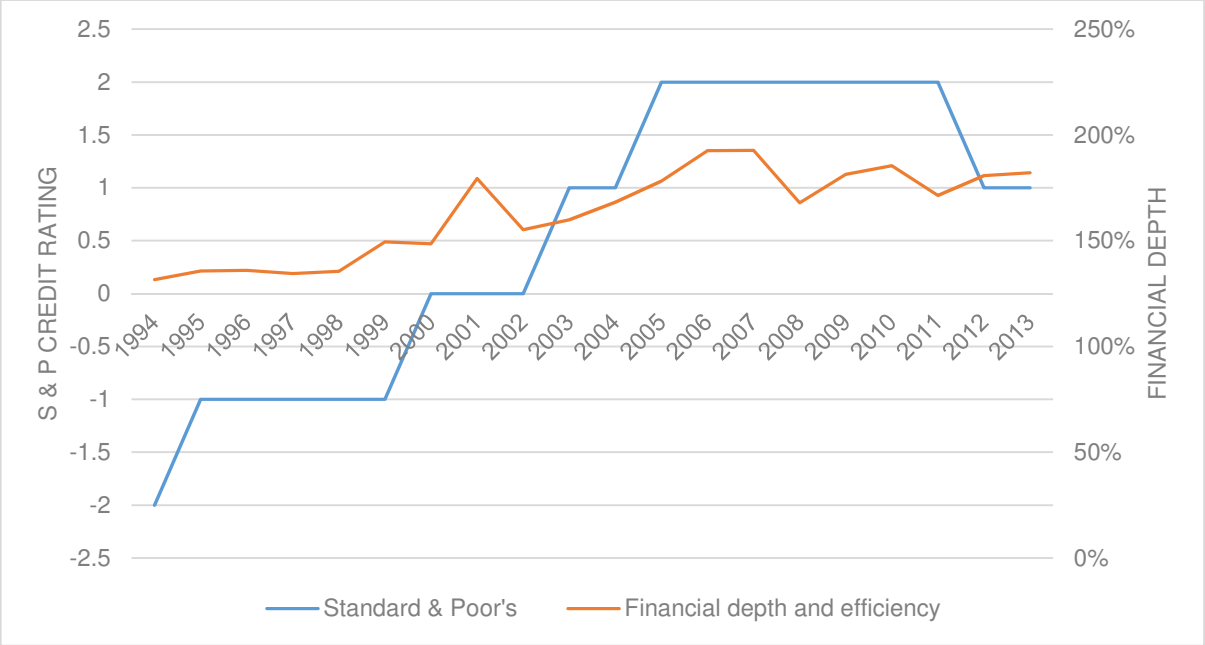
Figure 24 above displays both the nature and the strength of a relationship between financial depth efficiency and strike action. The pattern shown in Figure 24 is evidence that there is a weak relationship between financial depth and efficiency and strike action if the two indicators are examined directly.

Correlation Coefficient r = 0.22493

Interpretation of Slope Coefficient b_1 = -0.0015

For every unit increase in strike action, the financial depth efficiency will decrease with 0.0015. This implies that there is slight impact which strike action causes on the financial depth efficiency.

Figure 25. Plot of S&P Credit Rating against Financial depth & efficiency



Source: S&P and World Bank

Financial depth and efficiency is an indicator that represents the ratio between domestic credit offered by banks to the country in question and the gross domestic product of that

country. GDP plays a role as a standalone indicator for the credit rating agencies but also as a component of the other indicators identified.

This is a reflection of the country's accessibility to finance for both the government and private sector.

Hypothesis 3.13

Statistical Modelling

Purely mathematical models, in which the relationships between inputs and outputs are captured entirely in deterministic fashion, can be important theoretical tools but impractical for describing observational or experimental data. In this section, correlations were used to do pre-checks of the data as well as determine the strength of the relationships among indicators. A model was designed to estimate the parameters.

Pearson Correlations

Table 19: Pearson correlations between indicators

Pearson Correlation Coefficients
Number of Observations

	GDPc	CPI	TB	EGR	RES	FB	DGDP	PS	GE	COR	EX	FDE	S_P	WgL
GDPc	1.00000	-0.27006	-0.68379	-0.09213	0.88533	-0.67901	0.22462	-0.23307	-0.84652	-0.60827	0.20762	0.68853	0.75500	0.47697
GDPc	20	20	15	20	19	15	20	20	18	19	18	20	20	9
CPI	-0.27006	1.00000	-0.17012	-0.10641	-0.07224	0.14330	-0.54535	0.20442	0.10711	0.46794	0.17937	-0.42645	-0.33606	-0.13079
CPI	20	20	15	20	19	15	20	20	18	19	18	20	20	9
TB	-0.68379	-0.17012	1.00000	-0.06456	-0.75694	0.34395	0.37760	-0.19390	0.65471	0.29262	-0.14187	-0.55206	-0.45873	-0.74138
TB	15	15	15	15	15	15	15	15	15	15	15	15	15	9
EGR	-0.09213	-0.10641	-0.06456	1.00000	-0.28587	0.36963	-0.14850	0.41156	0.23028	0.25021	-0.36173	-0.20786	-0.19344	0.03016
EGR	20	20	15	20	19	15	20	20	18	19	18	20	20	9
RES	0.88533	-0.07224	-0.75694	-0.28587	1.00000	-0.80719	0.35798	-0.48316	-0.91282	-0.66875	0.55835	0.70362	0.69227	0.77066
RES	19	19	15	19	19	15	19	19	18	19	18	19	19	9
FB	-0.67901	0.14330	0.34395	0.36963	-0.80719	1.00000	-0.16402	0.29815	0.79443	0.65906	-0.27225	-0.26206	-0.23183	-0.58923
FB	15	15	15	15	15	15	15	15	15	15	15	15	15	9
DGDP	0.22462	-0.54535	0.37760	-0.14850	0.35798	-0.16402	1.00000	-0.79070	-0.32936	-0.68057	0.54302	0.56517	0.44203	0.68110
DGDP	20	20	15	20	19	15	20	20	18	19	18	20	20	9
PS	-0.23307	0.20442	-0.19390	0.41156	-0.48316	0.29815	-0.79070	1.00000	0.42879	0.70464	-0.84438	-0.56363	-0.49779	-0.61096
PS	20	20	15	20	19	15	20	20	18	19	18	20	20	9
GE	-0.84652	0.10711	0.65471	0.23028	-0.91282	0.79443	-0.32936	0.42879	1.00000	0.69214	-0.53331	-0.70344	-0.66736	-0.58773
GE	18	18	15	18	18	15	18	18	18	18	18	18	18	9
COR	-0.60827	0.46794	0.29262	0.25021	-0.66875	0.65906	-0.68057	0.70464	0.69214	1.00000	-0.52282	-0.65162	-0.66078	-0.57908
COR	19	19	15	19	19	15	19	19	18	19	18	19	19	9
EX	0.20762	0.17937	-0.14187	-0.36173	0.55835	-0.27225	0.54302	-0.84438	-0.53331	-0.52282	1.00000	0.51993	0.39925	0.66268
EX	18	18	15	18	18	15	18	18	18	18	18	18	18	9
FDE	0.68853	-0.42645	-0.55206	-0.20786	0.70362	-0.26206	0.56517	-0.56363	-0.70344	-0.65162	0.51993	1.00000	0.88499	-0.01228
FDE	20	20	15	20	19	15	20	20	18	19	18	20	20	9
S_P	0.75500	-0.33606	-0.45873	-0.19344	0.69227	-0.23183	0.44203	-0.49779	-0.66736	-0.66078	0.39925	0.88499	1.00000	-0.99499
S_P	20	20	15	20	19	15	20	20	18	19	18	20	22	9
WgL	0.47697	-0.13079	-0.74138	0.03016	0.77066	-0.58923	0.68110	-0.61096	-0.58773	-0.57908	0.66268	-0.01228	-0.99499	1.00000
WgL	9	9	9	9	9	9	9	9	9	9	9	9	9	9

Source: SAS Software

The above table gives all Pearson correlations of the indicators. Also, there seems to be strong correlations among some variables such as 0.88499 between S&P's credit rating and Financial Depth Efficiency. This could be indicating the possibility of perfect relationships among our explanatory variables. Therefore, it could have an effect on the results in the statistical modelling.

Based on the above results, there is a negative correlation between wages lost due to strike action and inflation rate. SARB uses interest rate to control inflation when the country is faced with high inflation problem. When the country is faced with high inflation, central banks usually increase the interest rate to control the money available in the market. The amount of money available in the market is the main driver of inflation as one can see from the purchasing power of the people.

The evidence is showing that there is a strong negative correlation which is statistically significant between wages lost due to strike action and S&P's credit rating indicated by a correlation of -0.99499.

It has also been found that there is a negative correlation between Wages lost due to strike action and Trade Balance. This evidence is statistically significant. This is because from an economic perspective, according to theories, if the wages lost due to strike action is high, the Trade Balance will be negatively affected. The Trade Balance also helps to assess the overall performance of the economy.

There is statistical evidence that Wages lost due to strike action are negatively correlated to both Government effectiveness and Inflation rate. A change in the exchange rate has an ambiguous effect on employment as it depends on the relative strengths of the income versus substitution effects; therefore an increase in the wages lost is associated with higher exchange rates.

Regression Analysis

In this section, a model was designed and used for prediction purposes as well as to examine the extent of the impact of wages lost due to strike action on the indicator. The method of Ordinary Least Squares was used in the analysis to estimate the regression function. The method of least squares seeks to minimize the sum of square errors between the line and the data points.

In many business and economic decisions it is necessary to predict the unknown values of numeric variables using other numeric variables that are related to it and whose values are known. Regression analysis is a statistical method that quantifies a relationship between a single response variable and one or more predictor variables.

Mathematically the model can be stated as follows:

$$WgL = f(S\_P, RI, CPI, TB, RES, FB, DGDP, PS, EX, FDE, GE, EGR, COR)$$

Where: S_k = Strike Action (Number of Strikes)

WgL= Wages Lost due to strike action

RI = Inflation rate

GDPc = GDP per Capita

TB = Trade Balance

RES = Foreign Exchange Reserves

FB = Fiscal Balance

DGDP = Dept to GDP

PS = Political Stability

EX = Exchange rate

FDE = Financial Depth and Efficiency

GE = Government Effectiveness

EGR = Export Growth Rate

COR = Corruption

S_P = S&P's Rating

In the results below step-wise selection regression was run to generate the output.

The model below was estimated to examine the extent of the impact of wages lost due to strike action on other explanatory variables defined below.

$$WgL_t = \beta_{0+}\beta_1 GDPc_t + \beta_2 S\_P_t + \mu_t$$

Figure 26: Stepwise regression.

Stepwise Selection: Step 2

Variable GDPc Entered: R-Square = 0.9962 and C(p) = .

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	6.226509E19	3.113255E19	788.58	<.0001
Error	6	2.368741E17	3.947901E16		
Corrected Total	8	6.250197E19			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	10965675217	713445793	9.326422E18	236.24	<.0001
GDPc	251080	80163	3.872923E17	9.81	0.0203
S_P	-6084626566	174417030	4.80459E19	1217.00	<.0001

Source: SAS Software

Interpretation of the R-Square

99.62% of variation is explained by the 2 quantitative regresses, namely the GDP per Capita and S&P's credit rating. This is a good model with better predictions if we examine the R-Square.

Testing of the Overall Model for significance

State the Null and the Alternative

H0: $\beta 0 = \beta 1 = \beta 2 = 0$

H1: At least one βi is different

Conclusion (using 5% level of significance)

Since p-value<< 0.05, we reject the null hypothesis.

Therefore, there is overwhelming statistical evidence that the model is significant.

Testing the significance of Individual Parameters

State the Null and the Alternative:

H_0: $\beta 1 = 0$

H_1: $\beta 1 \neq 0$

Since the p-values<<<0.05 for all Parameters after running a step-wise regression, the remaining variables in the model GDP per Capita, and S&P's credit rating are significant at a 5% level of significance.

Therefore, it is interesting to note that there is sufficient statistical evidence that Wages lost due to strike action has an influence on GDP per Capita and S&P's credit ratings.

Chapter 6: Discussion of results.

In this chapter, the research results presented in chapter five are discussed. These results are discussed in order to answer the research questions and test hypotheses as outlined in chapter 3. This chapter demonstrates how the research objectives were achieved as outlined in chapter 1. The three research questions were as follows:

1. How the number of strikes affect those factors and indicators which ultimately dictate the rating given? Substantiated in Hypothesis 1.
2. How do political risk ratings fluctuate in relation to the credit ratings of the country? Hypothesis 2.1 and 2.2.
3. Does the number of strikes per annum have a direct effect on the indicators which affect the credit rating granted?

Hypothesis 1.

As stated in Chapter 3, a hypothesis was proposed between ratings historically granted by Standard & Poor's and the number of strikes per year from 1999 to 2013. Within this period 1166 strikes where experienced, totalling 55 042 593 working days lost due to strike action (Department of Labour, 2013; Standard & Poor's, 2013). South Africa's credit rating rose from BB+ in 1999 to BBB+ in 2005, then dropped from BBB+ in 2011 to BBB- in 2013 (Country reports: South Africa, 2015).

The findings as indicated by the scatter plot between Standard and Poor's rating and the number of strikes per year indicated a weak or negative relationship. This is again supported by the findings of the t – Test which indicates a negative influence by strike action on credit ratings.

The relationship indicated by the scatter plot substantiates that for every strike conducted in a given year, South Africa's credit rating with Standard and Poor's would decrease by 0.0078. As the value allocated to a change in rating is one, the direct relationship dictates that for every 128 strikes $(1 \div 0.0078 = 128.2)$ experienced in a given year a decrease of one rating would be issued, assuming no other factors are taken into account. This is

relevant as South Africa experiences 78 strikes a year on average. The inverse of this is not true since ratings are not improved as strikes decrease. Between 2006 and 2009, as seen in figure 5, strike action in South Africa started reducing to its lowest number of 51 strikes in 2009. The ratings granted plateaued for this period and did not increase. This is an indication that credit rating agencies are quick to downgrade but slow to upgrade.

The relationship as stated is weak but negative, which is understandable since there are many factors which dictate the ratings in both positive and negative ways as specified by Hammer *et al.* (Hammer *et al*., 2011). The results indicated that the number of strikes do play a substantial role in the South African economy and the indicators as identified by Hammer which form the core of the credit rating agency's evaluation of South Africa (Country Reports: South Africa, 2015).

The results presented indicates that strike action reflected in number of strikes per year does have an effect on ratings issued by Standard and Poor's which supports the statements made in the RatingsDirect publication (Standard & Poor's, 2014).

The correlation between these two indicators, namely number of strikes per year and credit ratings granted by S&P's, are broad and will require data over a greater duration. South Africa is still a very young country as it has only been a democratic republic for the past 21 years. Data regarding strike action has only been gathered from 1999 and ratings granted since 1994.

Hypothesis 2.1

The reason for this hypothesis is to check the relationship between two separate entries and their perception of the same country. As mentioned in Chapter 2, ratings granted by evaluations conducted by credit rating agencies are separate from evaluations conducted by political evaluation groups like The PRS Group (The PRS Group, 2013). Strike action, riots, state of government, amongst many others, play a role in the grading of political stability within a country (The PRS Group, 2013). A good relationship between the two entities will indicate that political stability has a strong effect on finical indicators as listed within a country.

As indicated by the scatter plot there is a relationship between political stability and credit ratings granted. The negative nature of the relationship renders an outcome such that when political stability worsens so too does the credit ratings. For every five units of increase in political stability, Standard and Poor's will downgrade South Africa's rating by one. South Africa's average political stability rating for the period from 1999 to 2013 has been 67 with a high of 71 and a low of 63.

Strike action plays a fundamental role in the rating granted by political stability groups which in turn supports the relationship between political stability and credit ratings. The higher number of strikes, the weaker the political stability and the lower the credit rating.

Hypothesis 2.2

Hammer and a number of other academics have indicated that the Corruption Perception Index is one of the 12 indicators that dictate the fluctuation of credit ratings granted by Standard and Poor's (Alfonso *et al*., 2011; Alfonso, 2003; Depken *et al*., 2007; Hammer *et al*., 2011).

In this proposed hypothesis, corruption has been directly related to the ratings granted by Standard and Poor's as indicated by Craig Deken. This is substantiated in the published Corruption and Creditworthiness (Depken *et a*l., 2007). The journal indicates that for every standard deviation decrease in corruption the credit worthiness of the country in question improves by a full category (Depken *et al*., 2007). As this study was not undertaken in the same statistical manner the same result cannot be expected.

As indicated by the scatter plot there is a weak yet negative relationship. The Corruption Perception Index plays a small part of the twelve indicators as is substantiated in chapter 5.

Taking both hypothesis 2.1 and 2.2 into account as an independent indicator, strike action does have an effect on political ratings of South Africa. This again substantiates the effects of strike action on South Africa's political outlook and future conditions if strike action is not managed differently.

Hypothesis 3.1

When conducting the analysis on the relationship between GDP per Capita and number of strikes there is no defined relationship between the two indicators based on a scatter plot. This could be due to a number of reasons but fundamentally because there is not sufficient data to substantiate a relationship (Saunders & Lewis, 2012).

When conducting the same analysis using an F – Test and then the t – Test there is overwhelming evidence that the number of strikes have a significantly negative influence on the GDP per Capita at a 5% level of significance. In addition to this hypothesis, a scatter plot between days lost per worker due to strike action was related to GDP per Capita. This test indicated that a weak relationship does exist

GDP per Capita is the average income per person within the boundaries of a country (*Gross domestic product,* 2014). The fact that GDP per Capita and the number of strikes have an overwhelming relationship statistically indicates that wages and salaries paid play a significant role in stimulation of the economy. During periods of strike action employees involved are not paid their wage or salary. This has a direct impact on the average wages/salaries received by the population of South Africa, which in turn affects the GDP per capita.

GDP per Capita has been indicated as the most influential indicator when determining credit ratings (Hammer *et al.*, 2011). This substantiates the relationship indicated in Hypothesis 1.

Hypothesis 3.2

A moderate relationship is recognized between Inflation Rate and number of strikes experienced per annum as per the scatter plot. For every unit increase in strike action the inflation rate has historically decreased by 0.0078%. The relationship as indicated on the scatter plot is reinforced by an overwhelming correlation indicated using a t – Test.

A decrease in inflation is a means of stimulating the movement of cash within a country. This could also be as a result of no money coming into the market since wages are not being paid. This in turn prevents the flow of money and the subsequent decrease in inflation rate

to accommodate the sort supply of cash into the market. Lower interest rates promote spending and investment (Hammer *et al.*, 2011).

Hypothesis 3.3

Trade balance is the difference between monetary values of exports vs imports. As indicated by the t – Test conducted there is overwhelming evidence of a negative influence of strike action on trade balance. This is also reflected in Figure 14 where the trade balance responds sharply to the fluctuations in number of strikes per year. As strikes decrease between 2000 and 2004 trade balance is at record high but as soon as the number of strikes increase trade balance drops.

It is advantageous for a country if exports exceed imports and ideally to have no imports at all. Such a scenario indicates that a country is self-sustaining and has sufficient within its borders to supply the rest of world from its surplus. In terms of strike action, an increase has an effect on the ability to supply produce or products to the international market which reduces the potential to export. This increases the relevance of the imports even though the imports themselves have not increased. If the exports drop the point where imports are higher this will indicate a negative trade balance. This was experienced at the peak of South Africa's strikes. In 2013 South Africa was experiencing a deficit of R -13 022 700 000.20 on trade balance thus implying that imports exceeded exports during the time that the mining sector was experiencing a high number of longer duration strikes thus hampering the export of commodities.

Trade balance has been identified as one of the 12 relevant indicators dictating credit ratings. The relationship indicated supports a relationship between strike action and ratings granted.

Hypothesis 3.4

Based on the outcome of the scatter plot in Chapter 5 there is a minimal positive relationship between export growth rate and strike action. The t – Test indicates an overwhelming

relationship between the number of strikes and the export rate but due to the flat nature of the relationship as indicated on the scatter plot the outcome is negligible.

South Africa's average export growth rate was 2.38% between 1999 and 2014. This is far below the required 10% for a developing country (Country reports: South Africa, 2015). Taking this into account as well as the vast fluctuations in export growth rate has no relationship with number of strikes per year.

Hypothesis 3.5

Foreign reserves are used to back the currency of a country and also used as collateral when applying for debt or owning debt. Foreign reserves are used to back ones currency this is also used as collateral when applying for debt or owning debt. It is thus important for companies such as Standard and Poor's, Moody's and Fitch to be aware of the extent of a country's foreign reserves; this will indicate the ability of a country to pay its debt should it be in default.

The positive relationship between foreign reserves and number of strikes per year is an indication that the government is being proactive in terms of the loss of exports over this period as indicated in hypothesis 3.3. This approach by the government could be a counter measure to the repercussions of strike action to maintain South Africa's credit rating.

South Africa increases foreign reserves by R 3 billion for every unit increase in strike action.

Hypothesis 3.6

There is no relationship indicated between the fiscal balance of South Africa and the number of strikes experienced annually.

(Tax Revenue + Assets Sold) – Government Spending = Fiscal Balance

Fiscal balance indicates whether a country is profitable or not. As indicated above it is comprised of tax revenue, assets sold and government spending. All of which can be

manipulated by a number of leavers and management of money within the government. Fiscal balance is well regulated by government and has no direct correlation with the number of strikes per annum.

Hypothesis 3.7

Similar to the result arrived at in hypothesis 3.6 there is no relationship between government debt to GDP and the number of strike days experienced annually. While government debt is managed to facilitate a number of issues and strategies, as dictated by the government of the country, the GDP of a country cannot be manipulated. The government debt to GDP is not pegged in any way directly to the repercussions of strike action.

Hypothesis 3.8

The positive relationship indicated between numbers of strikes experienced per annum and political stability supports the findings highlighted in hypothesis 2.1 where political stability was directly related to credit ratings granted. As the politics within a country becomes unstable, credit ratings will downgrade. As the number of strikes per year increase so too would the stability of the political rating of that country. The higher the rating granted to political stability the more unstable a country is perceived to be. An increase in political stability is of a negative nature. Therefore an increase in both number of strikes and political stability is of a positive nature on the scatter plot.

For every unit increase in strike action per year political stability will increase by 0.59 above the norm. This effectively means that if strike action increases by two units per year, political stability will increase by one unit. On average South Africa experiences 78 strikes a year and historically fluctuates between 47 and 114 per year. Political stability on average within South Africa is 67 and fluctuates between 63 and 71. This indicates that political evaluators do not take strike action as the only factor when determining their rating as indicated in chapter 2.

In addition to the scatter plot, the t – Test shows overwhelming evidence that the number of strikes per year have a positive influence on political stability.

Hypothesis 3.9

The nature of the relationship between the numbers of strikes per year and government effectiveness supports the understanding that strike action plays a role in this indicator. As the number of strikes increase the effectiveness of government decreases by -0.0012.

The negative nature and weak strength of the relationship indicates that there are many factors within government effectiveness that play a role. The relationship exists and therefore strike action in its own right has direct marginal influence on government effectiveness.

Another factor that influences government effectiveness is the standard of public service provided by the government. This level of service is both the reason for strikes and dramatically effected by strikes.

As indicated by the t – Test there is overwhelming evidence that the number of strikes have a significantly negative influence on government effectiveness.

Hypothesis 3.10

A negative relationship exists between the corruption index and strike action. As indicated in Chapter 5, as strike action increases the rating related to corruption decreases. The corruption index works on the following principal. The rating ranges between 0 and 100. The lower end of the scale indicates the highest level of corruption with 100 being corruption fee. This indicates that as the number and severity of strikes increase so too the severity of corruption within South Africa increases. The weak relationship indicates that there are still many other factors that dictate this index. One of which is the extent of corruption in the public sector specifically, and how the level of corruption is perceived by others around the world.

The index is independent by nature and is not influenced by government. Business surveys and corruption related data is collected and verified by independent bodies which indicate the country's level of corruption accurately (Moody's, 2013).

The outcome of the scatter plot and t – Test indicate that corruption as one of the twelve indicators dictating credit ratings granted is influenced by strike action in a negative way.

Hypothesis 3.11

The scatter plot indicates a significant relationship between the number of strikes per year and the exchange rate of the South African rand. The rate of exchange is dictated by the demand and rate of supply of a particular currency. It is of an independent nature and fluctuates with respect to perceptions as well as relationships between other currencies.

The relationship shown indicates that strike action does have an effect on investor's willingness to capitalise into the rand. The strong significances of this relationship indicate that strike action has a substantial weighting in the outcome of the exchange rate.

Hypothesis 3.12

Financial depth efficiency indicates the ratio between domestic credit offered by banks to the country and the GDP. There is a slight, weak negative relationship between number of strikes per annum and financial depth efficiency.

This indicates that there are many other aspects that influence the outcome of this indicator. GDP per capita as indicated in hypothesis 3.1 also indicates little to no relationship to number of strikes experienced per year.

Hypothesis 3.13

The above table, Table 19 gives all Pearson correlations of the indicators. Also, there seems to be strong correlations among some variables such as 0.88499 which is between S&P

Credit Rating and Financial Depth efficiency, and this could be indicating the possibility of perfect relationship among our explanatory variables. Therefore, it could have an effect on the results in the statistical modelling.

Based on the above results, there is a negative correlation between wages lost due to strike action and inflation rate. SARB uses interest rate to control inflation when the country is faced a high inflation problem. When the country is faced with high inflation, central banks usually increase the interest rate to control the money available in the market. The amount of money available in the market is the main driver of inflation as one can see from the purchasing power of the people.

The evidence is showing that there is a strong negative correlation, which is statistically significant, between wages lost due to strike action and S&P's credit rating as indicated by a correlation of -0.99499. This concurs with the empirical evidence of some findings which has been found previously as has been substantiated in chapter 5.

It has also been found that there is a negative correlation between Wages lost due to strike action and trade balance. This evidence is statistically significant because from an economic perspective, according to theories, if the wages lost due to strike action is high, the Trade Balance will be negatively affected. The Trade Balance also helps one to assess the overall performance of the economy.

There is statistical evidence that Wages lost due to strike action is negatively correlated to both Government effectiveness and Inflation rate.

As indicated in chapter 5, there is overwhelming evidence that the model created is significant. The outcome of this model has indicated that wages lost due to strike action has significant influence on GDP per Capita and S&P's credit rating granted to South Africa.

GDP per capita has been indicated as one of the fundamental indicators when determining a country's credit rating. The fact that wages lost during strike action has a 99.49% correlation with the ratings granted by S&P is interesting.

Chapter 7: Conclusion.

Principal findings

Of the twelve indicators determining the ratings granted to a country, the following results were substantiated within a South African context in comparison to the number of strikes per year.

Table 20: Summary of statistical findings of indicators to number of strikes per year.

Indicator	Scatter Plot	F – Test	t - Test
GDP per capita	Unclear relationship	Unequal variance	Overwhelming evidence of negative influence.
Inflation Rate	Moderate negative relationship	None	Overwhelming evidence of negative influence.
Trade Balance	Significant negative relationship	None	Overwhelming evidence of negative influence
Exports growth rate	Moderate positive relationship	None	Overwhelming evidence of positive influence.
International reserves	Strong positive relationship	None	None
Fiscal balance	Unclear relationship	None	Overwhelming evidence of positive influence.
Government Depth to GDP	Unclear relationship	None	Overwhelming evidence of positive influence.

Political stability	Weak positive relationship	None	Significant evidence of a positive influence
Government effectiveness	Moderate negative relationship	Unequal variance	Overwhelming evidence of negative influence
Corruption Index	Weak negative relationship	None	Overwhelming evidence of positive influence
Exchange rate	Unclear relationship	None	Overwhelming evidence of negative influence
Financial depth and effectiveness	Weak negative relationship	None	None

Of the twelve indicators determining the credit ratings, eight show relationships with the number of strikes per year within South Africa. This shows that there is a 66% correlation with the effects of strike action on the credits ratings granted based on the number of indicators affected. The indicators having this relationship are as follows:

1. Inflation rate
2. Trade balance
3. Exports growth rate
4. International reserves
5. Political stability
6. Government effectiveness
7. Corruption index
8. Financial depth and effectiveness

The relationship between the number of strikes and indicators as listed above all range between a strong, moderate to weak relationships. This indicates that the number of strikes per year might not be the main driver with each indicator but definitely has a part to play in each when determining the rating of a country.

The remaining four indicators that show no clear relationship:

1. GDP per capita
2. Fiscal balance
3. Government debt to GDP
4. Exchange rate

Number of strikes per annum is not something that can be manipulated or dictated. Therefore it is circumstantial by nature and is dictated by the socioeconomically environment of the country.

GDP per capita has been addressed using statistical modelling as indicated in Table 20.

Fiscal balance is based on South Africa's tax base which is not affected during a period of strike since only 13% of South Africa's population contribute to the majority of the value and majority of which do not strike or partake in stand downs. Therefore fiscal balance is expected to show an unclear relationship as indicated in the scatter plot.

As indicated in chapter 2, Government debt to GDP is not a good indicator in the sense that the level of debt can be manipulated within a business or country depending on the strategy of the entity or how it chooses to move money around within the entity. This can only happen to a point but still allows for an unnatural figure which is not dictated by the environment around it.

In both the statistical modelling, as seen in Table 20, and the scatter plot in Table 21 there is no relationship or substantial correlation between the exchange rate, number of strikes per annum or ratings granted by S&P. Exchange rate is therefore independent of strike action.

Table 21: Summary of statistical findings of global indicators.

Indicator	Indicator	Scatter Plot	F – Test	t - Test
S&P	Number of strikes per year	Weak negative relationship	Unequal variance	Overwhelming evidence of negative influence
Political Stability	S&P	Moderate negative relationship	None	Overwhelming evidence of negative influence

S&P	Corruption	Moderate negative relationship	None	None

To substantiate the findings as per the twelve indicators and the number of strikes per year a direct analysis was conducted between the ratings granted by S&P from 1999 to 2013 and the number of strikes per year. The weak negative relationship was substantiated which supports the eight out of twelve results supporting the relationship.

As an additional check, political stability was compared to the ratings granted by S&P which supported the outcome of all the indicators to number of strikes and the direct correlation between number of strikes and ratings granted.

In addition one of the twelve indicators was compared directly to the ratings granted which again supported all of the outcomes as indicated above.

Table 22: Summary of Pearson correlations between indicators.

Indicator	**Indicator**	**Correlation %**
GDP per capita	S&P rating	76.50%
Foreign exchange reserves	S&P rating	69.22%
Government effectiveness	S&P rating	66.73%
Corruption	S&P rating	66.07%
Financial Depth and Efficiency	S&P rating	88.49%
Wages lost due to strike action	S&P rating	99.49%

Of the twelve indicators used to substantiate ratings granted, five have been identified as having a greater than 66% correlation within a South African context.

GDP per capita related to S&P's ratings granted shows a 76.5% correlation which supports the statement that this indicator plays a fundamental role when determining the credit rating of a country (Hammer *et al.*, 2011).

Foreign exchange reserves, government effectiveness and corruption all show correlations over 66% between the indicator and S&P's ratings. This is supported by the results in tables 20 and 22, solidifying the fact that strike action does play a significant role in the majority of all indicators and does dictate the outcome of ratings granted to a point.

Financial depth and efficiency of South Africa is dependent on credit within independent banks of the country and the GDP of the country. This ratio is of a holistic nature and covers both the private and public sector. Any kind of effect on the assets that form part of the South Africa's GDP or cash flow will affect the financial depth and efficiency indicator. The fact that the number of strikes per year alone has a correlation of 88.49% is overwhelming. This means that the supply of credit to both the private sector and government institutions by financial institutions is substantially affected by strike action within South Africa. In addition, the effect of strike action hampers the growth within financial institutions and the extent to which people save their money. This could have major repercussions in the future of each individual when moving into retirement and becoming an additional burden on the government and society.

A correlation of 99.49% has been identified between wages lost due to strike action and downgrading of ratings by S&P. This is of great interest that wages not issued over the period of a strike has such a strong correlation with fluctuations in ratings granted to South Africa.

Over periods of strike action entities in both the private and public sector do not pay wages or salaries to those that partake. This in turn stifles the flow of money within the country and does not allow the money to grow. Strikes within South Africa have lost over R16,142,769,101.00 between 2005 and 2013.

The wages lost due to strike action is also a product of duration as well as the number of participants in the strike. This adds to additional dimensions to the comparison and not only the number of strikes per year.

Implications for management

Strike action has a strong influence in a South African context. A greater number of strikes experienced per year over a longer duration have an effect on ratings granted by credit rating

agencies. A greater number of strikes over a longer duration suggest future downgrades of South Africa's rating. With a lower rating, a greater cost of capital and less foreign direct investment ensues. These circumstances will then influence the rate of growth within the country and minimize South Africa's exposure to affordable funds.

Wages lost due to strike action from a company's perspective cannot be seen as a savings but in effect a cost since the cost of debt will increase and the standard of living across the country will decrease due to a low rate of GDP growth.

Limitations of the research

South Africa is a very young sovereign country with only 21 years of democracy. The extent of the data is minimal. A larger data set would give a more representative result.

Standard & Poor's were the only credit rating agency used during the statistical analysis. Excluding Moody's and Fitch does not allow for a fully representative data set of ratings granted.

Data collected for indicators were of a secondary nature and could be misrepresentative and contain bias to studies they were intended for.

Data was analysed from a yearly perspective. Results of a more accurate nature could be substantiated if analysed from a month to month or week to week basis.

Data collected from the department of labour was unreliable in the sense that reports did not follow the same format year-on-year.

Suggestions for future research

Additional studies should be conducted in further fields of strike action. Such studies could involve segregation into smaller sectors, for example private and public sectors. The unit of measure could also be reduced form yearly to monthly or weekly.

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APPENDICES

	GDP (current US$)	*Population, total*	*Gross domestic product per capita (US $)*	*Inflation rate (%)*
GDP (current US$)	1			
Population, total	0,874095979	1		
Gross domestic product per capita (US $)	0,995216967	0,82897231	1	
Inflation rate (%)	-0,277029014	-0,331314038	-0,27006	1
Trade balance (US $)	-0,696430025	-0,74373167	-0,68379	-0,170119618
Exports' growth rate (annual growth %)	-0,123591515	-0,279934691	-0,09213	-0,10640515
Official Foreign Exchange Reserves (US $)	0,920052899	0,931602705	0,885328	-0,0722432
Fiscal balance (US $)	-0,715846237	-0,761361161	-0,67901	0,143299666
Government Debt to GDP (% of GDP)	0,292964011	0,600241252	0,22462	-0,545346552
Political stability	-0,31243386	-0,662850223	-0,23307	0,204415995
Government effectiveness	-0,877083646	-0,912644221	-0,84652	0,107110384
Corruption	-0,655070045	-0,824535728	-0,60827	0,467939536
Exchange rate (Rand to US $)	0,280304217	0,638655494	0,207618	0,179370464
Financial depth and efficiency	0,720324737	0,867671035	0,688532	-0,426451496
Number of strikes	0,162895185	0,100536149	0,153749	-0,309552035
Work days lost	0,419022492	0,294752463	0,436148	-0,2036178
Workhours Lost	0,491940982	0,346898985	0,508302	-0,269002012
Number of workers involved in industrial action	0,111194507	-0,071338319	0,133919	-0,362551879
Wages lost due to strike action	0,564180191	0,779514006	0,476969	-0,130789757
Standard & Poor's	0,771106899	0,873094826	0,755002	-0,336055185

	Trade balance (US $)	*Export's growth rate (annual growth %)*	*Official Foreign Exchange Reserves (US $)*	*Fiscal balance (US $)*	*Government Dept. to GDP (% of GDP)*
GDP (current US$)					
Population, total					
Gross domestic product per capita (US $)					
Inflation rate (%)					
Trade balance (US $)	1				
Exports' growth rate (annual growth %)	-0,06456	1			
Official Foreign Exchange Reserves (US $)	-0,75694	-0,28587	1		
Fiscal balance (US $)	0,343954	0,36963	-0,80719	1	
Government Debt to GDP (% of GDP)	0,377604	-0,1485	0,357975	-0,16402	1
Political stability	-0,1939	0,411563	-0,48316	0,298153	-0,7907
Government effectiveness	0,65471	0,230277	-0,91282	0,794429	-0,32936
Corruption	0,292623	0,250212	-0,66875	0,659064	-0,68057
Exchange rate (Rand to US $)	-0,14187	-0,36173	0,558346	-0,27225	0,54302
Financial depth and efficiency	-0,55206	-0,20786	0,703618	-0,26206	0,565166
Number of strikes	-0,40207	0,409348	0,199769	-0,11867	0,375995
Work days lost	0,015383	0,192376	0,246574	-0,27212	-0,18576
Workhours Lost	0,055434	0,223766	0,296121	-0,36134	-0,11158
Number of workers involved in industrial action	0,201792	0,370371	-0,0316	-0,13222	0,180748
Wages lost due to strike action	-0,74138	0,03016	0,770656	-0,58923	0,681103
Standard & Poor's	-0,45873	-0,19344	0,692266	-0,23183	0,442028

Financial depth and efficiency	*Number of strikes*	*Work days lost*	*Workhours Lost*	*Number of workers involved in industrial action*	*Wages lost due to strike action*	*Standard & Poor's*
1						
0,224932	1					
0,447558	0,073887	1				
0,404861	0,06085	0,971169	1			
-0,0744	0,164165	0,674881	0,674837	1		
-0,01228	0,627608	-0,23002	-0,2411	-0,22052	1	
0,884993	-0,17571	0,360324	0,39169	-0,0146	-0,9949943	1