

**The Contribution of Sport Betting to the South
African Gross Domestic Products**

BY

SIYETHEMBA NZAMA

A00018168

**In partial fulfilment of the requirements for the award of
the Degree in Economics (B. A) By the School of Arts and
Sciences, American University of Nigeria.**

The Contribution of Sport Betting to the South African Gross
Domestic Products

Student: Siyethemba Nzama

Semester: Fall 2018

American University of Nigeria

In partial fulfilment of the course Eco 491, Economic
Research Methods

Project Supervisor: Dr. John Leonard

Certification

This is to certify that this project *“The contribution of Sport Betting to the South African Gross Domestic Products”* was done by Siyethemba Nzama of the department of Economics, School of Arts and Sciences, American University of Nigeria.

.....
Dr John Leonard
(Supervisor)

.....
Date

.....
Siyethemba Nzama
(Student)

.....
Date

Declaration

I, **Siyethemba Nzama**, Student Number, **A00018168**, hereby declare that this project “The Contribution of Sport Betting to the South African Gross Domestic Products” is my original work and has not been submitted to any institution.

Also have adequate knowledge relating to sport economics after taking the following courses at lower level; Principles of Microeconomics, Principles of Macroeconomics, Intermediate Microeconomics, Intermediate

Macroeconomics, Foundations of Econometrics, Econometrics 1, and I did my first part 1 of Senior Research on sport economics topic.

Dedication

I dedicate this work first of all to God for giving me another chance and always guide and protect me. Secondly, I dedicate this work to Nokubonga Shange, Penelope Ndimande, Fadimatu Malabu and Hafiz Saleh Michika for believing and supporting me unconditionally. Also to the Economics academics staff that has been helpful and supportive since day one.

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Abstract

An attempt was made to determine the relationship between the revenue made in sport betting within South Africa and the country's gross domestic product. The aim was to determine whether sport betting is a significant contributor gross domestic product comparing to other GDP contributors. Sport betting is deemed to be addictive and not good for public, however, it has been growing dramatically for the past few decades and its involvement in economic activities has been noticeable. The OLS method was used to generate the regression results and autocorrelation and heteroskedasticity were carried out. The analysis and interpretation of results indicated sport betting is not a significant contributor to GDP but has a positive relationship with GDP.

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND AND INTRODUCTION

Sport is no longer an activity that people engage in just for the sake of passing time but it has evolved to be a means of living, competitive business and professional career industry. There are different literatures that have confirmed the view. “Sport is no longer only seen as a relaxing way to exert energy and interact with friends and families but it is a universal language that can bring nations together, educate individuals, entertain millions and in the past decade a business that can generate billions. Sport has grown into a multi-dollar industry that has generated millions for players, sponsors and sport partnerships” (Wyk, 2008). A proof that sport has evolved over time into a multi-billion dollar activity, can be seen through an example of the prize money being put in to the game.

An early Wimbledon competition, a prestigious tennis competition, which was played in 1877 and won by Spencer Gore, had prize money of \$18 for the men category. In 2010, men and women champions, Roger Federer and Serena Williams, respectively, took home a staggering amount of \$2.1 million each. This did not include endorsement deals and television revenues (Gittings, 2010). Another prize evolution in sport is being provided through looking at the 1860 first British Golf Open Championship. The Open as it is fondly known, its first prize was a mere a red leather belt for a champion. However, more than 100 years down the line that had changed for the better, as the red leather belt was replaced by a claret jug accompanied by huge prize money of \$1.8 million which was won by Zach Johnson in 2015(Sandritter, 2015). Over the years, more and more people have been getting interested and attracted to sport. This means that more money is being injected into sport. The evolution of sport has been realised through commercialisation. Commercialisation led to an increase or created more opportunities for different stakeholders such as professions

(players), media outlets, merchandisers, and sport venues. Commercialisation assigned a value to sport as it transformed completely from being considered as a past time active into a wealth generating avenue and a multi-billion dollar business. “In the past two decades, sport has moved from being a pastime to a business as a result of the process of commercialisation, which has led sport managers and organisations to become concerned with business principles. This commercialisation process has led sport organisations to be described as ‘business-like’ as they become market oriented, pursue operational strategies that maximise profit or revenue, and become responsive to the needs of customers” (Robinson, 2008).

“Commercialisation is ‘the process of transforming ideas, knowledge and inventions into greater wealth for individuals, businesses and/or society at large’. Commercialisation is a subset of the broader process of innovation. It is driven by market and profit motives, with firms and others seeking to gain a positive return on investment in research, licensing, product development, and marketing, including through the creation of competitive niche markets” (Government, 2003). Indeed, sport has evolved to be one of the most money-spinning entertainment businesses. It has all the possibilities to generate billions dollars on a daily basis for all the state holders involved. Given the above information, one can gather that sport commercialization is a process of generating income through handling the business aspect of sport. Robinson (2008), deduced that there are four fundamental factor drivers of sport commercialization namely sport management, spectating, level of technology, and the rise of competition.

The magnitude of sport commercialization is understood when looking at the Soccer FIFA World Cup competition. This is the biggest sport competition in the globe and since its inception it has been generating billion dollars for the host countries, soccer clubs, FIFA (governing body), players and their clubs. Economies of host countries and their

infrastructures are left enhanced after the tournament which holds every after four years. Sources of the FIFA World Cup are reported to be ranging from television broadcasting rights, licensing rights, marketing rights, hospitality rights, other event-related revenue and other avenues.

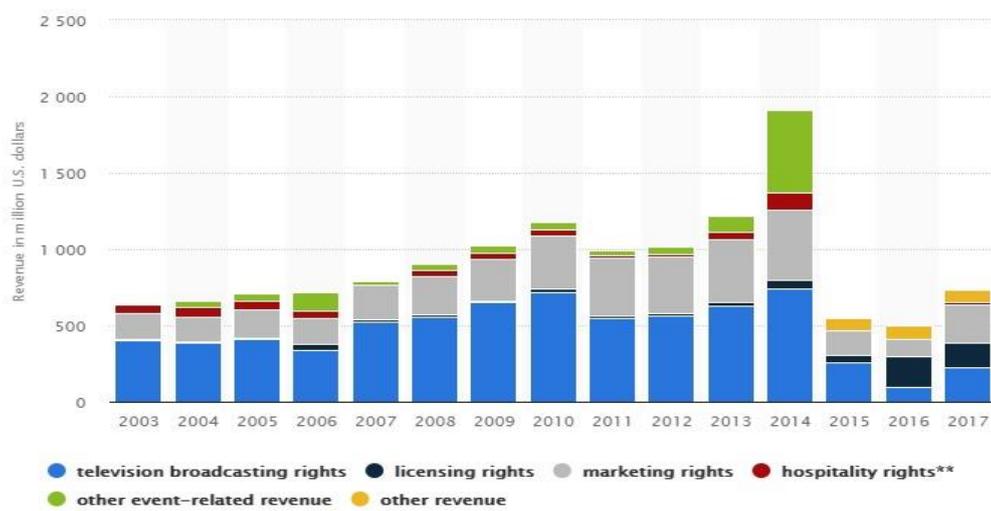


Fig1.1

(Statistica, 2018)

Figure 1.2 (in \$ million)

SOURCE	YEAR		
	2006	2010	2014
1. TV Broadcasting Rights	\$337.81m	\$717.98m	\$742.64m
2. Licensing Rights	\$43.65m	\$26.10m	\$54.23m
3. Marketing Rights	\$163.62m	\$342.94m	\$465.08m
4. Hospitality Rights	\$53.36m	\$40.0m	\$110.64m

5. Other event-related revenue	\$118.83m	\$52.22m	\$537.37m
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These two above figures are showing the trends of sources of income for Federation Internationale de Football Association (FIFA) from 2003 to 2017. Figure 1.1 shows sources of income measured in US Dollar million for fifteen years (2003 -2017) not considering with competition is taking place. Figure 1.2 has narrowed down the results to focus more on the trends during the world cup competition years. Television broadcasting rights is the leading source as it increased from \$337.81 million, in 2016, to \$717.98 million, in 2010. Also there was increase in the source between 2010 and 2014, from \$717.98 million to \$742.64, respectively. The second most contributing avenue is the marketing rights that indicate a constant increase during these three world cup years. The other three sources which are licensing rights, hospitality rights, and other event-related revenue decreased in 2010 when the competition was held in South Africa, Africa for the first time in history. This is evidence that stakeholders involved on these sources did not value the competition as much they did in German in 2006, and these sources contributed much when the competition was held in Brazil in 2014.

However, holistically, FIFA managed to generate revenue of \$2.9 billion in German in 2016 and it went up in 2010 to \$3 billion, and then generated staggering revenue of \$4.1 billion in Brazil in 2014. This is the proof that sport is a lucrative entertainment business which also affects other businesses and industries (Sheetz, 2018).

The value being put on sport is due to the process of commercializing sport. The activity is no longer just a mere entertainment commotion. Sport comes as a package with some side attractions other than the actual sport game.

Spectators have different reasons of watching and attending matches. The main reason being the entertainment value they get. However, sport commercialization brought some advancement to the sport industry. Sport business stakeholders decided to package sport to be more than just an entertainment activity but rather include other attractive elements. Some people engage into sport because they want to escape or rather take some time-off from their busy and stressful lives. Others attend matches because they want to mingle, socialise and make new friends. According to Robinson (2008), some newly included elements to the sport package include the likes of half-time live music, hospitality, merchandising, opening shows and activations. “It can be seen that sport provides an avenue for entertainment, and one of the avenues running parallel with sport is sport betting” (Nienaber, 2016).

Betting on its own is a form of entertainment which creates interest and competition in every activity. It can be cock fight, soccer match, golf, fist fight, or cricket match; there is always someone who is willing to bet on the results of the activity. Betting in sport creates more interest and moreover enhances competitiveness of the game, especially for the live matches (Church-Sanders, 2011). Sport betting is said to have a natural part of sport culture since sport has been played competitively and not everyone has been betting for profit but mostly for leisure then entertainment (Church-Sanders, 2011). Since sport betting has been part of competitive sport, therefore, commercialization did not only occur in sport but also in sport betting. Betting evolved from a traditional method of placing it over the counter face to face, in cash, with a bookmaker, to modern digital methods of placing wagers online anytime and anywhere. Moreover, one can bet through a telephone call, mobile applications or directly in the internet.

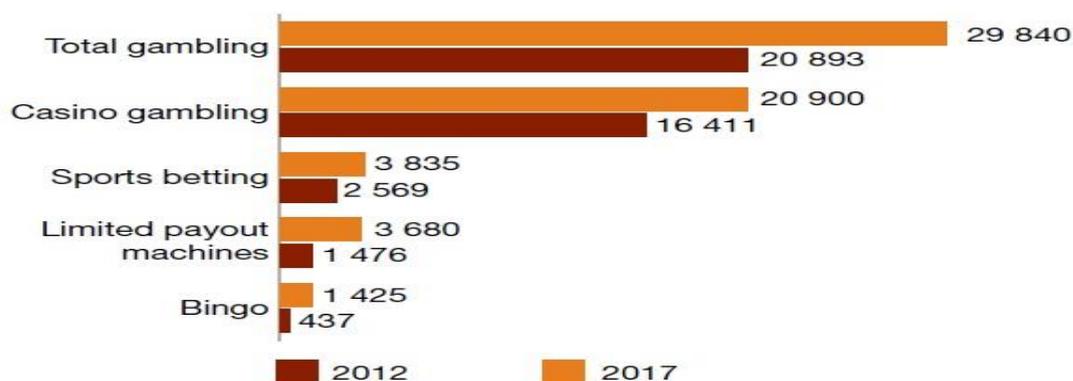
Sport betting occurs in a form of an exchange activity. It can be defined as a process of predicting or guessing an outcome of a certain sport. A punter or bettor predict the outcome

and places a price then hand it over to a wager. However, a punter does this after analysing the past performance and results of the two competing opponents. "...is where punters bet against each other in a controlled environment. The odds on a game are determined by the punters, the more the individuals who place money on a game, the lower the odds are the less the payout are. Punters bet against each other and not against a specific organisation, making the risk less" (Nienaber, 2016).

HOW HAS SPORT BETTING BEEN DOING SINCE IT WAS LEGALIZED?

South African sport betting industry has been doing fantastically well for the past few years with the gambling sector, even compared to other industries. Other components, with sport betting, that make the South African gambling sector include casinos, national lottery, bingo, and limited pay-out machines (LPM). Sport betting is the largest component after casino gambling with regard to revenues generated.

Figure 1.3 Gross Gambling Revenues (R millions), 2012 vs. 2017



PwC (2017)

The above graph shows the Gross Gambling Revenues, in million Rands, of 2012 and compared to 2017. The Gambling Gross Revenue is the money generated from all gambling activities, as seen on the graph, which are Casino gambling, Sport betting, limited payout

machines, and bingo. All these activities are legal and regulated by the National Gambling Board. From the graph, Casino are and always been leading the gambling industry in terms of revenues and popularities. Sport betting is the second most gambling activity that generates revenues. Limited payout machines and bingo are least ones. There was a noticeable increase from 2012 to 2017. Sport betting generated, in 2017, R3 835 million which increased by approximately 49.28% from 2012 revenue of R2 569 million. This revenue increase shows how the industry of sport betting is growing in the country.

1.2 PROBLEM STATEMENT

There has been a widespread myth that sport betting is just mere money and time wasting and illegal activity and some consider it as gambling. However, it is much better than that as it is a regulated economic activity within South Africa.

This is due to the lack of information that people have and also because there is no much research on the field. Nonetheless, the dynamic nature of technology has made it to easier for those interested in sport betting to have access to information. The presence of televisions, broadband and mobile cell phones has been a positive contribution to the field as people can search and be provided with real-time information regarding sport betting.

Though, most people are still in the dark about the impact and significance of sport betting to the country`s economy. This brings to the study`s objectives which are listed in the following section.

1.3 RESEARCH OBJECTIVES

1.3.1. Primary Objective

The primary objective of this research is to investigate whether Sport betting industry in South Africa is a significant as a gross domestic product contributor.

1.3.2 Secondary Objectives

- To investigate whether gross domestic product has a relationship with South African industries such as manufacturing, mining, tourism, agriculture, wholesale & retail trade, finance & business services and sport betting.
- To statistically determine which industry is the highest contributor to the gross domestic product.
- Consider the laws and regulations in the sport betting industry.
- Analyse the factors that contribute to the increasing of sport betting.

1.4 SCOPE OF THE RESEARCH

For government to consider developing and supporting sport betting industry, it is of utmost important to understand the effect and impact of the industry to the economy and lives of the people in general. This research will provide an analysis of the sport betting industry in South Africa in terms of its significance as the gross domestic products contributor. The quantitative data that will be used in the analysis will be gathered from 1994 till 2017.

1.5 RESEARCH METHODOLOGY

The research is designed to offer an analysis and description of sport betting industry in South Africa. This section of research design will outline how this will be accomplished.

1.5.1 Research Design

Sport betting industry in South Africa is considered an emerging one because it started to be legally considered in 1994 and before that there are no researches that were done pertaining to it. Due to that there is very limited information available on the industry, especially its contribution to the gross domestic products. One has to browse through many different websites to find proper and relevant information.

As there are three types of research methods namely exploratory, descriptive and explanatory research method. For this study, an exploratory research method will be used due to the fact that the industry is still emerging and there is nothing much known about it.

1.5.2 Research Approach

The research will make use of the data that has been gathered from 1994 up until 2017 based on Gross Domestic Product contributors including sport betting industry.

1.5.3 Data Collection

Quantitative data, which will be measured in US dollars, will be collected for twenty three years in order to determine an existing relationship between the country's gross domestic products and fundamental contributing industries.

Due to a very limited data available on sport betting industry in South Africa, hence, it is an emerging industry; therefore, data collected was only secondary from different sources. Websites, journals and reports were the main sources of data for this study. Data collected was for the prominent industries that are contributing massively to the country's gross domestic product.

1.5.4 Data Analysis

The study will make use ordinal least squares to determine the relationship between Gross Domestic Products explained by the eight vital industries in South Africa. Dependent variable will be the Gross Domestic Product (GDP) and independent variables will be the eight GDP contributors; manufacturing, mining, agriculture, communication, tourism, wholesale & retail trade, finance & business services, and sport betting, The collected data will be analysed through a regressed model and complemented by the validated literatures. Also will run Breusch-Pagan, Abridged White test, and Durbin-Watson test will be used as an analysis tools. They will be used to test for heteroskedasticity and autocorrelation.

We hypothesize that sport betting is not a significant contributor to gross domestic product, regardless of its performance. This implies that the alternative hypothesis is sport betting is a significant determinant of gross domestic product.

H₀: u = sport betting is not a significant contributor to gross domestic product

H_a: u= sport betting is a significant contributor to gross domestic product

1.6 LIMITATIONS

During every research undertaken there are occurrences that come up and distort or halt the research. These factors also influence the results and analyses of the study (Murnan, 2004).

Limitations of this particular study are being detailed in chapter four.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Sport has a different meaning and purpose to different individuals and groups. For some is a form of business, others a hobby, entertainment, team building, relaxation. However, for the majority and origin of sport, people take it as a form of relaxation activity that would keep them away from their serious and stressful lives. Sport as an entertainment mean going out with friends and family to play or watch any sport match. It also encompasses watching it on television and playing video games.

However, according to Wann, Schrader and Wilson (1999), there are two core fundamental reasons that make one become a sport fanatic relating to sport betting entertainment and economic gains. Sport has been an entertainment activity before it was commercialised and at some lower and amateur level is still considered as an entertainment. The package that comes with sport games gives individuals more reasons to escape their daily lives and engage in sport, especially attending live matches at stadiums or organise a live viewing gatherings with friends and family (Wann, 1995).

Sport is said to be an atmosphere where possibilities would be seem endless. The businesses are also not overseeing the importance and impact of sport. This is an activity that brings people from all walks of life to bond, strengthen their relationships and make new friends. Businesses use sport activities to allow their employees to engage with one another. They create these platforms through sport for their employees to develop partnerships, get use in cooperating, develop their interpersonal communication skills, thinking skills, and these sport activities take place in a less professional set up and employees are being entertained in a process. In addition, this is proves right a popular saying, which says ‘business is make on the

golf course, not in the boardroom'. According to Nienaber (2016), "Employees who share knowledge, time, and space with one another usually become friends. Friends, who communicate well with one another and are in harmony, normally work together. Employees who are also friends with another will be more productive in the workplace, because they communicate, socialise and share common goals".

2.2 THE LEGALIZATION AND REGULATORY OF SPORT BETTING IN SA

Betting in sport is not a new think as it dates back centuries ago but over the years it evolved and also went through commercialization. Sport betting started to be popular through betting in horse racing which is the oldest sport in South Africa on which betting was allowed to. Prior to 1994, horse racing was the only legal sport betting allowed by the country`s government, under the Gambling Act of 1965 (Nzimande, 2010).

National Horse racing authority (NHA) is the regulator of the horse racing industry and its responsibilities include issuing of licencing to owners of race tracks, horse trainers, and the general monitoring of all races. According to the Department of Trade and Industry (2005), all the registered and participating bookmakers in the horse racing industry are obliged to pay three percent of their revenue to the provincial regulator of horse racing inudstry. Gambling is regulated provincially in South Africa, in other words, each an every province has its own set of rules and regulations that bookmakers should adhere to inorder to operate in that particular province. The levely contributed by the bookmakers is paid to racing operators.

Horse racing industry is a well-established and matured industry but has been attract old punters because of its lack of transformation. Ever since it existed, there has been no much change and that is why is referred to as old-fashion betting. However, it has never been scrutinized like sport betting and casinos. Casinos and sport betting were only introduced or legalized after 1994 and since then have been gone numerous transformation.

South Africans were, before 1994, to travel to the neighbouring countries in order to engage in betting because it was legal in those countries. Some countries include Botswana, Lesotho and Swaziland. This cost the South Africa government the tax rebate that could have been received from the betting revenues.

Betting attracted a lot of people and even the horse racing track owners, Phumelela and Gold Circle, ended up investing in one of the oldest sport betting company, Betting World, in 2009. This was due to that fact that they could no longer ignore the booming sport betting industry. Also their horse racing industry was not growing as much or improving.

In 1994, a Lotteries and Gambling Board was established as a first step of introducing gambling in South Africa. At the time, only casinos were exempted. “This board was given the mandate to draw up a national policy for gambling in SA. The Gambling Act of 1995 was no longer relevant and was replaced by the Gambling Act of 1996. The Act of 1996 stated that government should legalize lotteries and gambling within SA. This act was adopted with numerous key principles for the regulation of gambling” (Nienaber, 2016).

According to a report that was prepared by Nzimande et. al (2010), these principles were meant to protect all the stakeholders who were involved in betting that include players (punters), bookmakers, ensuring that provincial governments benefit from this new money generating activity. Some of these principles include the protection of society from the

overstimulation of latent gambling through the limitation of gambling opportunities, the protection of players and integrity and fairness of the industry through the strict control and supervision of the industry, the generation of revenue and taxes for provincial government and for good causes, the economic empowerment of the historically disadvantaged, and the promotion of economic growth, development and employment, among others.

Two most important boards, National Lotteries Board and National Gambling Board, to the gambling industry were officially established after the report on policy and regulatory framework. Each province had its own gambling board, there for the National Gambling was responsible to ensure that they provide policy advice and promote uniformity among these provincial gambling boards. On the other hand, National Lotteries Board was there to regulate independently operated national lottery and sports pools, but state-owned. Therefore, in nutshell, this meant that then gambling and sport betting in South Africa was governed and related by eleven acts since there are nine provinces and two national acts. These acts were:

- National Lotteries Act, 1997
- National Gambling Act, 2004
- Gambling ad Betting Act, 1997 which applied only in the Eastern Cape Province
- Free State Gambling and Racing Act, 1996
- Gauteng Gambling Act, 1996
- KwaZulu-Natal Gambling Act, 1996
- Mpumalanga Gambling Act, 1995
- North West Casino, Gambling and Betting Act, 1994
- Northern Cape Gambling and Racing Act, 1996
- Northern Province Gambling Act, 1996 (Northern Province is currently known as Limpopo Province)

- Western Cape Gambling and Racing Law, 1996

As expected that every newly adopted policies have to be evaluated and reviewed in order to ensure that are effective. The first review of the above policy as reported by Nzimande et al. (2010), took place in 2002. The reviewed revealed three most important issues; firstly it was a then a clash and contestation between gambling regulatory authorities at provincial level and those at a national level (National Gambling Board). Secondly, was a mounting concern about the possibly negative socio-economic impact of gambling. Lastly, was to address the other forms of gambling such as interactive gambling and horse racing as they were not dealt with in the National Gambling Act, 1996. A new legislation was established as a result of the review. The National Gambling Act, 2004, was passed and changed the role and responsibilities of the National Gambling Board from just being an advisory board but to oversee the whole gambling industry and further come up with measure to prevent public from being socially harmed in gambling. Also to make sure that gamblers have sufficient information available for them about the whole betting and gambling activities. This could be achieved by making sure that gambling and betting are openly and transparently advertised enough and information brochure issued for punters.

2.3 THE GROWTH FACTORS OF SPORT BETTING IN SA

The rising trends of the sport betting have been caused by several factors, Church-Sanders (2011), mentioned most three impactful in the South African context; technology, internet and government role through regulation. PwC (2013) reported an amusing increase of betting shops and sportbooks, to more that 400 and 300 respectively in which individuals can choose from. Sport betting is undoubtedly the fast growing gaming revenue and becoming one of the most lucrative businesses in the country. In 2012, the gross gaming revenue amounted to

R2.6 billion with horse racing making up the majority of that with R1.8 billion while the industry grew by 4.5%. On the other hand, Sport betting grew by 71.3% within the same year, making it the fastest growing gaming revenue in 2012 (PwC, 2013).

Figure 2.1 Total sports betting gross gaming revenue by category (R millions) 2008 to 2012

**Sports gross gambling revenues by category
(R millions), 2008-2012**

	2008	2009	2010	2011	2012
Horseracing	1 510	1 411	1 651	1 675	1 750
<i>% change</i>		-6.6	17.0	1.5	4.5
Sports betting	123	194	352	478	819
<i>% change</i>		57.7	81.4	35.8	71.3
Total	1 633	1 605	2 003	2 153	2 569
<i>% change</i>		-1.7	24.8	7.5	19.3

PwC (2013)

Sport betting continued to prove to be a gambling revenue to be reckoned as it kept dominating the horse racing, in terms of percentage change in 2013. The industry rose by 18.4% while horse racing changed by a mere 0.1% from a previous increase of 4.5% to 4.6%. The main reason that these changes went down compare to 2012 is that bookmakers have observed a fluctuations when there are major sporting events such as Olympics and FIFA World Cup. The figures for 2010, 2012 and 2013 are not the same for that reason. Sport betting went up by 81.4% in 2010 because of FIFA World Cup in South Africa and Olympics games took place in 2012 and sport betting pickup by 77.2% and since there was no major sporting event in 2013, it was expected the change won't be that much.

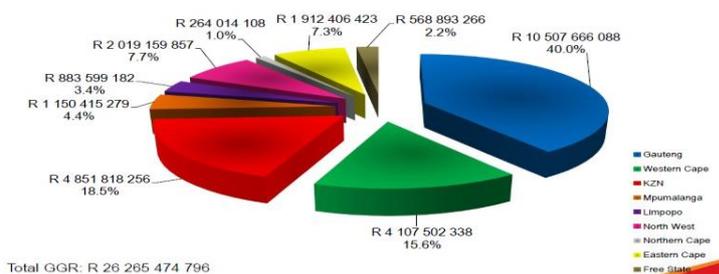
Figure 2.2 Total sports betting gaming revenue by category (R millions) 2009-2013

	2009	2010	2011	2012	2013
Horse racing	1 411	1 651	1 675	1 750	1 830
% change	-6.6	17.0	1.5	4.5	4.6
Sports betting	194	352	478	847	1 004
% change	57.7	81.4	35.8	77.2	18.5
Total	1 605	2 003	2 153	2 597	2 834
% change	-1.7	24.8	7.5	20.6	9.1

PwC (2014)

As it was mentioned earlier that each province has its governing board, therefore, as idea applies with the revenues. The percentage change of growth for all nine provinces is also taken into account.

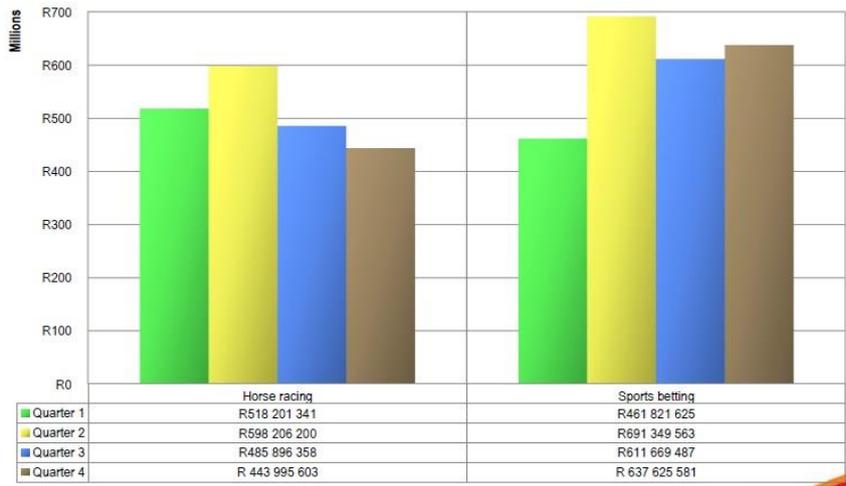
Figure 2.3 Turnover per province yearend 31 March 2016



National Gambling Board of South Africa (2016)

The sport betting's constant rising trend can be witnessed by the following comparison between its trend and horse racing in 2016. The figure shows the rand of money wagered includes 'recycling' which refers to amounts that are staked on more than one occasion, for the four year 2016 quarters.

Figure 2.4 Quarterly betting turnover – FY2016



National Gambling Board of South Africa (2016)

Nzimande et al. (2010) indicated the main factor that contributes to the rise of sport betting is the improvement in technology. Sport betting has been made easier through internet access which was brought by the broadband. Individuals can easily access bookmakers anytime and anywhere. Betting is just one click away. Also, the dynamic technology brought mobile phones which are very smart and make sport betting simple in one's comfort zone.

CHAPTER 3: METHODOLOGY

The main objectives of the current study is to investigate the impact on South African GDP by major country`s eight industries that contribute to the GDP and to determine whether Sport betting industry is significant when combined with other industries.

In this chapter, the methodology adopted for researching is detailed under the following major sub-sections.

3.1 Model and Variables

3.2 Data Sources

3.3 Objectives

3.4 Hypothesis

3.1 MODEL AND VARIABLES

The study documents two sets of variables namely dependent variables and independent variables. Here is the initial regression model that was generated from the dependent and independent variables which will be explained below:

The complete model is: Annual GDP= \hat{f} (manufacturing, mining, agriculture, communication, tourism, wholesale & retail trade, finance & business services, sport betting).

$$GDP = \beta_0 + \beta_1 Man + \beta_2 Min + \beta_3 Agri + \beta_4 Comm + \beta_5 TRM + \beta_6 WRT + \beta_7 FBS + \beta_8 SB + u$$

B_0 = the intercept or the constant.

B_1 - β_8 = the coefficients of the explanatory variables.

μ = error term.

3.1.1 Dependent Variable

There is only one dependent variable which is gross domestic product. Gross domestic product is being determined by independent variables. For this study, the values for gross domestic product were gathered from 1994 to 2017.

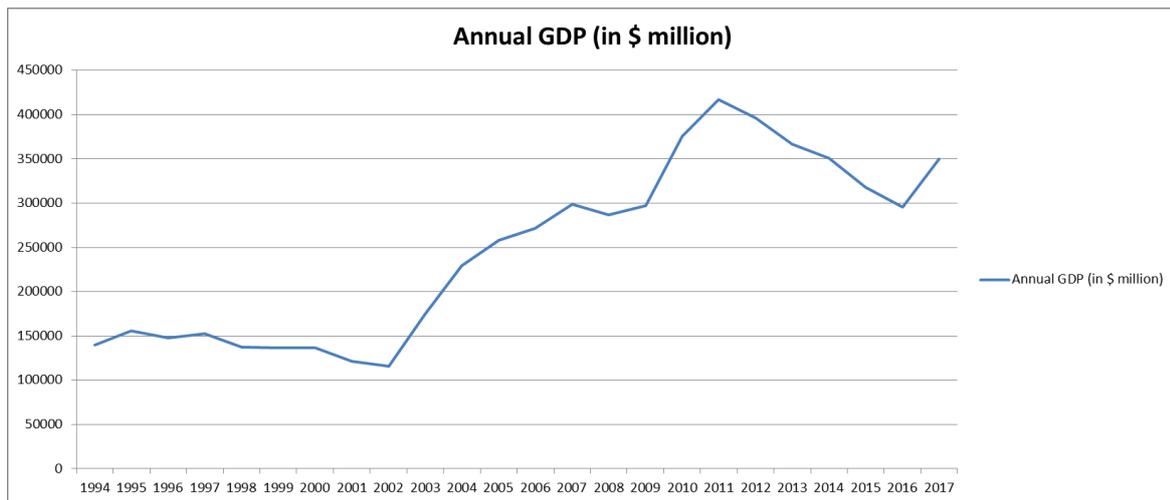


fig 3.1

The above graph shows the trend in annual gross domestic product, measured in million US Dollars from 1994 to 2017. Between 1994 and 2002, GDP was not stable as it can be seen that a trend is decreasing but from 2003 it started to pick up.

3.1.2 Independent Variables

The selection of any variable as an independent variable was based on the assumption that their contributions to the national gross domestic were measurable in terms of their role in job creation and revenues generated, based on historical data.

From the above regression model, all eight independent variables are represented. β_0 represents the intercept which is a constant in the linear regression. An intercept means that, if all explanatory variables are zero, then the expected or predicted depended variable equals

the intercept. β_1 Man is made up of a parameter and an explanatory variable. β_1 is the slope intercept of the first explanatory variable, which is the manufacturing industry represented by Man in the equation. The second explanatory variable is the mining industry which is represented by Min and has a coefficient of β_2 . The third predator variable is agricultural industry which is denoted by 'Agri' with a coefficient β_3 . Agriculture is one of most important industries as it ensures food security and exports some of the internal cultivated food. Communication industry includes all the form of communication developments and it is a promising industry. In the equation is denoted by 'COMM' with β_4 as a coefficient. The first independent variable is one of three highest contributed industries to GDP for the past twenty-three years. Tourism (TRM) is the fifth independent variable with β_5 as a coefficient. Wholesale and Retail Trade industry (WRT) comes as sixth variable with β_6 coefficient. It is also a prominent one because it deals with all consumer good from convenient to durable good. It also responsible for Proudly South African campaign which aims to promote locally made products.

Finance and Business Services industry was also in the top three most contributors of gross domestic product. South Africa has a sophisticated and developed financial system in Africa. This attracts many investors and foreign banks from all over the world. In the model, the industry is represented by FBS and its coefficient is β_7 . Sport betting is the last independent variable in model as SB with β_8 as a coefficient. Sport betting was only legalized in 1994 but its growth is noticeable. To date, it is the second most revenue generating gambling activity after casinos. In addition, the 'u' is for error terms, other variables that contribute to the GDP but not accounted for in this model.

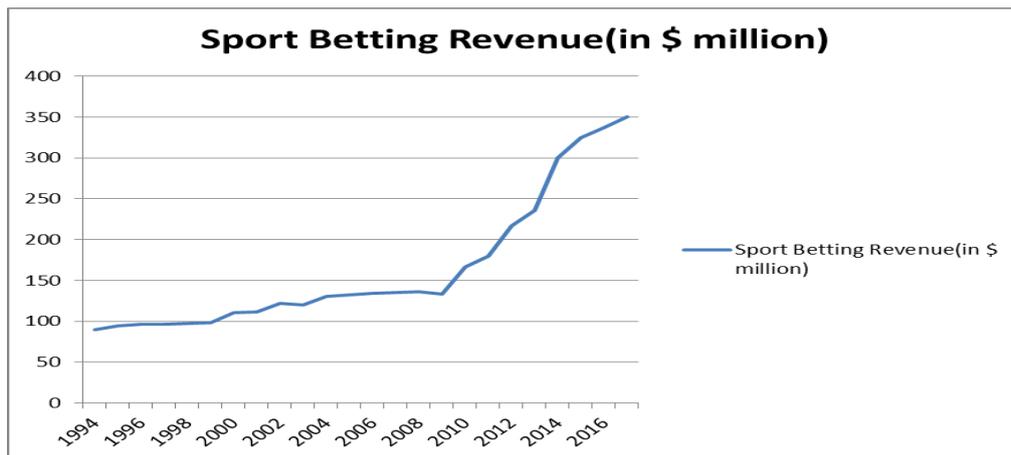


fig 3.2

The above graphs shows the revenue trend of Sport betting between 1994 and 2017. As it has been reported that the industry is dramatically growing. This upward trend is an evidence that sport betting is an important gross domestic product contributor.

3.2 DATA SOURCES

Due to limited resources on the subject, one had to swift through many different website in order to gather relevant and important information. However, the following sources are the main ones for different years but with the time frame of twenty years, from 1994 to 2017 as indicated above.

National Gambling Board and PriceWaterCoopers are main sources of information for this study, which are institutions that specialise in issuing periodical reports on gambling industry in South Africa. Also, Statistics South Africa (www.statssa.gov.za), which is a South African government institution that specialise in gathering and issuing open source information on all statistics including gross domestic product. Moreover, some information was obtained from the South African Trade and Industry department and National Gambling Statistics of South Africa (www.casasa.org.za).

3.3 OBJECTIVES

The objectives formulated for this study are stated below:

3.3.1 To determine if the selected eight industries will explain a variation in the gross domestic product

3.3.2 To determine whether sport betting is a significant gross domestic contributor combined with other industries.

3.4 HYPHOTHESIS

These independent variables might not account for the whole variation in annual gross domestic product (GDP), because they are not the only GDP contributors. However, are not expected to distort the model because are main contributors to GDP. From a historical data perspective, the strongest variables should be finance and business services, wholesale and retail trade, manufacturing and mining industries. However, positive effect is expected on these independent variables and the annual GDP. It is also expected that sport betting will have a correlation with the annual gross domestic products due to its increasing trend.

H₀: u= (Null hypothesis): Sport Betting is not significant contributor to South African gross domestic product.

H_a: u= (Alternative hypothesis): Sport betting is a significant contributor to South African gross domestic product.

CHAPTER 4: ANALYSIS OF RESULTS

4.1 INTRODUCTION

4.2 DESCRIPTIVE ANALYSIS (OLS)

4.2.1 Initial Model

4.2.2 Log-Log Model

4.3 AUTOCORRELATION TEST

4.3.1 Durbin Watson Test

4.4 HETEROSKEDASTICITY

4.4.1 Breusch-Pagan Test

4.4.2 Abridged White Test

4.4 CONCLUSION

4.1 INTRODUCTION

This chapter will cover the data analysis, which includes the descriptive analysis, heteroskedasticity test through Breusch-Pagan and Abridge White Tests. Also cover autocorrelation test through a use of Durbin Watson test. Each tool will analyse and interpret the results generated in order to give answers to the research questions.

4.2 DESCRIPTIVE ANALYSIS (Ordinal Least Squares)

4.1.1 Initial Model

$$\text{GDP} = \beta_0 + \beta_1\text{Man} + \beta_2\text{Min} + \beta_3\text{Agri} + \beta_4\text{Comm} + \beta_5\text{TRM} + \beta_6\text{WRT} + \beta_7\text{FBS} + \beta_8\text{SB} + u$$

As indicated in the previous section that this model is made up of two types of variables which are dependent and independent variables. This section will show the OLS results of this model after regression for periods from 1994 to 2017.

Regression Statistics							
Multiple R		0,999795126					
R Square		0,999590294					
Adjusted R Square		0,999371784					
Standard Error		2515,949558					
Observations		24					
ANOVA							
	df	SS	MS	F	Significance F		
Regression	8	2,31657E+11	28957074359	4574,575735	5,54E-24		
Residual	15	94950032,65	6330002,176				
Total	23	2,31752E+11					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95%, Upper 95,0%
Intercept	-1397,337875	5334,836661	-0,261927021	0,79694042	-12768,27305	9973,597303	-12768 9973,6
Manufacturing	-0,474549831	0,57353302	-0,827415013	0,420970811	-1,697006526	0,747906864	-1,697 0,74791
Mining	1,730159211	0,403684906	4,285915045	0,000649966	0,869725202	2,590593221	0,8697 2,59059
Agriculture	3,146575984	1,567881784	2,006896194	0,063133118	-0,195284931	6,488436899	-0,195 6,48844
Communication	-0,444558212	0,835908571	-0,531826359	0,602634544	-2,226255156	1,337138732	-2,226 1,33714
Tourism	-0,031292026	0,542049458	-0,057729098	0,954726434	-1,186643098	1,124059045	-1,187 1,12406
Wholesale&Retail Trade	4,654803802	0,806272876	5,773236258	3,67706E-05	2,936273847	6,373333757	2,9363 6,37333
Finance&Business Services	0,845421173	0,371244161	2,27726457	0,037849302	0,054132976	1,636709371	0,0541 1,63671
Sport Betting	9,058958546	21,7450049	0,416599517	0,682871602	-37,28942227	55,40733936	-37,29 55,4073

Fig 4.1

Upon completion of data collection a basic regression of all the independent variables (manufacturing industry, mining industry, agricultural industry, communication industry, tourism industry, wholesale & retail trade industry, finance & business services industry and sport betting industry) on the dependent variable (annual gross domestic product) was run. From the initial regression results, R² was perfect as it was 99.99%, however, the results were not as were expected as most variables were not significant at a 5% level. In other words, most variables were not impactful to the gross domestic product because their p-values were greater than a significance level of 0.05.

R² indicates a variation of a dependent variable explained by independent variable(s). In this model, there is a 99.99% variation in gross domestic product explained by these eight industries

which shows a good relation between them. However, initial results only indicated three industries, mining, wholesale & trade retail trade and finance & business services, as significant at a 5% level of confident. The other four industries were deemed to be insignificant including sport betting.

These results were confusing because coefficients showed that industries such as sport betting, and agriculture are the most contributing to gross domestic product, but are not statistically significant. Industries such as manufacturing, communication, and tourism are negatively related to gross domestic product. Moreover, the intercept was also negative. In addition, the p-value of F (significance F) indicated that combined together, all variables are significant for the model. These confusing results led to a high positive Durbin Watson statistic and as a results, a log-log regression model was generated as a remedy for a Durbin Watson, which will be discussed later.

4.2.2 Log-Log Linear Model

$$\ln\text{GDP} = \beta_0 + \beta_1 \ln(\text{MAN}) + \beta_2 \ln(\text{MIN}) + \beta_3 \ln(\text{AGRI}) + \beta_4 \ln(\text{COMM}) + \beta_5 \ln(\text{TOUR}) + \beta_6 \ln(\text{WRT}) + \beta_7 \ln(\text{FBS}) + \beta_8 \ln(\text{SB}) + u$$

Log-Log linear model was generated as a way of correcting for Durbin Watson test and to observe the relationship between independent and dependent variables. The results were not that much, however, as expected the model was normalized. Out of eight independent variables, four of them were statistically significant. Independent and dependent variables were all transformed, in other words, were logged.

To interpret the results will start with a variation of gross domestic product caused by industries. The variation is measured by R² which is 99.94% and is very much positive. The standard error of the regression is \$0.0132, which is an estimate of the variation of the observed gross domestic product, in dollar terms, about the regression line. The p-value of F is 9.8147E-23 which is

significant at a 5% significance level, meaning that the independent variables are not by chance but are related to the dependent variable.

The estimated regression line

The results of the estimated regression line include the estimated coefficients, the standard error of the coefficients, the calculated t-statistic, the corresponding p-value, and the bounds of both the 95% and the 95% confidence intervals.

The independent variables that statistically significant in explaining the variation in the gross domestic product are mining industry(lnMIN), communication industry(lnCOMM), wholesale & retail trade industry(lnWRT), and finance & business services industry (lnFBS), as indicated by the calculated p-values that are less than the significance level of 5%.

1. The model's intercept of 1.8134 means that when all independent variables are zero, then gross domestic product will be 1.8134%
2. The relationship between mining industry and gross domestic product is positive: the larger the mining industry revenue, the higher is gross domestic product. The coefficient of 0.235923 indicates, on average, an additional 1% increases the gross domestic product by 0.235923 %
3. The communication industry is negatively correlated to gross domestic product. The larger the communication industry revenue, the lower is gross domestic product. A 1% increase in communication industry revenue will cause gross domestic product a 0.172% decrease. Regardless of the inverse relationship between communication industry and GDP, it is statistically significant because its p-value is greater than the confidence level. This indicates that the industry has an effect on GDP changes.

3. The wholesale & retail trade industry and gross domestic product are also positively related. On average, a 1% increase in the revenue of wholesale & retail trade industry will lead to a 4.6548% increase in gross domestic product.
4. The finance & business services industry with a coefficient of 0.32225 is also positively related to the gross domestic product. This coefficient indicates that, on average, a 1% increase in finance and business services industry revenue will see a 0.32225% increase in gross domestic product.
5. The other independent variables do not add significantly in explaining the variation in gross domestic product. However, they are positively correlated with the GDP except the manufacturing industry. Sport betting is the fourth highest contributor after wholesale & retail trade, finance & business services and mining. Agriculture and tourism industries are not significant but are positively related to GDP.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
Intercept	1,81344709	0,217985958	8,319100507	5,30184E-07	1,34882102	2,278073161	1,348821	2,278073
lnMAN	-0,07302022	0,092958936	-0,785510503	0,444385599	-0,271157502	0,125117061	-0,27116	0,125117
lnMIN	0,235923578	0,059891952	3,939153265	0,001312196	0,108266904	0,363580251	0,108267	0,36358
lnAGRI	0,073754826	0,047254413	1,560802905	0,139417024	-0,026965572	0,174475223	-0,02697	0,174475
lnCOMM	-0,172013183	0,077174828	-2,228876798	0,041537537	-0,336507435	-0,007518931	-0,33651	-0,00752
lnTOUR	0,00687092	0,043430345	0,158205504	0,876405056	-0,085698669	0,099440508	-0,0857	0,099441
lnWRT	0,61069568	0,14174718	4,308344472	0,000621289	0,308568717	0,912822643	0,308569	0,912823
lnFBS	0,322258515	0,109375642	2,946346276	0,010007452	0,089129853	0,555387177	0,08913	0,555387
lnSB	0,018234935	0,021310883	0,855663028	0,405645345	-0,027188137	0,063658007	-0,02719	0,063658

Fig 4.2

4.3 AUTOCORRELATION TEST

Autocorrelation is the relatedness of independent variables and this is not good for OLS model. In order to check for autocorrelation in data for this study, a Durbin Watson test was carried out.

Durbin Watson statistic is computed by dividing the sum of squared difference of residuals by sum of squared residuals. A Durbin Watson statistic ranges between zero and four. If it is closer to 0 means that data is positively correlated and when it is closer to 4, data is negatively correlated. But if it closer to 2 it means that the results are inconclusive.

Initially, a calculated Durbin Watson was 0.031 which was too close to 0 and indicating that there is a positive correlation in the sample. This had to be corrected because this would have distorted the regression interpretation.

As a process of correcting for Durbin Watson (DW), a new log-log regression model was generated as indicated above. The new DW test was carried out and a calculated statistic was 1.103 but the following conditions applied before concluding whether there is autocorrelation or not.

Ho: $u =$ there is no autocorrelation

Ha: $u =$ there is autocorrelation

Decision rule: if $d < d_L$ reject H_0

 If $d > d_U$ fail to reject H_0

 If $d_L < d < d_U$ test is inconclusive

In this case, $d = 1.103$, level of significance is 0.05 (5%), n (number of observation) = 24, k (number of independent variables) = 8. With this information d_L (lower interval) and d_U (upper interval) can be obtained from Durbin Watson table.

From a table, $d_L = 0.604$ and $d_U = 2.318$, therefore, the above condition can be evaluated and a decision be made.

The results show that $dL < d < dU$, therefore, the results are inconclusive. It is not easy to tell whether there is autocorrelation or not.

4.4 HETEROSKEDASTICITY TEST

In order to be sure about the answers given to the research questions and hypothesis, two more tests were carried out for heteroskedasticity. These tests are Breusch-Pagan and Abridged White tests. “Heteroskedasticity (also spelled heteroskedasticity) refers to the circumstance in which the variability of a variable is unequal across the range of values of a second variable that predicts it” (Taylor,2011).

Ho: $u =$ Homoscedasticity

Ha: $u =$ Heteroskedasticity

4.4.1 Breusch-Pagan Test

This is the first test for heteroskedasticity. It was run through generating a new OLS model of the squared residuals, from the initial regression model, to all the initial independent variables, which are the eight industries. Then a new regression output is being produced and its p-value of F is the only value of interest. If the p-value of F is greater than the level of significance, then we reject the null hypothesis.

The results show a p-value of F to be equal to 0.5 or 50%, which is higher than the 5% level of significance. Therefore, we fail to reject the null hypothesis. In other words, data is homoscedasticity.

4.4.2 Abridged White Test

Abridged White test is conducted by running a regression of expected or predicted annual gross product and predicted annual gross product squared on residual squared. Then a new regression p-value of F is compared to a significance level in order to determine whether there is heteroskedasticity or not.

The calculated p-value is 0.208, which is also greater than the 5% level of significance. Therefore, we fail to reject the null hypothesis.

4.5 CONCLUSION

The analysis of results is the most important section of this study because it analyses the variables and their importance in the model. The analysis provides an avenue to answer the research questions and rejecting or failing to reject the null hypothesis. This section analyses the initial model that had only three significant independent variables, but it had a high variation determinant (R^2) of 99.99%. However, a new lagged OLS model was regressed because the initial model provided unexpected results and a positive Durbin Watson statistic.

In addition, a lagged, log-log model was generated and it provided more expected results as it had four significant independent variables. A Durbin Watson was also calculated to test for autocorrelation and it gave an inconclusive answer. Moreover, a biasedness or heteroskedasticity test was run through Breusch-Pagan and Abridged White tests. The results calculated results indicated that there was no heteroskedasticity.

These results show that sport betting is not a significant contributor to GDP; therefore, we fail to reject the null hypothesis. However, sport betting has a positive relationship with gross domestic product. This might be because of the small sample size which is only 23 years (1994 -2017).

Moreover, gross domestic product has a positive relationship with other industries such as mining, agriculture, tourism, wholesale & retail trade, and financial & business services. The model indicated the following industries as the ones that are significant: Mining, Communication, Wholesale & Retail Trade, and Financial & Business Services.

CHAPTER 5: CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

5.2 SUMMARY

5.3 LIMITATIONS

5.4 RECOMMENDATIONS

5.1 INTRODUCTION

In this chapter the conclusions derived from the findings on this study on the significance of sport betting industry to the South African gross domestic product and other seven major industries. The conclusions were based on the purpose, research question and the results of the study. The shortcoming of the study and recommendations will be given.

5.2 OVERVIEW OF THE STUDY

Sport betting is drastically increasing worldwide and revenue increases more during major sport events such Olympic Games and FIFA world cup. However, it is not a significant contributor to South African gross domestic product, based on the regression results. There are literatures that support the notion sport betting is more than just a gambling act, but a growing industry and has a positive contribution to gross domestic product.

Moreover, the regression results indicated that as much as sport betting is not a significant contributor, but it is positively correlated to gross domestic product. Gross Domestic Product and sport betting industry have a positive relationship. The insignificance might be due to a small data sample used to find the relationship, as it was only twenty years used.

In addition, other industries were significant to gross domestic product determination. Gross domestic product has a positive relationship with Mining industry, Agricultural industry, Tourism industry, Wholesale & Retail Trade, and Financial & Business Services.

The results show that there was no biasness in the data and error terms had the same variance. The data was homoscedastic, there was no heteroskedasticity.. Also the results of autocorrelation were inconclusive, meaning that it could not be told whether there is autocorrelation or not in the error terms.

5.3 LIMITATION / SHORTCOMINGS

Every study or research has its own shortcoming and obstacles that a researcher faces during the researching period. For this study, the limitations are listed as follow:

5.3.1 Small Sample Size

The study made use of a small sample size of a time series data of 23 observations. These observations were very small for a study of an industry.

5.3.2 Time to Research

The researching time was very limited. The research was supposed to be finished within four months which not enough was considering the subject of the study.

5.3.3 Lack of Prior Research studies on the subject

The lack of previous research on the significance of sport betting industry to South African gross domestic product was a set back because it was not easy to obtain all relevant and needed data.

5.4 RECOMMENDATIONS

The study can be expanded in future and the recommendations for future research on the subject are listed below:

5.4.1 To use a larger sample size, maybe fifty years of data or more.

5.4.2 To engage industry stakeholders (bookmakers, punters and law makers) to get their experience and opinion about the industry of sport betting.

5.4.3 To run more tests such as reliability and multicollinearity tests.

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