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DEPARTMENT OF ECONOMICS

THE DEMAND FOR SPORTS LOTTERY IN GHANA

(A CASE STUDY OF THE KUMASI METROPOLIS)

**A THESIS SUBMITTED TO THE DEPARTMENT OF ECONOMICS, IN PARTIAL
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PHILOSOPHY DEGREE IN

ECONOMICS

BY

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DECLARATION

I hereby declare that this thesis is my own work, undertaken with supervision, and contains no material previously published by another without due acknowledgement.

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DEDICATION

I dedicate this work to my parents, Professor and Mrs. G.K.S. Aflakpui. You have set the example for us to follow suit; God bless you for pushing me to attain higher academic laurels.



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ABSTRACT

Formalised sports lottery is fast becoming a craze in Ghana, especially amongst the male populace. There is however no documented research on the demand for this product as well as its effects on the population and economy of Ghana as a whole. This study sought to investigate the factors that influence the demand for sports lottery in Ghana. Based on the expected utility hypothesis, a model was constructed using a binary logistic regression to analyse the characteristics that influence the demand for sports lottery in Ghana. Four hundred respondents were employed in this study where it was realized that 92% out of the about 96% males engaged in sports lottery in Ghana were within the age bracket of 21-40 years. Furthermore, 53.6% of those engaged in sports lottery were reported to be unemployed. Price, sex, age, employment status, monthly income and whether a person has won a bet before were discovered to be the factors that significantly influence the demand for sports lottery in Ghana. The study realized that BC1 and BC2 were the most patronized sports betting companies, whilst BC4 and NLA's Soccer Cash were amongst the least patronized.

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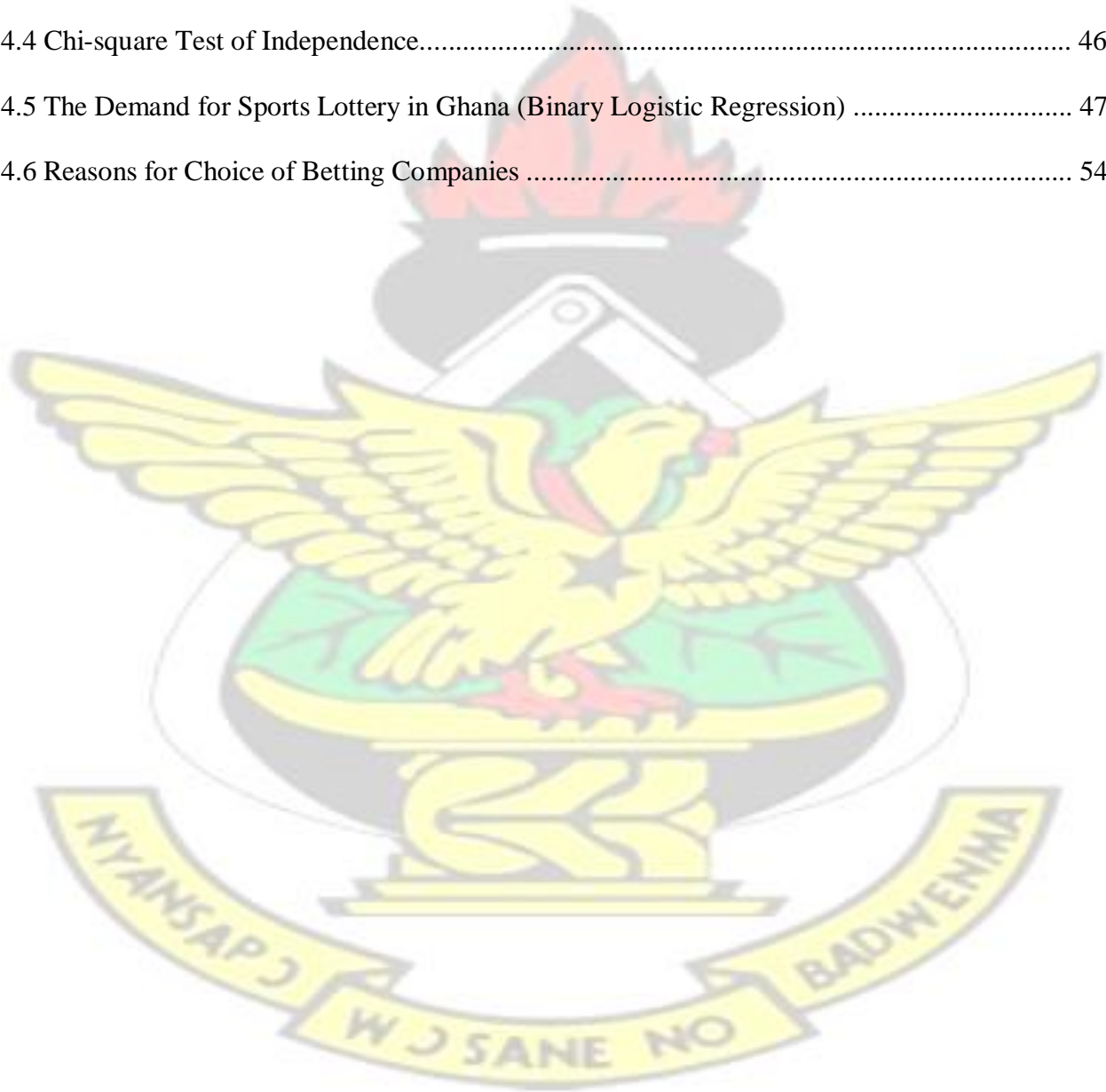
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LIST OF ACRONYMS AND ABBREVIATIONS

BC-	Betting Company
GSS-	Ghana Statistical Service
KMA-	Kumasi Metropolitan Assembly
NGC-	National Gaming Commission
NLA-	National Lottery Authority



CHAPTER ONE

INTRODUCTION

1.1 Background

Sports lottery is a type of game that has existed informally for a very long time. The informal one (usually referred to as sports betting) usually takes place amongst friends or sports enthusiasts who either go to a sports stadium or watch a match live from their television screens. They could bet on varying aspects of the game such as how many goals a match could produce, and which team would win the match. The formalised form of sports lottery has recently gained much popularity with Ghana not being an exception. Several sports lottery outlets have sprung up all over the country where sports enthusiasts have the opportunity to place bets on a wide variety of options such as how many yellow or red cards a match will produce, which player would score a goal, whether the match would end up in a draw, amongst other options.

Although there are several sporting activities like basketball, horse racing and ice hockey that could be betted upon, football seems to be the most preferred choice among the betting populace in Ghana. Statistics from China, Spain, Canada and the United Kingdom, show that sports bettors tend to be males (Humphreys and Perez, 2010; Mao 2013). Other studies have shown that factors such as price, age, dependency burden, employment status, religion, educational level, marital status and ease of accessibility to a betting centre have a significant effect on the demand for sports lottery (Humphreys and Perez, 2010; Grote and Matheson, 2011; Conlisk, 1993; Beckert and Lutter, 2013; Mao, 2013; Zhou and Zhang, 2013; etc).

In Ghana, the main body in charge of lottery is the National Lottery Authority (NLA). This institution runs two main types of lotteries: the “5/90 Fixed Odds Game” which entails picking out

five winning numbers out of ninety numbers and the “Soccer Cash” game which is a pool based game for lovers of football. The Soccer Cash game is a pari-mutuel game similar to the Shengfu game of China, where one needs to predict at least ten out of twelve matches correctly to win a cash prize. Whereas the Soccer Cash is played manually, betting companies like MyBet, Oddsportal, Supabet, Superbet, and EuroBet amongst others, provide online options for betting.

Although there is a general notion that sports lottery is merely gambling and should therefore not be encouraged as it could corrupt sporting officials and participants as well as encourage game fixing, others are also of the view that since the interest in the activity continues to peak at a very fast pace, it could be a viable source of revenue to the economy which could help in economic growth and development (Humphreys and Perez, 2010). Evidence from the United Kingdom for example, shows that between 2010 and 2011, the British gambling industry generated an amount of £5.5 billion out of which 53% came from the sports betting sector (Mao, 2013). Mao et al. (2015) cited the China Sports Lottery Administration Center (i.e. CSLAC, 2012) which indicated that in the year 2011, sales of 19 billion Yuan, representing 20% of the sports lottery market, were accrued in China. Li et al. (2012), cited by Zhou and Zhang (2015) are of the view that sports lottery promotes economic and social development through the provision of employment, the boosting of consumer spending, the generation of tax incomes, not forgetting the promotion of various industries such as communication, transport, manufacture, finance, and advertisement.

Although the average rational consumer is assumed to make his choice of demand for sports lottery based on the product attributes, consumer demographics and marketing variables (Mao, 2013), studies have shown that the ambition of social improvement coupled with the dream of moving up into higher social classes is a key motivation behind the demand for lotteries. This dream can arise

from socio-economic inequalities, and lottery gambling has been found to be more frequent and intense in countries with more acute social inequalities (Kaizeler & Faustino, 2008a; cited by Mao, 2013).

Ghana is currently faced with a sovereign debt crisis, rising interest rates, policy slippages and external shocks which have dampened the country's medium-term prospects. As at the year 2014, the country's debt-to-GDP ratio was 67.6% prompting the country to sign up for an IMF conditionality programme which has placed stringent rules on the economy such as the freezing of employment into the public sector and the removal of subsidies on fuel consumption and utilities (Ghanaweb 2015; Trading Economics 2016). There is therefore the need for the country to pay more attention to revenue boosting industries like the sports lottery industry, in order to generate more revenue for the economy as anecdotal evidences, like that of the UK cited above, show that the sports betting industry is a very lucrative venture which can bring a nation lots of revenue.

1.2 Statement of Problem

Formalised sports lottery is fast becoming a craze in Ghana, especially amongst the male populace. Several sports lottery centres have sprung up all over the country with considerable amounts of patronage from sports enthusiasts. Taking advantage of the general appeal of sports betting, sports lottery has become a significant public financing avenue in some countries and states where sports lotteries have been legalized (Li *et al.*, 2012 cited by Mao, 2013). Revenues generated from sports lotteries have often been used to raise funds for social welfares courses, including orphanages, nursing homes, medical care, education, and legal assistance. In China for instance, revenues generated from sports lottery have been earmarked for sports development as sports play a very

vital role in most nations of the world. Revenues earmarked for sports development are oftentimes used for promoting sports for all programs, building sports infrastructures for mass participation, hosting mega sporting events, and sports development in the regions under the poverty line (Mao et al., 2015).

Despite its positive contribution to the advancement of national development, sports lottery can also bring about a type of gambling behavior which could sometimes result in serious social problems such as problem gambling and crime-related activities like the use of narcotic drugs (Mikesell and Pirog-Good, 1990, cited by Grote and Matheson, 2011). It is therefore critical to examine factors determining the demand for sports lottery in Ghana.

Ghana's income inequality has shown a widening gap between the poor and the rich although several strides have been made in economic growth and poverty reduction (UNDP, 2014). This increasingly widening gap between the rich and the poor, calls for a critical look at the demand for sports lottery in the Ghanaian market.

Much of the knowledge gained from lotteries has been conducted on lottery games in the U.S.A, U.K., China, Spain, and Canada. There have however been no studies that provide any empirical analysis on lottery games in Ghana hence the need for this study.

1.3 Objectives

The main objective of this study was to determine the factors that influence the demand for sports lottery in Ghana. To attain this, the following specific objectives were set:

1. To determine the characteristics of subscribers of sports lottery in Ghana.
2. To explore how these characteristics influence the demand of subscribers for sports lottery.
3. To identify the forms of sports lottery patronized in Ghana.
4. To investigate the kind of regulations that guide sports lottery in Ghana.

1.4 Research Questions

The following questions were posed to aid the researcher attain the set objectives:

1. What are the characteristics of subscribers of sports lottery in Ghana?
2. How do the characteristics of subscribers influence their demand for sports lottery in Ghana?
3. What forms of sports lottery are patronized in Ghana?
4. What kind of regulations guide sports lottery in Ghana?

1.5 Hypotheses

The following hypotheses were advanced in order to achieve the set out objectives of the study:

1. H_0 : Price does not have a significant effect on the demand for sports lottery.
 H_1 : Price has a significant effect on the demand for sports lottery.
2. H_0 : Age does not have a significant effect on the demand for sports lottery in Ghana.
 H_1 : Age has a significant effect on the demand for sports lottery in Ghana.
3. H_0 : Sex does not have a significant effect on the demand for sports lottery in Ghana.
 H_1 : Sex has a significant effect on the demand for sports lottery in Ghana.
4. H_0 : Income does not have a significant effect on the demand for sports lottery in Ghana.

H₁: Income has a significant effect on the demand for sports lottery in Ghana.

5. H₀: Educational level does not have a significant effect on the demand for sports lottery in Ghana.

H₁: Educational level has a significant effect on the demand for sports lottery in Ghana.

6. H₀: Employment status does not have a significant effect on the demand for sports lottery in Ghana.

H₁: Employment status has a significant effect on the demand for sports lottery in Ghana.

7. H₀: Marital status does not have a significant effect on the demand for sports lottery in Ghana.

H₁: Marital status has a significant effect on the demand for sports lottery in Ghana.

8. H₀: Whether one has won a bet before does not have a significant effect on the demand for sports lottery in Ghana.

H₁: Whether one has won a bet before has a significant effect on the demand for sports lottery in Ghana.

1.6 Significance of Study

Since this study is the very first of its kind in the country, it would serve as a pedestal for further research to be done in the area of sports lottery. Based on the characteristics of respondents, potential investors into the industry could be guided in their decisions to set up more sports lottery companies in the country. The NLA would by this study, be able to make its sports lottery products more attractive and lucrative and thereby generate more revenue to fulfill its aim of promoting economic development.

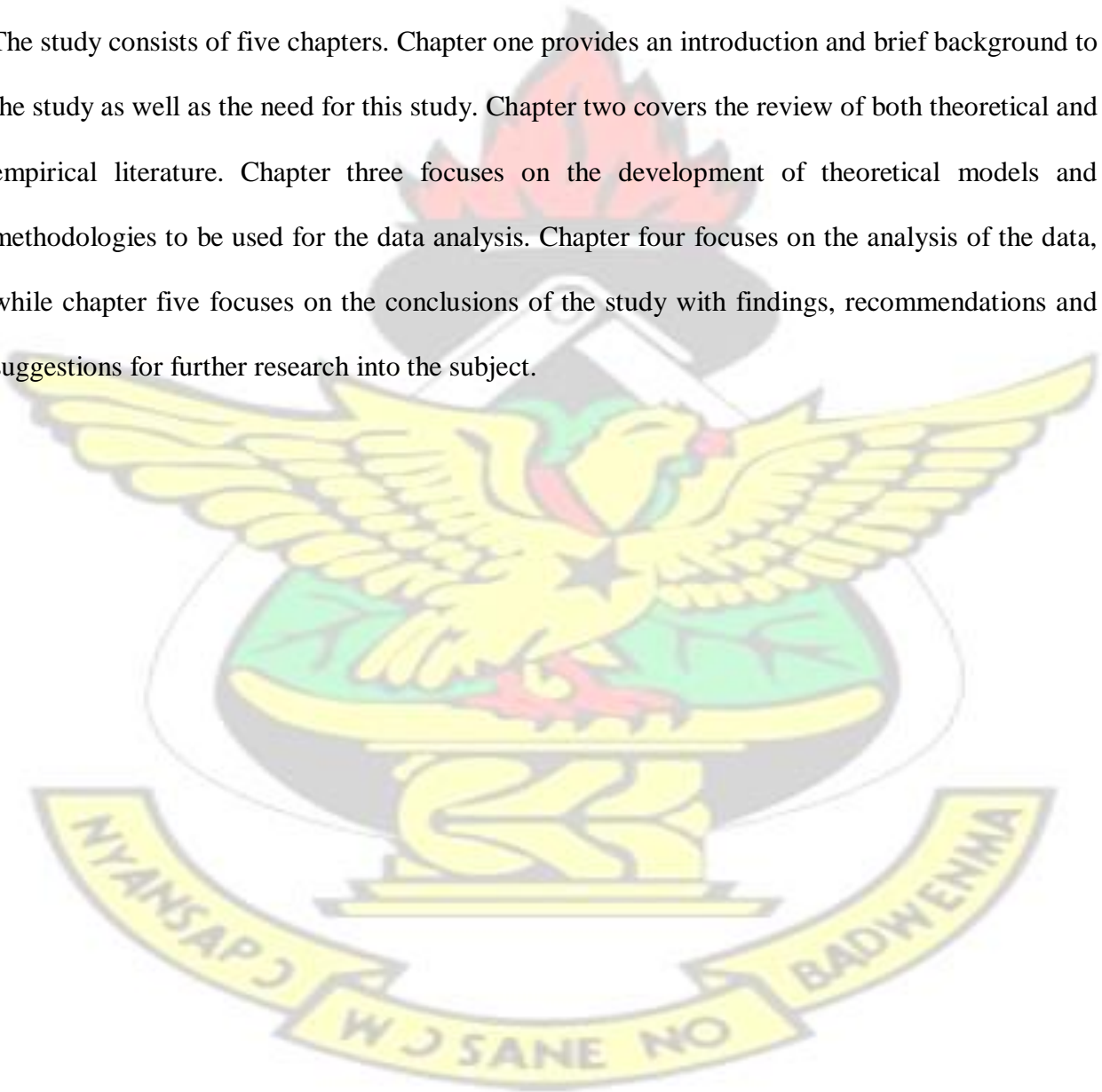
1.7 Scope of the Study

The main aim of this study was to identify the determinants of demand for sports lottery in Ghana.

The Kumasi Metropolis was used as the target sample for this study.

1.8 Organisation of the Study

The study consists of five chapters. Chapter one provides an introduction and brief background to the study as well as the need for this study. Chapter two covers the review of both theoretical and empirical literature. Chapter three focuses on the development of theoretical models and methodologies to be used for the data analysis. Chapter four focuses on the analysis of the data, while chapter five focuses on the conclusions of the study with findings, recommendations and suggestions for further research into the subject.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the various literature available on the subject of sports lottery to find out the extent of research done in the area and to establish the general consensus on what determines the demand for sports lotteries in other parts of the world. In this section, both theoretical and empirical reviews were considered.

2.2 Definition of Lottery

Lottery is simply an event whose outcome is dependent on choice. The Merriam-Webster dictionary (2015) defines lottery as:

“An event or situation in which what happens is decided by luck or chance.”

To add to the above definition, the Cambridge Advanced Learner’s Dictionary (2015) defines it as:

“A game, often organized by the state or a charity in order to make money, in which tickets with numbers are sold to people who then have a chance of winning a prize if their number is chosen.”

Synonyms of lottery include, gambling, betting, and wagering (Conlisk, 1993). These synonyms will be used interchangeably in the text as need requires.

2.3 History of Lottery (Worldwide)

Lottery (lotto) is one of the oldest and most common forms of gambling, dating as far back as to the Bible, ancient Rome and even earlier to the Han Dynasty of China in 2nd Century BC. In the

Old Testament of the Bible, Moses cast lots to allocate the inheritance of the Israelites; Jonah was cast overboard by avenue of lots; the Jews in the book of Esther, also cast lots. In the New Testament, lots were cast to appoint people into leadership; the soldiers cast lots over the apparel of Jesus to determine who got what. The Chinese and Japanese are said to have employed lotteries in the prediction of events that were to take place in the future. In the historical accounts of countries such as Germany, Spain, France, and the England, lotteries were mainly for the purpose of generating revenues for the financing of wars, fortification of the countries as well as for putting up certain monumental structures (Willmann, 1999; Grote and Matheson, 2011).

2.4 The History of Lottery in Ghana

The National Lottery Authority (NLA) which was formerly known as the Department of National Lotteries (DNL) was established in 1958 with the mandate to organize raffles as a means of entertainment and winning prizes. Two years later, the Lotto and Betting Act 94 was passed into a law where the aim of lottery in Ghana, was now to raise revenue in support of the country's development. Over the years, the authority has evolved in line with modern trends and has the legal monopoly to organize lotteries in the country.

Currently, the authority has two packages: the 5/90 Fixed Odds Game and the Soccer Cash Game. The Soccer Cash Game which was launched in December 2014, is a pari-mutuel game where one is to predict at least ten out of twelve matches in order to win the cash prize. This game however is played offline; the online version is yet to be created by the authority (NLA, 2015).

The NLA is currently regulated by the National Lotto Act 2006, Act 722, which gives the

Authority the sole prerogative to organize lotteries in this country. Per the lotto act;

“National Lotto shall be conducted for the purpose of raising revenue for the nation...There shall be conducted as part of the National Lotto, a lottery with the object of providing care and protection for the physically or mentally afflicted, the needy, the aged, orphans and destitute children.”

The act goes on further to say that

“The Authority may, in consultation with the Minister, operate any other game of chance or enter into collaboration, partnership or joint venture with any person, society, association or corporate entity, to operate a game of chance in accordance with existing laws...”

The NLA is also mandated by the act to *“...devise methods to help maximize the revenue generated by the Authority for the State...”*

The NLA, in fulfilling the above mandate, in the year 2014 experienced a 24% growth in its revenue. The Authority in that same year was able to create over 3,000 jobs by licensing new Lottery Management companies (LMC's), thereby making the Authority's total employment in the segment, 8000. Furthermore, the Authority spent an amount of GH¢ 1.0 million on various project in the health, cultural, educational, sports, safety and security sectors within the said time frame (GNA, 2015).

2.5 Sports Lottery

Sports lottery has been in existence for centuries, only that it was informal and not referred to as sports lottery; it was merely betting upon a game. People watching a game in a stadium, could place bets on who would either win or lose the match. Friends watching a television game could also do likewise. In recent times however, sports lottery is growing at a very fast pace. In China

for instance, sports gambling for the past five years has been growing at an annual rate of 14.7% (AAP News 2012, cited by Mao et al.). It has become more formalized and is fast becoming the preferred lottery choice as it does not involve random draws like that of the traditional lottery games. Sports lottery requires that one has some amount of knowledge or expertise on the style of play of the football team in question as that would greatly influence the predictor's chances of winning. Humphreys, and Perez (2010) see sports lottery and sports spectatorship as complementary goods as consumers of both goods tend to have similar characteristics. It is assumed that some engage in sports lottery as a way of showing allegiance to their favourite football teams. Some sports, such as horse racing, would have even gone extinct if there was nothing like sports lottery as they could not elicit much spectator support (Mao et al., 2015).

2.6 Arguments in Favour of Sports Lottery

2.6.1 Development

Zhou and Zhang (2015) concluded that sports lottery promotes both economic and social development by providing employment opportunities for those in the print, communications, transport, manufacturing and advertisement industries which in turn generates income through taxation as well as boosting consumer spending.

Matheson and Grote (2008), cited by Grote and Matheson (2011), state that a great number of state lotteries in the US and some other countries, earmark either all or a part of revenues accrued, for specific governmental programmes, with education on top of the list. This is mostly done in a bid to reduce the level of opposition against the adoption of lotteries.

Lottery is said to contribute more to state budgets than tariffs. Several anecdotal evidences show that funds generated from lotteries were used to service debts of countries, revamp economies after wars, fund the military of various countries, take care of orphans, among others (Willmann 1999); so in actual fact, the revenues accrued were put to good use.

In China, even though private lotteries are illegal, citizens are encouraged to participate in national lotteries as it is deemed as contributing to good causes (Mao et al., 2015).

2.7 Arguments against Sports Lottery

2.7.1 Unprofitable

Inasmuch as some see sports lottery as a means of entertainment and revenue, others see the activity in an altogether different light. Moralists consider the whole concept of lottery and gambling as wrong; some economists see it as an unprofitable economic activity. Samuelson (1971), cited by Ignatin (1984), was of the view that:

“...a substantial economic case [can] be made against gambling... it involves simply sterile transfers of money or goods . . . [which] absorb time and resources.

When pursued beyond the limits of recreation... gambling subtracts from the national income.”

Ignatin (1984) also asserts that since illegal sports betting is rife, it is very difficult to track the amounts of money involved in this game although evidence points to the fact that the amounts involved are quite huge.

Lotteries are viewed as a regressive form of taxation which also lead to very large dead-weight losses as high administrative costs have to be paid (Grote and Matheson, 2011).

2.7.2 Criminal

There are others who think that sports lottery encourages organised crime because lottery is essentially gambling and it is assumed that gamblers are more prone to committing crimes (Mikesell and Pirog-Good, 1990, cited by Grote and Matheson, 2011). It is argued that the profits made from winning a gamble are used in the purchase and distribution of narcotic drugs. However, Ignatin (1984) is of the view that such an assumption is erroneous because the fact that a lot of money is involved in sports lottery does not mean that a lot of profit is accrued in the process. Furthermore, such an assumption also implies that narcotic operations are not profitable enough, yet this is not true.

Mikesell and Pirog-Good (1990), cited by Grote and Matheson (2011) assert that there is a significant positive correlation between crime rates and the adoption of a lottery. Some sports associations such as the National Football League (NFL) in Delaware, USA oppose any form of sports betting because they feel it has the tendency to corrupt both athletes and officials as well as encourage game fixing (Humphreys and Perez, 2010).

2.7.3 Volatile Revenue

Although lottery has been proven to contribute a significant amount to state revenues, this type of revenue is very volatile in nature and therefore cannot be relied upon (Humphreys and Perez,

2010). This assertion is further buttressed by Humphreys and Matheson (2012) who state that lotteries are unlikely to provide the much needed revenue of a modern state or government, even though the revenues may exceed the tax revenues generated from goods such as alcohol and tobacco.

2.8 Theoretical Review

2.8.1 Economic Theories Underlying the Demand for Sports Lottery

With the right amount of information, an individual should be able to make the right choice about which good to consume. In the cases where there is inadequate information, there is the tendency for an individual to make a wrong choice which may even have disastrous consequences in very extreme cases. Economists have sought to propound various theories on uncertainty and how a consumer makes a choice when faced with the issue of uncertainty. Sports lottery is a game that comes with a lot of uncertainty; although players of the game may gain experience over time which would enable them to make more accurate predictions, there is still the element of uncertainty. Below are some of the theories that have been propounded to explain why an individual would want to consume lottery as a good:

2.8.2 The Theory of demand

The law of demand states that all other things being equal, the quantity of a good demanded per period of time will fall as price rises and will rise as price falls. This shows an inverse relationship between the price of a good and the quantity demanded of the good in question. In other words, price is the main determinant of demand. There are however other factors apart from price, which influence the demand for a good; some of which include, the price of other related commodities, taste/preference, income and the expectation of a future rise or fall in price levels. The satisfaction

one derives from the consumption of a commodity is referred to as utility and is measured in utils (Sloman, 2006). The demand for sports lottery is classified as a consumption good as it provides one with utility (Conlisk, 1993). Like any other good, the demand for sports lottery is also determined by factors other than price; such as one's age, sex, religion, marital status, employment status amongst other factors.

2.8.3 Choice Under Uncertainty: The Bernoulli Utility Function

The Bernoulli utility function classifies individuals under three main categories: one could either be a risk lover, risk neutral or risk averse. The Bernoulli utility function for a risk lover is convex, whereas that of a risk averse person is concave. The utility function of a risk neutral person is simply a straight line as such an individual is indifferent as to which type of choice to make. A person that engages in sports lottery is assumed to love risk to some extent, although the extent of risk loving varies from individual to individual. For one who is a risk lover, his expected utility is greater than the utility of his expected income since he operates on a convex shaped utility function (Silberberg and Suen, 2001).

2.8.4 The Expected Utility Theory (Friedman and Savage)

This theory appears to be a modification of the Bernoulli Utility function explained above. Whereas the Bernoulli utility function shows that an individual can possess only one of the already-mentioned characteristics, Friedman and Savage (1948) posit that an individual could exhibit all such characteristics at a go. The expected utility theory is used to explain why an individual would engage in gambling, and yet at the same time, also take up an insurance policy. Friedman and Savage (1948) go on further to suggest that an individual that engages in risky consumption such

as the consumption of lottery or insurance, is likely to have a utility function that has both concave and convex segments (Eisenhauer, 2005).

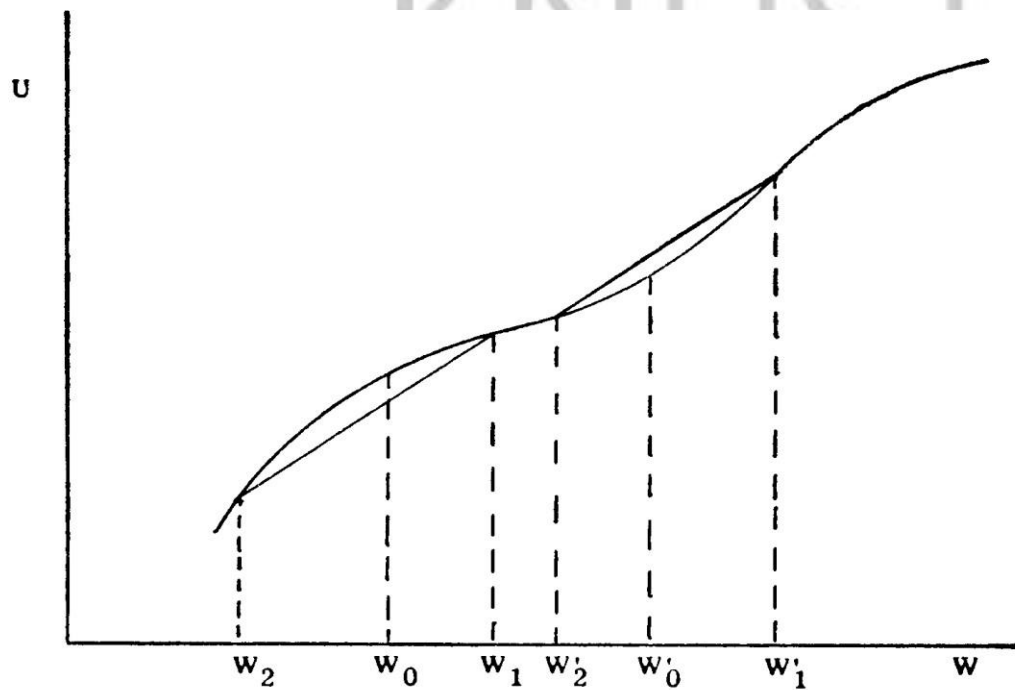


Figure 2.1 Diagram Showing the Expected Utility Theory

(Source: Markowitz, 1952)

Figure 2.1 is the Friedman-Savage utility curve ('w' represents wealth and 'u' represents utility); this curve shows that at different income levels, the individual has different utility curves. The convex portion of the diagram (i.e. from w_2' to w_1') represents the utility curve of a risk lover. The straight line just above the point w_0' on the curve represents his expected utility. For one who is a patron of sports lottery, his expected utility is greater than the utility of his expected income.

2.9 Empirical Review

2.9.1 Rationality of Lottery Demand: Consumption or Mere Irrationality?

Generally, it is assumed that those who engage in any form of gambling apparently “...switch off their rational...” senses and switch them back on after they have gambled (Ariyabuddhiphongs, 2011). Friedman and Savage (1948), who are quoted by Grote and Matheson (2011), try to justify the rationality of demand for sports lottery by suggesting that an individual’s utility curve changes shape as they get richer hence explaining the kind of risky behaviour that they exhibit as they participate in lotteries.

Although the Friedman-Savage theory has been criticized, there are others that still hold the view that the Friedman-Savage theory is valid. Eisenhower (2005) in his survey on Dutch households, by means of a unique survey technique developed by the Tilburg University in the Netherlands, comes to the conclusion that about 18% to 20% of individuals evaluate risks in a way that is consistent with that of Friedman and Savage. Conlisk (1993) justifies the rationality of sports lottery as its consumption entails benefits and expected winnings (sometimes losses). According to Conlisk (1993), if economists insist on looking at lottery (i.e. gambling) only as a means for which one would want to improve his/her wealth, then very little can be said in the defence of lottery as rational consumption. Conlisk (1993) cites Samuelson (1952, pp. 677) who argues that the demand for lottery (i.e. gambling) cannot merely be linked to the prize at stake, since the elements of “...suspense and gamesmanship...” also play a role. Conlisk (1993) goes on further to argue that if insurance consumption can be justified as rational, then lottery (i.e. gambling) should also be seen as rational as it entails more ‘pleasant uncertainty’ than insurance which does not seem to have any form of ‘pleasantness’ but is rather full of moral hazards and periods of long and delayed uncertainty.

According to Ignatin (1984), people gamble for two main reasons and these reasons could be used to justify the rationality of engaging in the activity; they gamble for the purpose of investment with the aim of increasing their wealth and also gamble for the purposes of consumption so that they can increase their utility. Hartely and Farrell (2002) also support the assumption that consumption can be used to explain the rationality of gambling.

2.9.2 Factors that Influence the Demand for Sports Lottery

Humphreys and Perez (2010), by means of a probit model, assessed the characteristics of sports bettors in three countries, namely Canada, Spain and the UK. The study showed that sports bettors in the UK were mostly less educated than their Spanish and Canadian counterparts; the participation rate of Spanish sports bettors was higher however, the UK had more sports betting options than Spain and Canada. The study further showed that the average sports bettor in all three countries had an income that was above the household median. The study concluded that sports bettors were more likely to be male; the probability that one would engage in sports as they increased in age was less likely and that people with higher incomes were more likely to engage in sports lottery although the marginal effect was not so strong.

Perez (2010) employs two stage least squares, instrumental variables and dynamic panel data models to draw the conclusion that effective price is negative and highly significant, hence a downward sloping demand curve which shows that subscribers of sports lottery respond to the value for money. In the study, it was realised that the La Quiniela game, which is the sport lottery played in Spain, is a normal good and regressive; the income elasticity is positive but less than one.

Matheson and Grote (2011) in a comprehensive literature review stated that modern lotteries are usually operated by governments instead of private firms; however these tend to have high takeout rates and large deadweight losses as high administrative costs (such as payments to vendors and advertising firms) are entailed. It was also realized that the presence of state lotteries causes the expenditure on other consumption goods to fall by 2.4% which in turn has a negative effect on well-being (Kearney, 2005b). The study sought to determine whether there was a relationship between lottery sales and the effective price (which is the difference between the nominal ticket price and the expected return) and realized that from earlier studies, there was no significant impact of the effective price on the sale of lottery tickets. From later studies, it was realized that there was a significant, however negative relationship between the takeout rate (which is sometimes used to calculate the effective price) and lottery sales; anytime the takeout rate was higher, lottery sales would diminish and vice versa. It gathered that if the demand for lottery sales were elastic, a lower takeout rate would cause an increase in government revenues. In countries like Taiwan and UK where the demand was inelastic, governments would increase revenues by issuing higher takeout rates (a higher takeout rate simply means that a greater part of the ticket price is kept back as revenue). The study further revealed that where income levels were low, the elasticity of lotteries was less than one; meaning that a greater percentage of income was spent on lottery products. The effect of unemployment on ticket sales was however mixed as some showed a positive relationship whereas others showed a negative relationship with some showing no relationship at all.

A number of demographic characteristics were shown to have an effect on lottery sales. It was discovered that the relationship between education and sports lottery was inverse; the less educated

a person was, the more likely he/she was to demand for lottery and vice versa. Sports lottery was shown to be a male dominated activity, with Blacks and Hispanics demanding more of the commodity, in comparison to whites. It was further shown that sports lottery was more prominent in the urban centres. Age and marital status however showed inconsistent results as they could be positive in some cases, negative in other cases, or show no relationship altogether. Matheson and Grote (2011) further found that income, poverty levels and income changes, have a strong relationship with the demand for lottery. Income elasticities of lotteries were found to be uniformly less than one, indicating individuals earning lower level incomes spent greater percentages of incomes on lottery products.

Li et al. (2012), who are cited by Zhou and Zhang (2015), group the various determinants of demand for sports lottery into three main headings: product attribute variables, consumer characteristic variables and marketing variables. Effective price, the jackpot and the prize structure were the main determinants found to be under the product attributes. With the consumer characteristic variables, factors such as a person's income, age, sex, religion and ethnicity were considered. For the marketing variables, the accessibility of the venue, cross border competition, product substitution and social responsibility marketing were seen as determinants.

Beckert and Lutter (2013) conducted a survey using 1,508 lotto players in Germany. The study employed sociological approaches, where series of nested regressions, binomial regression models, generalized linear modeling and Ordinary Least Squares (OLS) were combined to come out with the conclusion that income, age, cohabitation, ethnic minority and status frustration are significant factors that can be used to predict one's demand for lottery. Other factors such as peer-

influence and educational attainment were also discovered. Educational attainment was seen to play very significant roles; the less educated were more likely to spend more on lottery.

Mao (2013), who investigated the consumption of sports gambling, used an econometric approach where he employed time series analysis and panel data analysis (i.e. pooled models, fixed effects models, two-way random-effects models and instrumental variables results) to assess the Shengfu game of China, which is the main sports lottery game played. The econometric model was empirically examined, using a set of draw-to-draw sales data from 2001 to August 2012 of the *Shengfu* game.

Mao (2013) discovered that the provinces in China that had relatively higher income levels simultaneously had higher demand for sports lottery which is rather in contradiction to the notion of regressivity in traditional lottery games. The study further went on to say that those who tend to be financially and socially burdened are the ones that are prone to buying more lottery tickets. This finding was buttressed by an estimated income elasticity of 0.4. Mao (2013) also discovered that pending on the way in which the games were structured and marketed; it could have a substantial impact on the demand for sports lottery tickets. For instance, the results showed that draws that were composed of matches from the German Bundesliga (GB) and the English Premier League (EPL) increased sales by 60% whereas draws consisting of less popular leagues sold 30% less.

It was however realized that population, educational level, sport development and venue accessibility did not have significant effects on the demand for sports lottery in China. It was also realized that rollovers did not make any significant changes in sales difference; a finding which

was inconsistent with that of other studies. By means of an ADF test, it was discovered that the *Shengfu* lottery market had not seen any obvious growth or decline, and hence, was a stationary market.

Mao et al. (2015) employed a multilevel model to look at the factors that determine the demand for sports lottery. Panel data comprising sales of 211 draws from thirty different provinces in China within the span of 2011 and 2012 was used, out of which a number of findings were made. It was revealed that the ease of access to a sports lottery centre has a considerable positive impact on the demand for sports lottery. Mao et al. (2015) cited Welte et al. (2004) and Hing and Haw (2009) who indicate that the easy availability of gambling opportunities, coupled with the facility density and the proximity of a venue to one's home, all have a significant positive effect on the demand for sports lottery.

The study further showed that the composition of a ticket had a significant impact on the demand for lottery tickets. The finding was corroborated with the work of Garcia et al. (2008), who showed that adding a top division club to a draw had significant effects on ticket sales in Spain. The study in addition revealed that provinces with higher income levels had a higher demand for sports lottery and that those with higher financial and social burdens were more likely to demand for sports lottery. Some in a bid to improve upon their social statuses would engage in sports lottery as they had hope that their financial fortune, in light of their present economic predicaments, could turn around.

2.10 Characteristics of Subscribers of Sports Lottery

Below are certain characteristics that are seen to be common amongst subscribers of sports lottery.

2.10.1 Sex and Financial Status

According to Ignatin (1984), sports bettors tend to be urban, middle class males, who spend more of their time and money on recreation and vacation. This assertion is consistent with the findings of Humphreys and Perez (2010) who are of the view that sports bettors tend to be young males with relatively high incomes as their results show that the average sports bettor's income is either at or above the median household income. There unfortunately seems to be some inconsistency in the findings of Humphreys and Perez (2010) as it is also stated in the study that sports bettors tend to be unemployed males.

Mao (2013) however indicates that past studies have shown that the heaviest lottery players are young, poor, uneducated single men who live in urban areas and belong to religious groups such as the Catholics and also tend to belong to specific minorities such as American Hispanics.

2.10.2 Level of Education

Previous studies show that the level of education is inversely related to the sale of lottery tickets as those with lower levels of education tend to participate more in sports lotteries (Grote and Matheson, 2011). Humphreys and Perez (2010) could however not establish any specific link between educational levels and sports lottery as their findings appeared to be somewhat mixed. Mao et al (2015) from their study concluded that education has a positive and significant impact

on the demand for sports lottery. By running a series of Ordinary Least Squares (OLS) and robust regressions, it was concluded that majority of the participants in sports lottery were mostly people who had pursued higher education and this finding contradicts that of previous studies. Ariyabuddhiphongs (2011) shows that education is negatively related to the demand for sports lottery; the higher a person's educational level, the smaller the probability that he will engage in sports lottery.

2.10.3 Dependency Burden

Mao et al. (2015) concluded that those with dependents are more prone to buying lottery tickets as they believe they could win and use the proceeds obtained to cater for their dependents.

Ariyabuddhiphongs (2011) and Beckert and Lutter (2013) also concluded as Mao et al. (2015) that the more dependents a person has, the more prone he is to demand for sports lottery because he wants to make his life and that of his family better.

2.10.4 Income

Mao et al. (2013) indicate from their study that provinces in China that have higher income levels, have a higher demand for sports lottery. Humphreys and Perez (2010) also show that sports bettors tend to have higher incomes. Eisenhower (2005) who cites Hawley and Fujii (1993/94), corroborates this fact by stating that higher income individuals tend to be more tolerant of financial risks and so are more likely to take the risk of engaging in sports lottery.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter looks at the methods employed in the study to determine the demand for sports lottery in Ghana. This chapter provides a background to the area of study, a theoretical framework and a model specification. It then goes on to show how the sample size was estimated as well as the process of data collection. It also describes the regression technique employed (i.e. binary logistic regression) in the analysis of the data.

3.2 Study Area

The Kumasi Metropolis which is also referred to as the “Garden City” has the largest share of Ashanti Region’s total population (i.e. 2,035,064 out of 4,780,380). It is Ghana’s second largest city and has ten (10) sub-metros namely, Oforikrom, Asokwa, Subin, Asawase, Manhyia, Tafo, Bantama, Suame, Kwadaso and Nhyiaeso. About 48%, 46% and 60% of the metropolis are urban, peri-urban and rural respectively. There are forty six (46) major settlements in the Kumasi Metropolis with Bantama being the most populous and popular settlement in the metropolis. (GSS, 2010; KMA, 2016).

The Kumasi Metropolis is situated in the transitional forest zone and is about 270 km north of the nation’s capital, Accra. It is approximately 250-300 meters above sea level with an area size of about 254 square kilometers. The Kumasi metropolis shares boundaries with Kwabre East District to the north, Atwima District to the west, Ejisu-Juaben Municipal to the east and Bosomtwe to the south (GSS, 2010).

The Kumasi Metropolis is a major commercial centre with all major trade routes converging to it. The service economy of the Kumasi Metropolis records an employment level of 71%; the industrial economy has an employment level of 24% and the agricultural economy has an employment level of 5% (KMA, 2016)

The metropolis is home to one of Ghana's renowned stadia; the Baba Yara Sports Stadium which has played host to several matches; both national and international. The stadium in 1978, hosted six (6) group matches of the 1978 African Cup of Nations Tournament; it also hosted seven (7) matches during the 2000 African Cup of Nations Tournament as well as the 2008 African Cup of Nations Tournament (BBC 2008; Wikipedia, 2016).

3.3 Population

Information gathered from various literature shows that sports lottery is mostly popular amongst people that live in urban centres (due to ease of access to betting facilities). It is in this light that the Kumasi metropolis was chosen because per the 2010 population census of Ghana, Ashanti Region has the highest population, accounting for 19.4% (i.e. 4,780,380) of the total population with the Kumasi metropolis having the highest population of 2,035,064. (GSS, 2010) in the Ashanti Region. The Kumasi Metropolis doubles as the Ghana's second largest city in terms of population. The Kumasi Metropolis also falls within the urban classification. In addition, the Kumasi Metropolis is home to a lot of sports enthusiasts as it has its own internationally acclaimed sports stadium which has played host to both local and international matches; since anecdotal evidence makes it clear that sports fans are more prone to bet, the Kumasi Metropolis was chosen for the survey.

3.4 Sample Size

Based on the population of the Kumasi Metropolis, which is 2,035,064, as already indicated in section 3.2, a sample size was estimated using the de Vaus (2002) formula:

$$n = \frac{N}{1 + N e^2}$$

where:

n= Sample size N=

population e=

Confidence Level

$$n = \frac{2035064}{1 + 2035064(0.05^2)}$$

$$n = 399.92 \approx 400$$

Four hundred individuals were therefore employed in this study.

3.5 Sampling Techniques

Non-probability sampling technique, specifically purposive sampling method was employed in the selection of respondents for the study. The questions posed to the respondents were grouped into three: demographic features, socio-economic features and sports lottery. Questions posed on sports lottery were mainly to find out which type of betting companies respondents subscribed to; the regularity with which they placed bets; the amounts they spent on bets and how much they won;

the frequency with which they win bets as well as their reasons for engaging in sports lottery. Respondents who did not engage in sports lottery were also posed with questions to give their reasons for their non-engagement in the activity.

The researcher also visited twenty lotto kiosks in various parts of the Kumasi Metropolis to interview the vendors with regards the NLA's Soccer Cash.

The Kumasi office of the National Lottery Authority was visited where the researcher conducted interviews in order to gain further information about how sports lotteries are run in the country, and to find out the extent of control the NLA has over this activity.

3.6 Instrumentation

The main instrument used in the gathering of data was the administration of questionnaires coupled with the conduct of interviews.

The researcher visited Amakom, Adum, Atonsu, Bantama, Tafo and Bremang to administer questionnaires as these vicinities had sports betting outlets. Various branches of sports lottery companies operating in the country visited, where the researcher administered questionnaires to the subscribers of the various betting companies.

3.7 Data Processing and Analysis

Upon completion of the survey, the researcher coded the responses of the respondents via SPSS v20. From the coded responses, the researcher generated frequencies, percentages and tables which were employed in the descriptive analysis. The binary logistic model was estimated using STATA 12.0.

3.8 Model Specification

The demand for a commodity depends on other factors apart from the price as already stated in chapter two of the study. A mathematical representation of the demand equation was modeled as;

$$Y = f(P, D, SE, G) \dots\dots\dots(1)$$

Where Y= demand for sports lottery in Ghana, P= price, D= demographic factors, SE= socioeconomic factors, G= features of the sports lottery industry

A Binary Logistic regression model was used in the study to determine the factors that are likely to influence the demand of individuals when it comes to sports lottery, given that the dependent variable (i.e. engage in sports lottery) is dichotomous.

A binary logistic regression was chosen because the dependent variable (i.e. whether one engages in sports lottery) is a dichotomous variable. Although the logistic regression model is just like the linear regression model, it is better suited for models that have their dependent variables as being dichotomous. The probit model (which is also another model of binary outcomes) is very much like the logistic regression model; the only difference is that whereas the logistic regression model measures the relationship between the categorical dependent variable and one or more independent

variables by estimating probabilities using a logistic function (i.e. a cumulative logistic distribution), the probit model uses a normal cumulative distribution function.

The logistic regression is based on the utility theory and typically estimated by the maximum likelihood method (Horowitz and Savin, 2001). This method is an iterative estimation technique that is particularly useful for equations that are non-linear in the coefficients. The logistic model is very popular in many fields, notable amongst which are the fields of Medicine and Economics. Several works have employed this model in their studies, amongst which include: Dutta et al. (2012), Ogden et al. (2006), Awunyo-Vitor et al. (2013), Partin et al. (1993) and Rahmatullah Imon et al. (2012).

The demand for sports lottery (Y_i) is a function of several variables and so can be written as:

$$Y_i = \beta_1 + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + u_i \dots \dots \dots (2)$$

In logistic regression, the dependent variable is a *log odd* or *logit*, which is the natural log of the odds. The dependent variable (Y_i) is therefore transformed as follows:

$$\frac{P_i}{1 - P_i} = Odds_i \dots \dots \dots (3)$$

where, $odds_i$ is defined as the ratio of the probability of the event occurring to its nonoccurrence. In this context, it would refer to the ratio of the probability of one engaging in sports lottery to one not engaging in sports lottery.

The natural log of the odds ratio is taken, hence calculating the logit L_i as:

$$L_i = \ln \left(\frac{P_i}{1 - P_i} \right) = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \dots + \beta_k X_{ik} + u_{ki} \quad (4)$$

(4) The probability that one would engage in sports lottery or not is a function of several explanatory variables. In using the logistic function to explain this probability, we have:

$$P_i = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \dots + \beta_k X_{ik} + u_{ki})}} \quad (5)$$

Equation 4 (which shows the probability that one would engage in sports lottery) constrains P_i to take on the values, 0 and 1 because as the explanatory variables become very large (approaches ∞) then $P_i=1$, and as they become very small (approaches $-\infty$), then $P_i=0$.

The probability that one would not engage in sports lottery is given as:

$$1 - P_i = \frac{e^{-(\beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \dots + \beta_k X_{ik} + u_{ki})}}{1 + e^{-(\beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \dots + \beta_k X_{ik} + u_{ki})}} \quad (6)$$

Combining equation 5 and 6 produces:

$$\frac{P_i}{1 - P_i} = \frac{1}{e^{-(\beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \dots + \beta_k X_{ik} + u_{ki})}} = e^{(\beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \dots + \beta_k X_{ik} + u_{ki})} \quad (7)$$

Taking the natural logarithm of both sides of equation 7 results in:

$$\ln \frac{P_i}{1-P_i} = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + u_{kii} \quad (8)$$

$(1-P_i)$ which gives us the odds ratio, described in equation 2. P_i is not linearly related to the explanatory variables, therefore the interpretation of the various β coefficients are not straightforward like that of the OLS model. In logistic regressions, the signs of the coefficients are reported together with either the marginal effects or the odds ratios. The magnitudes of the coefficients are not P_i used in the interpretations. The various β 's measure the change in $\ln \frac{P_i}{1-P_i}$ for a unit change in $(1-P_i)$

any of the explanatory variables (i.e. the X 's). The logistic regression model is preferred because the estimation procedure involved, automatically resolves the problem of heteroscedasticity and constrains the conditional probability of deciding to engage in sports lottery or not, in between 0 and 1. The model is also simple as compared to the probit model, as it provides mathematical convenience (Asteriou and Hall, 2011; Rodriguez, 2007).

3.9 Estimation

Y_i (i.e. a binary variable) was used to represent the observed response of each sample population (i th observation). Therefore, $Y_i = 1$ for engage in sports lottery and $Y_i = 0$ for no sports lottery. It follows that:

$$Y_i = g(X_i)$$

Where 'g' is the functional form of the model. This shows the relationship between sports lottery and the various factors that determine its demand.

$$Y_i = \beta_0 + \beta_1 P_i + \beta_2 X_1 + \beta_3 X_2 + \beta_4 X_3 + \beta_5 X_4 + \beta_6 X_5 + \beta_7 X_6 + \beta_8 X_7 + \beta_9 X_8 + \beta_{10} X_9 + \beta_{11} X_{10} + \beta_{12} X_{11} + \beta_{13} X_{12} + \beta_{14} X_{13} + \beta_{15} X_{14} + \epsilon_i$$

$$\beta_0 = P_i$$

Where:

Y_i = Qualitative dependent variable: 1 if engages in sports lottery; 0 if does not engage in sports lottery

P_i = represents the probability of one engaging in sports lottery

X_1 = Price

X_2 = Dummy variable (1 if male, 0 if otherwise)

X_3 = Dummy variable (1 if polytechnic education, 0 if otherwise)

X_4 = Dummy variable (1 if 1st degree, 0 if otherwise)

X_5 = Dummy variable (1 if 2nd degree, 0 if otherwise)

X_6 = Dummy variable (1 if age below 20, 0 if otherwise)

X_7 = Dummy variable (1 if age 21-40, 0 if otherwise)

X_8 = Dummy variable (1 if married, 0 if otherwise)

X_9 = Dummy variable (1 if employed, 0 if otherwise)

X_{10} = Dummy variable (1 if earns below GH¢ 500, 0 if otherwise)

X_{11} = Dummy variable (1 if earns GH¢ 500-999, 0 if otherwise)

X_{12} = Dummy variable (1 if earns GH¢ 1000-2999, 0 if otherwise)

X_{13} = Dummy variable (1 if earns GH¢ 3000-4999, 0 if otherwise) X_{14} =

Dummy variable (1 if won before, 0 if otherwise)

ϵ_i = Stochastic error term.

3.10 A Priori Expectations of Parameters

Based on findings from related studies, the following a priori expectations were made:

Price: The study expects the coefficient of the price of staking a bet to be negative. This would mean that the smaller the price of a bet, the more likely it will be for one to engage in sports betting (Perez, 2010).

Sex: It is expected that the coefficient of male be positive. Since sports lottery is a male-dominated activity, a positive coefficient would give credence to the fact that more males are prone to engage in sports lottery, instead of females (Humphreys and Perez, 2010; Matheson and Grote, 2011; Zhou and Zhang 2015).

Educational level: It is expected that the coefficient of education be negative. This would show that the more educational heights one attains, the less likely he/she is to engage in sports betting and vice versa (Matheson and Grote, 2011; Beckert and Lutter, 2013; Ariyabuddhiphongs, 2011).

Age: It is expected that the coefficient of age be negative. This would mean that the older one gets, the less likely he/she is to engage in sports betting. Sports lottery generally is a game for the

younger generation as shown in other studies (Humphreys and Perez, 2010; Beckert and Lutter, 2013; Zhou and Zhang, 2015).

Marital Status: The coefficient for one who is married is expected to be negative, signifying that one who is single is more likely to engage in sports betting than one who is married (Mao, 2013; Mao et al. 2015).

Employment Status: It is expected that the coefficient for one who is employed be negative. This would mean that the one who is unemployed is more prone to engage in sports betting (Beckert and Lutter, 2013).

Monthly Income: The coefficient of income is expected to be negative. This would imply that those who earn less are more likely to engage in sports betting; the more income one earns, the less likely he/she is to engage in sports betting (Matheson and Grote, 2011; Beckert and Lutter, 2013).

Likelihood of winning a bet before: The coefficient for whether a person has won a bet before is expected to be positive. This would mean that the more a person wins a bet, the more likely he/she is to engage in sports lottery (Mao 2015).

3.11 Ethical Consideration

The researcher obtained a letter of introduction from the Department of Economics, KNUST, which was shown to the management of the various sports lottery outlets in order to seek their consent to conduct the survey. With the exception of the NLA (which happens to be a public company), the names of the various sports lottery companies visited were not explicitly stated in

the study in order not to violate the privacy of these companies. The caption BC which means 'Betting Company' was used to represent the various betting companies.

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CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter discusses the results in line with the objectives outlined in chapter one of the study. The first section of this chapter looks at the general characteristics of all respondents as well as the characteristics of sports lottery subscribers; the second section looks at the effects of these characteristics on the demand for sports lottery by avenue of the binary logistic model employed in the study. The third section looks at the types of betting companies subscribers patronize. The final part of this section considers the rules and regulations that guide the operation of sports lottery in Ghana.

4.2 Characteristics of Respondents

This section presents the demographic and socio-economic features of the respondents employed in the study. The key demographic and socio-economic features examined include sex, age, educational levels, marital status, employment status and monthly income levels of the respondents. Table 4.1 gives the breakdown of the characteristics of the respondents.

A total of two hundred and sixty-five respondents (265) were engaged in sports lottery, out of which two hundred and fifty-five (255) were male and ten (10) were female, giving credence to the fact that sports lottery is a male dominated game. Respondents not engaged in the activity of sports lottery were one hundred and thirty-five (135), out of which one hundred and two (102) were males, and thirty-three (33) were females. Respondents not engaged in sports lottery cited

the following reasons for their non-involvement in the activity: some simply had no reason at all, some were simply not interested, others feared addiction whilst another section felt that it was too risky; the rest cited religious beliefs as their reason for not engaging in the activity.

Out of the numbers that engage in sports lottery, 19 (7.2%) respondents were below the age of twenty; 244 (92%) fell within the range of 21-40 (0.8%), and only 2 were in the range of 41-60, showing that younger males are more likely to engage in sports lottery as compared with the older generation. Majority of the respondents (67.2%) engaged in sports lottery were first degree holders. Although it was expected that respondents engaged in sports lottery in Ghana would have had lower levels of education, this result was not surprising as Humphreys and Perez (2010) realized that sports lottery subscribers in Canada and Spain tend to have more education, with Spanish sports bettors having the highest college attendance rate. Mao et al. (2015) also showed that individuals with higher educational levels on the average were more involved in sports lottery than those with lower educational levels. This would imply that the activity of sports lottery is gaining more popularity amongst those with higher levels of education.

Table 4.1 Cross Tabulation of Demographic and Socio-economic Characteristics of Respondents

Characteristics	Subscribers		Non-Subscribers		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Sex						
Male	255	96.2	102	75.6	357	89.2
Female	10	3.8	33	24.4	43	10.8
Age						
Below 20	19	7.2	6	4.4	25	6.25
21-40	244	92.1	128	94.8	372	93
41-60	2	0.8	1	0.7	3	0.75
Educational Status						
None	2	0.8	1	0.7	3	0.75
Primary to SHS	46	17.4	9	6.7	55	13.75
Polytechnic	20	7.5	7	5.2	27	6.75
Teacher Training	0	0	2	1.5	2	0.5
First Degree	178	67.2	93	68.9	271	67.75
Second Degree	18	6.8	23	17	41	10.25
PhD	1	0.4	0	0	1	0.25
Marital Status						
Single	246	92.8	122	90.4	368	92
Married	19	7.1	13	9.6	32	8
Employment Status						
Employed	123	46.4	79	58.5	202	50.5
Unemployed	142	53.6	56	41.5	198	49.5
Monthly income						
No income	141	53.2	56	41.5	197	49.25
Below GH¢ 500	54	20.4	23	17	77	19.25
GH¢ 500- GH¢ 999	33	12.5	23	17	56	14
GH¢ 1000- GH¢ 2999	29	10.9	25	18.5	54	13.5
GH¢ 3000- GH¢ 4999	7	2.6	3	2.2	10	2.5
Above GH¢ 5000	1	0.4	5	3.7	6	1.5

Source: Field Survey, 2016

Out of the 265 respondents that engaged in sports lottery, 246 (representing 92.8%), were single meaning that a married person was less likely to indulge in the activity of sports lottery as compared to one that was single. Ninety-two percent (92%) of the respondents engaged in sports lottery were within the age bracket of 21 to 40. The results of Table 4.2 further show that the greater percentage of subscribers engaged in sports lottery are unemployed. 53.6% of sports lottery subscribers are unemployed, whereas 46.4% are employed. Follow-up questions posed to respondents revealed that most of them could not find jobs hence their resorting to sports lottery, which provides them with the hope of earning some amount of income. Fifty four (20.4%) of the respondents engaged in sports lottery had monthly incomes below GH¢ 500.00; thirty-three (12.5%) had incomes between GH¢ 500.00 and GH¢ 999.00; 10.9% had incomes between GH¢ 1000.00 to GH¢ 2999.00; 2.6% had incomes between GH¢ 3000.00 and GH¢ 4999.00; 0.4% had incomes above GH¢ 5000.00.

4.2.1 Type of Sport

Respondents indicated the various types of sport they betted upon, with soccer (also referred to as football amongst Ghanaians) being the sport most betted upon. 257 (representing 96.9%) respondents indicated that they usually placed bets on football matches. 25 (representing 9.4%) placed bets on basketball matches. 9 (representing 3.4%) respondents placed bets on horse racing events, whilst 7 (representing 2.6%) placed bets on boxing events. 4 respondents (representing 1.5%) placed bets on cricket matches, with 21 respondents (representing 7.9%) placing bets on other less popular games such as ice hockey, volleyball and tennis. Soccer is a very popular sport amongst Ghanaians, and with matches being played every week, that could be the reason for which it is the dominant sport betted upon.

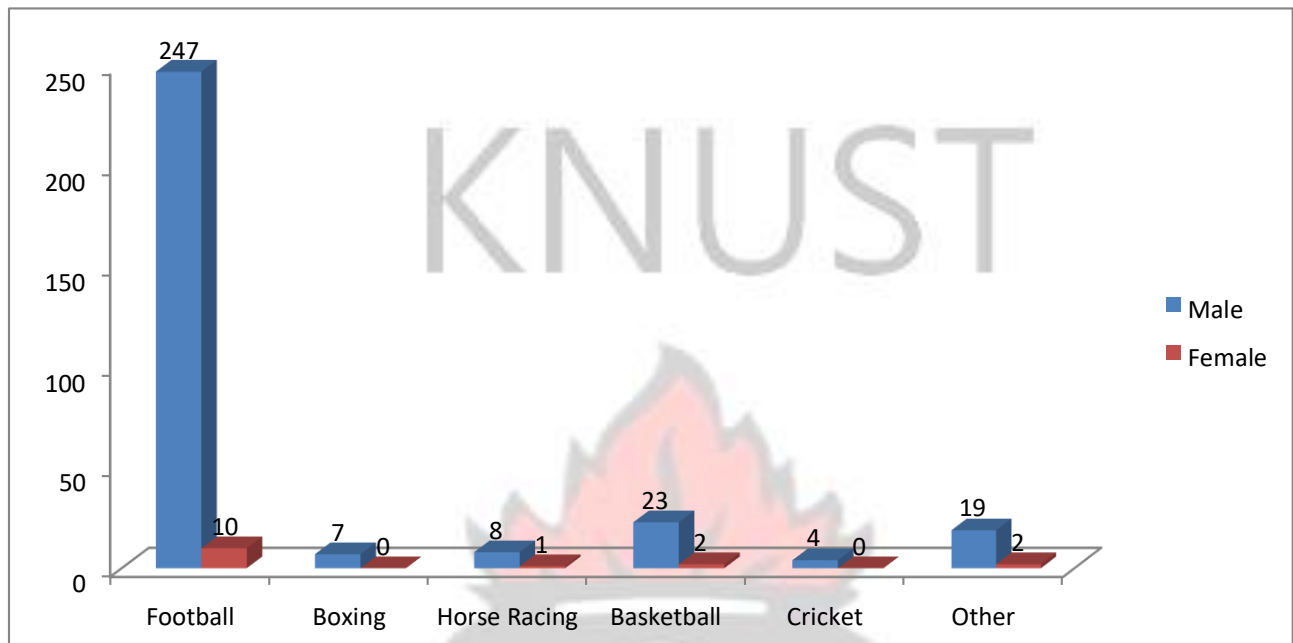


Figure 4.1 Distribution of Sport Choice According to Sex

Source: Field Survey, 2016

Figure 4.1 shows the distribution of sport type according to sex. Out of the two hundred and sixty-five (265) respondents engaged in sports lottery, two hundred and fifty-seven (257) betted on football, ten (10) were female whilst two hundred and forty-seven (247) were male. For boxing, no female expressed interest in betting upon it; seven (7) males betted on boxing events. Nine (9) respondents betted on horse racing events out of which one (1) was female. Twenty-five (25) respondents betted on basketball, out of which two (2) were females. Of the four (4) respondents that betted on cricket, none was female. Nineteen (19) males and two (2) females betted upon the other less popular games.

4.2.2 Reasons for Engaging in Sports Lottery

Respondents gave three reasons for which they engaged in sports lottery; some engaged in the activity mainly because of the need for income. Some engaged in it purposely for entertainment,

with the rest engaging in it for investment purposes. Some respondents indicated two out of the three reasons and some indicated all three reasons as being the motivating factor for their engagement in sports lottery.

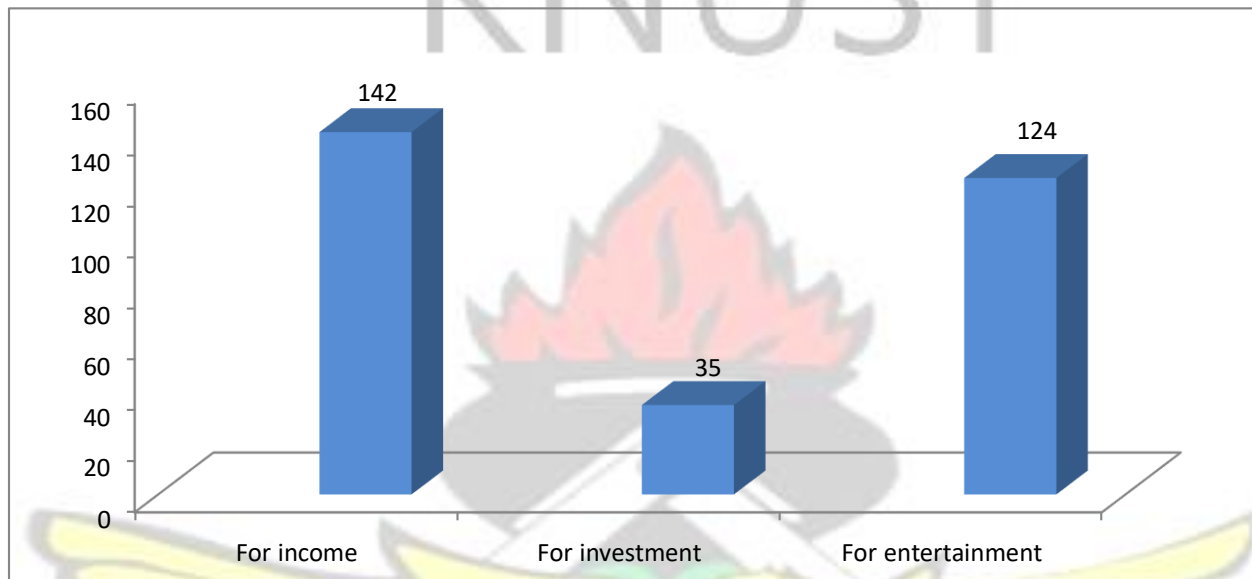


Figure 4.2 Reasons for Engaging in Sports Lottery Source: Field Survey, 2016.

Figure 4.2 gives the various responses of respondents when asked about the reasons for which they engage in sports lottery; the responses however were not mutually exclusive. Of the 265 respondents that engage in betting, 142 (representing 53.6%) stated that they engage in sports lottery in order to supplement their income. 35 (representing 13.2%) indicated that they use the proceeds from sports lottery for investment purposes, hence their reason for engaging in the activity. 124 (representing 46.8%) indicated that sports lottery is a source of entertainment for them, hence their reason for engaging it.

Table 4.2 Regularity of Placing Bets

How often do you engage in the activity	Frequency	Percentage
Daily	28	10.6
Weekly	135	50.1
Monthly	68	25.7
Yearly	9	3.4
Rarely	25	9.4
Total	265	100

Source: Field Survey, 2016.

Respondents were asked on how often they placed bets. Twenty-eight (28) respondents (representing 10.6%) indicated that placed bets on a daily basis. 135 (representing 50.1%) placed bets on a weekly basis. 68 (representing 25.7%) placed bets monthly; 9 (representing 3.4%) placed bets on a yearly basis, with the remaining 25 (representing 9.4%) rarely placing bets. The incidence of majority of respondents placing bets on a weekly basis, could be attributed to the fact that matches are played every week.

4.2.3 Amounts Placed on Bets

Respondents were asked to indicate the amounts of money they usually placed on bets. The least amount betted was GH¢ 0.50p and the highest amount placed was GH¢ 1000.00. This wide disparity in the amounts placed on bets is an indicator of the various levels of risk one can handle. A risk averse individual would be cautious and so place small amounts on bets. In the event that he/she does not win, he/she is not affected much by the loss. A risk lover on the hand, would stake

high amounts with the prospect of winning large sums of money and is not affected much in the event of a loss.

Table 4.3 Amounts Placed on a bet

		Least amount placed on a bet	Highest amount placed on a bet
N	Subscribers	265	111
Mean		10.2547	80.3063
Median		5	30
Mode		2	10
Std. Deviation		18.38303	158.7937
Minimum		0.5	1
Maximum		100	1000

Source: Field Survey, 2016

Table 4.3 gives a brief description on the amounts of money that individuals place on a bet. The mean value of GH¢ 10.00 shows that averagely, a subscriber of sports lottery stakes a minimum amount of GH¢ 10.00. The standard deviation of 18.38 shows some amount of dispersion from the mean. For the column showing the highest amount of money placed on a bet, the mean value of 80.31 shows that averagely, a sports bettor places a maximum amount of GH¢ 80.00 on a single bet. The standard deviation shows a wide variation as the minimum value is GH¢ 1.00 and the maximum value is GH¢ 1000.00

4.3 Results of the Determinants of Demand for Sports Lottery in Ghana

This section looks at how the characteristics of subscribers of sports lottery influence their demand for sports lottery in Ghana. This analysis is done by means of a Chi-square tests and a binary logistic regression model employed in the study.

4.3.1 Chi-square Test of Independence for Explanatory Variables

The researcher run a chi-square test of independence to determine whether there was any linear relationship between the dependent variable and each of the explanatory variables. A hypothesis was formulated to test the relationship.

H_0 : There is no linear relationship between the dependent and explanatory variables.

H_1 : There is a linear relationship between the dependent and explanatory variables.

The null hypothesis is rejected when the p-value is less than the 5% error level (i.e. $p\text{-value} < 0.05$) and it is not rejected when the p-value exceeds the 5% error level (i.e. $p\text{-value} > 0.05$). The results of the chi-square test of independence are presented in Table 4.4

Table 4.4 Chi-square Test of Independence

Explanatory variables	p-value	Decision	Interpretation

Sex	0.000<0.05	H ₀ is rejected	There is a linear relationship between sex and the demand for sports lottery
Age	0.567>0.05	H ₀ is accepted	There is no linear relationship between age and the demand for sports lottery
Educational level	0.005<0.05	H ₀ is rejected	There is a linear relationship between education and the demand for sports lottery
Marital Status	0.391>0.05	H ₀ is accepted	There is no linear relationship between marital status and the demand for sports lottery
Employment Status	0.020<0.05	H ₀ is rejected	There is a linear relationship between employment status and the demand for sports lottery
Monthly Earnings	0.011<0.05	H ₀ is rejected	There is a linear relationship between monthly income and the demand for sports lottery
Price	0.000<0.05	H ₀ is rejected	There is a linear relationship between price and the demand for sports lottery
Won Before	0.000<0.05	H ₀ is rejected	There is a linear relationship between winning before and the demand for sports lottery

Source: Field Survey, 2016

The results show that there is a linear relationship between the following variables and the demand for sports: sex, educational level, employment status, monthly income, price and whether a person has won a bet before. There is no linear relationship between age and marital status; however natural logarithms and squares cannot be applied to these variables due to their categorical nature.

Table 4.5 The Demand for Sports Lottery in Ghana (Binary Logistic Regression)

Dependent Variable: Engage in Sports Betting					
Variables	Coefficient	Std. Err.	Z	P-value	Marginal Effects (dy/dx)

Constant	-13.85396	3.456492	-4.01	0.000	-
Price	5.888589	1.79565	3.28	0.001	0.0145969
Sex (Female)					
Male	6.458384	1.23045	5.25	0.000	0.4412921
Education (SHS and below)					
Polytechnic	0.5631415	1.561544	0.36	0.718	0.0011097
First Degree	-0.0632839	0.908764	-0.07	0.944	-0.0001552
Second Degree	0.311129	1.449142	0.21	0.830	0.0006846
Age (Above 40)					
Age_Below20	-1.592544	1.134134	-1.4	0.160	-0.0087153
Age_21_to_40	-2.519751	1.207421	-2.09	0.037	-0.0027238
Marital Status (Single)					
Married	-0.7443764	0.867075	-0.86	0.391	-0.0025751
(Employed)					
Unemployed	6.782716	2.730996	2.48	0.013	0.0666798
(Earn above GH¢ 5000)					
Earn below GH¢500	6.311368	1.774737	3.56	0.000	0.0083104
Earn GH¢500 to GH¢999	7.25698	3.068555	2.36	0.018	0.006829
Earn GH¢1000 to GH¢2999	5.579486	2.077741	2.69	0.007	0.0052431
Earn GH¢3000 to GH¢4999	8.167185	2.338846	3.49	0.000	0.0030453
(Never Won)					
Won Before	6.018824	1.495808	4.02	0.000	0.0722894
Number of observations = 400		Prob > chi2		= 0.0000	
Wald chi2 (14) = 58.77		Pseudo R2		= 0.9107	
Log pseudolikelihood = -22.850412					

Note: Reference categories are in parentheses

The overall test of significance of all the variables employed in the model are statistically significant since the Likelihood Ratio of the model is $0.0000 < 0.05$. The implication of this is that collectively, the variables have a significant statistical impact on the demand for sports lottery in Ghana, although some variables are not statistically significant individually.

4.3.1.1 Price

From Table 4.5, the coefficient of price is positive and significant at the 5% error level. The null hypothesis for the first hypothesis is therefore rejected and the alternative hypothesis accepted. This result, although not in line with the a priori expectations, is true since sports lottery involves risk; the higher the amount of money a person stakes, the higher his/her returns if he/she wins the bet. In sports lottery, a person actually determines the price he/she would want to pay. In view of this, the positive price coefficient shows that the higher a person stakes, the more likely he/she is to obtain higher returns and hence his/her decision to engage in sports lottery. This interpretation is buttressed by the expected utility theory employed in chapter two of this study, which justifies why an individual would want to consume a risky commodity like lottery where one is not certain of his/her chances of winning.

Looking at Figure 4.2, 142 respondents, (representing 53.6%) of sports lottery subscribers indicated that their main aim for engaging in sports lottery is to obtain income; the average sports bettor is motivated by the fact that he/she could make more money and as such, would not mind the risk involved. A person would engage in sports lottery so long as his expected utility is higher than the utility of his expected income. The marginal effect of the price variable shows that a higher price increases the probability of one engaging in sports lottery by 1.45%. Perez (2010) considered the effective price (the difference between the nominal price and the expected return) and realized that it was inversely related to the demand for lottery tickets. Matheson and Grote (2011) also found an inverse relationship between the effective price and the demand for lottery sales.

4.3.1.2 Age

The coefficients for the age levels, below 20 and 21-40 are negative. The age group 21-40 is however significant at the 5% error level. The null hypothesis of the second hypothesis is rejected and the alternative hypothesis, accepted. This shows that the more one grows, the less likely he/she is to engage in sports lottery. This finding is consistent with the works of Beckert and Lutter (2013), Humphreys and Perez (2010) and Zhou and Zhang (2015), who also state that the likelihood that an individual bets on sports, falls with age. The demand for sports lottery in Ghana is therefore patronized by the younger generation within the age bracket of 21-40. The marginal effect for the age category 21-40, shows that the likelihood that one beyond the age of 40 would engage in sports lottery reduces by 0.2%.

4.3.1.3 Sex

The coefficient for males is positive and significant at the 5% error level which shows that males are more prone to engage in the activity of sports lottery as compared to females. The null hypothesis of the third hypothesis is rejected and the alternative hypothesis accepted. The marginal effect shows that being male increases the probability of engaging in sports lottery by 44%. This finding is consistent with the works of Ignatin (1984), Humphreys and Perez (2010) and Zhou and Zhang (2015) who state that sports lottery is a male-dominated activity.

4.3.1.4 Monthly Income

The coefficients for the various income levels below GH¢ 5000.00 are positive and statistically significant at the 5% error level. This means that anyone with income below GH¢ 5000.00 is more likely to engage in sports lottery, whereas anyone with income beyond GH¢ 5000.00 is not likely to engage in sports lottery. This shows that an income below GH¢ 5000.00 is perceived as low.

The marginal effects of the various income categories below GH¢ 5000.00 show that a low income level would increase the probability of one engaging in sports lottery by 0.8%, 0.6%, 0.5% and 0.3% respectively. This finding is however not consistent with the findings of Mao (2013), Mao et al. (2015), Perez (2010) and Humphreys and Perez (2010) who showed from their works that those who live in provinces with high income levels have a higher demand for sports lottery. It is however consistent with the findings of Beckert and Lutter (2013) who show that income and status frustration have a significant effect on the demand for sports lottery; the less the income, the greater the likelihood of engaging in sports lottery. The null hypothesis of the fourth hypothesis in this study is therefore rejected and the alternative hypothesis accepted, signifying that monthly income has a significant effect on the demand for sports lottery in Ghana.

4.3.1.5 Educational Level

The coefficients for polytechnic and second degree education are positive whereas that of first degree education is negative. These are however not significant at the 5% error level, showing that educational level does not really have a significant effect on the demand for sports lottery in Ghana. The null hypothesis of the fifth hypothesis is therefore not rejected. In the works of Humphrey and Perez (2010), Mao et al. (2013) and Beckert and Lutter (2013), they are however able to show that educational levels have a significant effect on the demand for sports lottery. In the case of Beckert and Lutter, it has a negative impact, whereas in the case of Humphreys and Perez (2010) and Mao et al. (2013), it has a positive effect (i.e. sports lottery is patronized more by those highly educated). Mao et al. (2015) also show that education has a significant positive impact on the demand for sports lottery.

4.3.1.6 Employment Status

The coefficient for unemployed is positive and statistically significant at the 5% error level; thereby leading to the rejection of the null hypothesis and the acceptance of the alternative hypothesis of the sixth hypothesis that was set in chapter one of this study. This means that the unemployed are more prone to engage in sports lottery. This result could be attributed to the fact that the unemployed has more time on his hands and so can afford to engage in sports lottery. Secondly, the desire to receive income could be another contributory factor for which reason an unemployed person would want to engage in sports lottery. This finding however contradicts the work of Humphreys and Perez (2010) who show that sports bettors are usually young males who are employed. The finding however concurs with the findings of Beckert and Lutter (2013) who show that status frustration is a significant factor to the demand for sports lottery; an unemployed person is frustrated with his present state and therefore needs money to upgrade his status and since sports lottery provides the hope of receiving some amount of income, such people are more likely to engage in the activity. The marginal effect shows that being unemployed increases the likelihood that one would engage in sports lottery by 6.7%.

4.3.1.7 Marital Status

The coefficient for married is negative but not statistically significant at the 5% error level. This shows that one's being married does not have an effect on his choice to engage in sports lottery. Humphreys and Perez (2010) were also unable to establish any strong association between marital status and the demand for sports. With the coefficient of married being negative, it means that it is more likely for a single person to engage in sports lottery as compared with a married person. In the work of Humphreys and Perez (2010), they showed that married men were more likely to demand for sports lottery as compared to their single counterparts. Mao (2013) and Mao et al.

(2015) were of the view that those with social burdens were more likely to engage in sports lottery, meaning that a married person (i.e. male) was more likely to engage in sports lottery as he would have additional responsibilities. The null hypothesis of the seventh hypothesis is therefore not rejected; hence marital status does not have a significant effect on the demand for sports lottery in Ghana.

4.3.1.8 Likelihood that One has Won Before

The coefficient for one who has won a bet before is positive and statistically significant at the 5% error level. This means that the degree to which a person wins, influences his/choice to engage in sports lottery. This is not surprising since the ability of one to win a bet boosts their confidence and gives them greater assurances of more wins in the future. The more a person wins a bet, the more likely he/she is to continue betting. The marginal effect shows that winning a bet increases the probability of one engaging in sports lottery by 7.2%. The null hypothesis of the eighth hypothesis is therefore rejected and the alternative hypothesis accepted. This finding is consistent with that of Mao et al. (2015) who also conclude that the ease with which a person wins, positively influences his/her demand for sports lottery.

4.4 Types of Sports Betting Companies Patronized in Ghana

This section, in fulfilling the third objective of this study, looks at the types of betting companies subscribers in Ghana patronize, coupled with the reasons behind their choices.

From the survey, six main betting companies were patronized by respondents, namely: BC1, BC2, BC3, BC4, Soccer Cash (NLA) and BC5. There were other betting companies which were in the minority; these were labeled as others.

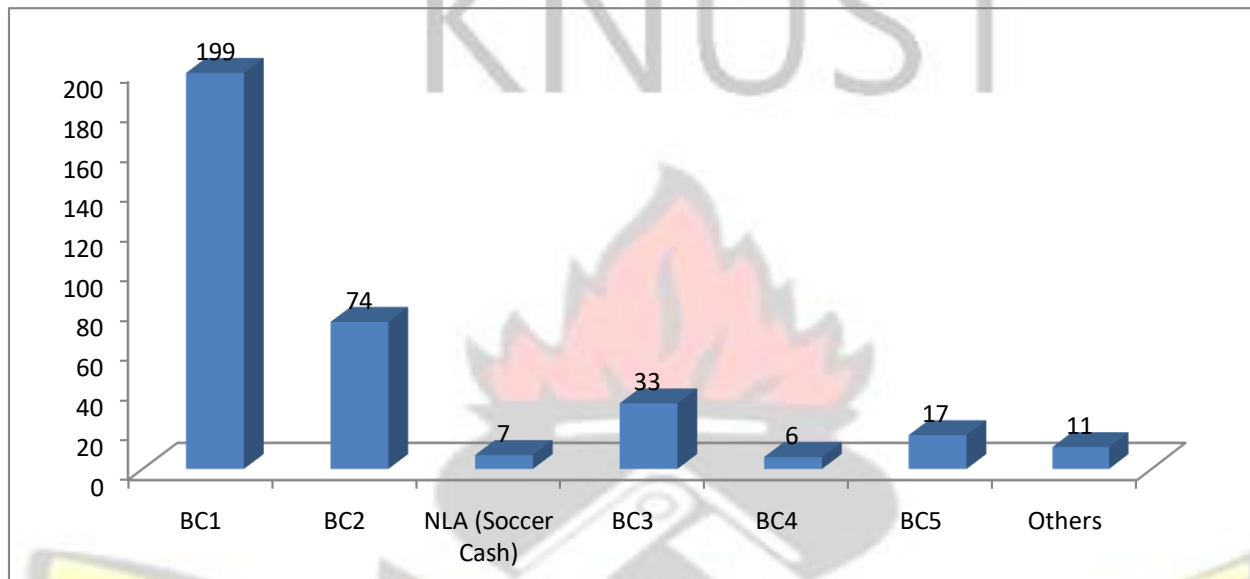


Figure 4.3 Distribution of Betting Companies

Source: Field Survey, 2016

Figure 4.3 shows the distribution of respondents according to the various betting companies. One hundred and ninety-nine (199) of the respondents (representing 75.1%) who engage in sports lottery patronized BC1. 74 (representing 27.9%) patronized BC2. 7 (2.6%) patronised Soccer Cash, 33 (12.4%) patronised BC3, 6 (2.3%) patronised BC4, 17 (6.4%) patronised BC5 and 11 (4.2%) patronised other less popular betting companies.

Table 4.6 Reasons for Choice of Betting Companies

	Proximity	Popular	Better Odds	Preference	Total
BC1	21	136	127	27	311
BC2	22	41	38	16	117

Soccer Cash	0	5	4	5	14
BC3	2	12	20	22	56
BC4	0	4	3	3	10
BC5	7	1	6	7	21
Others	2	3	4	9	18
Total	54	202	202	89	547

Source: Field Survey, 2016.

The above table shows the various betting companies and the number of respondents that patronize each company, together with their reasons for the choice of betting company. The responses are not mutually exclusive. 136 of the respondents (representing 51.3%) chose BC1 because of its popularity and 127 (representing 47.9%) also chose it because they offer better odds. From the responses, it was realized that BC1 was the most patronized. Further interviews with the respondents revealed that BC1 does a lot of radio and television advertisements, and so their popularity could be attributed to that. In addition, respondents were of the view that BC1 offered more options from which subscribers could choose from, as well as higher odds, which increased the amounts of money they were likely to win. Whereas betting companies like BC2 had attendants who placed the bets for the subscribers, BC1 allowed respondents to place their own bets without having to do it through an attendant, an option which was more appealing to subscribers of BC1. Respondents who patronized the services of BC3 also indicated that BC3 provides them with the option of accessing monies won via ATM's which makes it more convenient for them to place bets with BC3.

4.5 Rules and Regulations Guiding Sports Lottery in Ghana

This section of the study looks at how sports lottery companies are regulated in Ghana.

4.5.1 Regulatory Body of Sports Lottery in Ghana

In an interview with the Managing director of the Kumasi branch of the NLA, the researcher gathered that sports lottery in Ghana is rather regulated by the National Gaming Commission (NGC) and not by the NLA. The NGC, which was established by the Gaming Act (Act 721), has the authority to provide licenses for the start of sports betting companies. The Act states that a game “...includes a game other than Lotto in which participants in an anticipation of winning a reward on the results of the game which depends on luck and which cannot be determined before the end of the game, pay money for the right to participate in the game.” As at April 2015, there were 12 sports betting companies with each company having many branches in various parts of the country. These companies provide revenue to the NGC mainly through the payments they make for their gaming licenses and license renewals (Daily Graphic, 2015). In addition to the payments they make to the NGC, they are also taxed, and these tax payments are accrued to the Ghana Revenue Authority (GRA). It is however unfortunate that there seems to be a conflict of interest as the roles of NLA and NGC appear to clash. Sports lottery is a game of chance, and per the National Lotto Act 2006 (i.e. Act 722), “....A person other than the Authority shall not operate any form of lottery...The Authority may, in consultation with the Minister, operate any other game of chance or enter into collaboration, partnership or joint venture with any person, society, association or corporate entity, to operate a game of chance in accordance with existing laws...” This clash in roles has resulted in both bodies, filing law suits against each other and engaging in several legal battles.

The study further gathered from the interview that a number of lotto kiosks in the country are operating illegally as they are not registered under the NLA and as such, evade taxation. These illegal operators are contravening the law guiding lottery in this country as the NLA has the sole prerogative to operate lotteries in the country. This may be part of the reason for which the researcher had difficulty in locating lotto kiosks that provided services for Soccer Cash. These illegal lotto kiosk operators (also known as the banker to banker operators), pay their winners directly, whereas NLA registered lotto vendors pay their winners through the banks where a certain portion of their winning bonuses are deducted through tax payments. In view of this, most lottery subscribers are drawn towards these illegal operators and this has greatly hampered the chances of the NLA and the state in maximizing profit as these illegal operators do not provide services for Soccer Cash.

The researcher visited twenty lotto kiosks; none of them provided services for Soccer Cash. Two out of the twenty, representing 10%, were formerly providing the service, but have recently discontinued due to low patronage. This shows that the NLA's product has not gained popularity amongst the vendors let alone the Ghanaian populace.

CHAPTER FIVE SUMMARY OF MAJOR FINDINGS AND RECOMMENDATIONS.

5.1 Introduction

This chapter summarizes the major findings from the study and draws conclusions from the findings to state possible recommendations which could assist policy makers in taking and implementing decisions for the country.

5.2 Summary of Findings

The study sought to determine the factors that influence the demand for sports lottery in Ghana by setting out the following objectives: to find out the characteristics of subscribers of sports lottery and how these characteristics influence their demand for sports lottery; to find out which sports betting companies Ghanaians patronize as well as the kind of regulations that guide sports lottery in Ghana. A binary logistic regression was run to accomplish the first two objectives of determining the characteristics of sports lottery subscribers and how these characteristics influence their demand.

Out of the four hundred respondents sampled, 66.3% were engaged in sports lottery whilst 33.8% were not engaged in the activity. Two hundred and fifty-five (255) males, making up 96.2% of the sample, and ten (10) females, making up 3.8%, engaged in sports lottery. Approximately fifty-seven percent (i.e. 53.6%) of those engaged in sports lottery were unemployed; 92% of the respondents were within the age range of 21 to 40; 67.2% of respondents engaged in sports lottery had a first degree education and 92.8% of sports bettors were single. BC1 was discovered to be the most patronized sports lottery company in Ghana.

The study found price, age level (21-40), sex, employment status, monthly income and the likelihood that one has won a bet before, as significant factors that influence the demand for sports lottery in Ghana. Marital status and educational levels were not found to have any significant impact on the demand for sports lottery in Ghana.

The study also discovered that sports lottery in Ghana is regulated by the National Gaming Commission (NGC) although the National Lottery Authority (NLA) has the mandate to run sports lotteries in the country. This has resulted in ambiguities in the roles both institutions are supposed to play in the arena of sports lottery in Ghana.

5.3 Conclusion

The study confirmed that sports lottery is indeed a male dominated game that is popular amongst the younger generation.

The study found out that the main determinants of sports lottery in Ghana are price, sex, age, employment status, monthly income and whether one has won a bet before.

The study found out that Ghanaian sports bettors subscribe to a number of sports lottery companies, with BC1 being the most preferred company.

The study found out that there are ambiguities in the Acts that set up the NLA and NGC which has resulted in a clash between the two lottery regulatory bodies in Ghana, thereby adversely affecting the growth of the industry.

5.4 Recommendations

From the first findings, it was realized that BC1 is the most patronized sports lottery company. The researcher would suggest that the NLA considers re-branding its version of sports lottery since the findings showed that it is one of the least patronized in the country. Modern technology

contributes to the growth of the sports lottery industry so if the NLA would take advantage of modern technology and upgrade from its current manual system, the Authority would accrue a lot of revenue and thereby fulfill its mandate of promoting development through games.

The findings showed that graduate unemployment is still a persistent and chronic problem that must be given serious attention, since majority of the 53.6% sports bettors that were reported as unemployed, were first degree holders. Although the present IMF conditionalities do not permit the government to enroll new employees into the public sector, the researcher would want to suggest that other stakeholders take a critical look at this problem and find lasting solutions it.

The study from its last finding, would want to suggest that the roles of the two governing bodies (i.e. NLA and NGC) be clearly spelt out in order to clearly define their roles and improve the gaming industry as a whole as well prevent the incessant legal battles which are a waste of productive man-hours and state resources.

5.5 Limitations

The main problem encountered was the accessibility of data. With this research being the first of its kind in Ghana, the researcher could not obtain any secondary materials that spoke on the issue of Ghana. Due to the paucity of information, coupled with the improper recording of events, it was difficult obtaining enough data to ascertain the true situation on the ground. The researcher was met with hostility from some betting companies, who would not permit the researcher to distribute questionnaires to clients in their premises let alone interview the staff and management of the various companies. Some respondents were also reluctant to answer the questions posed by the researcher; this made the data collection process slow and tedious. This research being the first of

its kind, would require quite an ample length of time to be able to carry out the findings, however due to the limitations of time and money, only the Kumasi Metropolis was used. Ideally, data should be sought from different economic backgrounds across the various regions of Ghana and not only be restricted to Kumasi, however, with this being the pace setter, others may take up the task of expanding the research to the other regions of Ghana.



REFERENCES

- AAP News. (2012). Fed:Sports betting 'fastest growing' gambling. *AAP News*. Retrieved June 6, 2012, from <http://galenet.galegroup.com/>
- Ariyabuddhiphongs, V. (2011). Lottery gambling: A review. *Journal of Gambling Studies*, 27(1), 15-33.
- Asteriou D. and Hall, S.G. (2011). *Applied Econometrics*, 11th ed. (Palgrave Macmillan), p. 248257
- Awunyo-Vitor,D., Ishak, S., and Seidu, J.S. (2013). Urban Households' Willingness to Pay for Improved Solid Waste Disposal Services in Kumasi Metropolis, Ghana, *Urban Studies Research*, Vol. 2013 (2013), Article ID 659425, <http://dx.doi.org/10.1155/2013/659425>.
- BBC News (2008). African Cup of Nations. Retrieved February 27 2016 from news.bbc.co.uk/1/hi/English/static/sport/football/Africa/cup-of-nations/Kumasi.stm.
- Beckert J. and Lutter, M. (2013). Why the Poor Play the Lottery. *Sociological Approaches to Explaining Class-Based Lottery Play*. *Sociology* 47:1152-1170.
- Cambridge Advanced Learner's Dictionary and Thesaurus, Cambridge University Press. Retrieved December 8 2015, from dictionary.cambridge.org/dictionary/English/lottery.
- CSLAC. (2012). Sales Report of China Sports Lotteries 2011. Retrieved June 7, 2012, from <http://www.lottery.gov.cn/news/10018632.shtml>
- Conlisk, J. (1993). The Utility of Gambling, *Journal of Risk and Uncertainty*, 6(3), 255-275.
- Daily Graphic News (2015). Gaming Commission gets New Board. Retrieved February 15 2016, from www.graphic.com.gh/news/general-news/4175-gaming-commission-gets-newboard.html.
- De Vaus, D.A. (2002). *Surveys in Social Research* (5th ed.), London, Routledge.

- Dutta, A., Bandopadhyay, B., and Sengupta, S. (2012). Prediction of Stock Performance in the Indian Stock Market Using Logistic Regression, *International Journal of Business and Information* 7(1).
- Eisenhauer, J. G. (2005). How Prevalent are Friedman-Savage Utility Functions, *Briefing Notes in Economics*, 66.
- Friedman, M. and Savage L. J. (1948). The Utility Analysis of Choices Involving Risk. *Journal of Political Economy* 56:279-304.
- García, J., Pérez, L. and Rodríguez, P., (2008). Football pools sales: How important is a football club in the top divisions. *International Journal of Sport Finance*, 3(3): 167-176.
- Ghana News Agency (2015). National Lottery Records Revenue Growth in 2014. Retrieved February 21, 2016 from www.ghananewsagency.org/economics/national-lottery-recordsrevenue-growth-in-2014-84731.
- Ghana Statistical Service (2012). 2010 Population & Housing Census Summary Report Of Final Results.
- Ghanaweb (2015). IMF Conditionalities Create Rough Road for Government. Retrieved February 27, 2016 from mobile.ghanaweb.com/GhanaHomePage/NewsArchive?IMFconditionalities-create-rough-road-for-gov-t-355826
- Grote, K. R. and Matheson, V. A. (2011). The Economics of Lotteries: A Survey of the Literature, Working Paper.
- Hartley, R. and Farrell, L. (2002). Can Expected Utility Theory Explain Gambling? *American Economic Review*, 92 (3): 613-624
- Hawley, C. B. and Fujii, E.T., (1993-94). An Empirical Analysis of Preferences for Financial Risk: Further Evidence on the Friedman-Savage Model, *Journal of Post-Keynesian Economics*, 16(2): 197-204.

- Hing, N. and Haw, J., (2009). The Development of a Multi-Dimensional Gambling Accessibility Scale. *Journal of Gambling Studies*, 25(4): 569-581.
- Horowitz, J.L., and Savin, N.E. (2001). Binary Response Models: Logits, Probits and Semiparametrics, *Journal of Economic Perspectives*, 15(4): 43-56
- Humphreys, B. R. and Perez, L. (2010). A Microeconometric Analysis of Participation in Sports Betting Markets, *Economic Discussion Papers*.
- Humphreys, B. R., and Matheson, V.A., (2012). Booms, Busts, and Gambling: Can Gaming Revenues Reduce Budget Volatility? In *Boom and Bust Again*, edited by R. Ascah and D. Ryan. Alberta, Canada: University of Alberta Press.
- Ignatin, G. (1984). Sports Betting, *The Annals of the American Academy of Political and Social Science*, Vol. 474, 168-177.
- Kaizeler, M. J., & Faustino, H. C. (2008a). Demand for lottery products: A cross-country analysis. Working Paper: WP 33/2008/DE/SOCIUS. Department of Economics. Technical University of Lisbon.
- Kearney, M. S. (2005a). The Economic Winners and Losers of Legalized Gambling. *National Tax Journal* 58 (2) :281-302. (2005b). State Lotteries and Consumer Behavior. *Journal of Public Economics* 89 (11-12):2269-2299.
- Kumasi Metropolitan Assembly (2016). Brief on KMA. Retrieved February 27 2016 from www.kma.gov.gh/?brief-on-kma&page=5143.
- Li, H., Mao, L., Zhang, J., Wu, Y., Li, A., & Chen, J. (2012). Dimensions of Problem Gambling Behavior Associated with Purchasing Sports Lottery. *Journal of Gambling Studies*, 28(1), 47-68.
- Mao, L. L. (2013). Sports Gambling as Consumption: An Econometric Analysis of Demand for Sports Lottery. PhD Thesis.
- Mao, L. L., Zhang J. J., Connaughton, D. P., (2015). Determinants of Demand for Sports Lottery: Insights from a Multilevel Model, *Asian Economic and Financial Review*, 5(8), 973-987.

- Mao, L. L., Zhang J. J., Connaughton D. P., Holland, S.,(2015). An examination of the Impact of Socio-Demographic Factors on the Demand for Sports Lotteries in China, *Asia Pacific Journal of Sport and Social Science*, 4 (1), 34-52.
- Markowitz, H. (1952). The Utility of Wealth, *Journal of Political Economy* 60, 151-158
- Merriam-Webster.com; “Lottery”, Merriam-Webster, n.d. web. 8 Dec. 2015.
- Mikesell, J. L. and Pirog-Good, M. A., (1990). State Lotteries and Crime: The Regressive Revenue Producer Is Linked with a Crime Rate Higher by 3 Percent. *American Journal of Economics and Sociology* 49 (1):7-19.
- National Lottery Authority (2006). National Lotto Act, 2006, Act 722.
- National Lottery Authority (2015). History. Retrieved 1st November 2015 from <http://nla.com.gh/about.php> and http://nla.com.gh/soccer_cash_page.php.
- Ogden, C.L., Carroll, M.D., Curtin, L.R., McDowell, M.A., Tabak, C.J., and Flegal, K.M. (2006). Prevalence of Overweight and Obesity in the United States, 1999-2004. *The Journal of the American Medical Association*, 295(13):1549-1555.
- Partin, A.W., Yoo, J., Carter, H.B., Pearson, J.D., Chan, D.W., Epstein, J.I. and Walsh, P.C. (1993). The Use of Prostate Specific Antigen, Clinical Stage and Gleason Score to Predict Pathological Stage in Men with Localised Prostate Cancer, *The Journal of Urology*, 150(1): 110-114.
- Perez, L., (2009). State of Empirical Research on Demand for lottery, *Economic Discussion Papers*, 01.
- Perez, L.C., (2010). The Demand for Gambling: Empirical Evidence from State-Operated Lotteries and Football Pools in Spain. Thesis.
- Rahmatullah Imon, A.H.M., Roy, M.C., Bhattacharjee, S.K. (2012). Prediction of Rainfall Using Logistic Regression, *Pakistan Journal of Statistics and Operation Research*, 8(3).
- Rodriguez, G. (2007). Lecture Notes on Generalized Linear Models. URL:

<http://data.princeton.edu/wws509/notes/>

Samuelson, P. (1952). Probability, Utility, and the Independence Axiom, *Econometrica*, 20, 670-678.

Samuelson, P. A. (1971). *Economics*, 10th ed. (New York: McGraw-Hill, 1971), p. 425 n.

Silberberg, E. and Suen, W. (2001). *The Structure of Economics, A Mathematical Analysis*, 3rd ed. (McGraw-Hill), p. 394-415.

Sloman, J. (2006). *Economics*, 6th ed. (Prentice Hall), p. 34-93.

Trading Economics (2016). Ghana Government Debt to GDP. Retrieved February 27 2016 from www.tradingeconomics.com/ghana/government-debt-to-gdp.

UNDP (2014). Inequality in Ghana: A Fundamental National Challenge, *Ghana-UNICEF Inequality Briefing Paper*, Final Draft.

Welte, J.W., Wiczorek, W.F., Barnes, G.M., Tidwell, M.C., and Hoffman, J.H., (2004). The Relationship of Ecological and Geographic Factors to Gambling Behavior and Pathology. *Journal of Gambling Studies*, 20(4): 405-423.

Wikipedia (2016). Kumasi. Retrieved February 27 2016 from <https://en.m.wikipedia.org/wiki/Kumasi>.

Willmann, G. (1999). The History of Lotteries. *Unpublished manuscript, Stanford University, California, USA*.

Zhou, L. J. and Zhang, J. J. (2015), Variables Affecting the Market Demand of Sports Lottery Sales in China: The Case of Guangdong Province. *North American Society for Sport Management*.

Appendix I Binary logistic regression results: engage in sports betting as the dependent variable

```
. logit engage_in_betting Raw_Price Sex_Male Education_Polytechnic Education_FirstDegree  
Education_SecondDegree Age_Below20 Age_21_to_40 M
```



```
Iteration 0: log pseudolikelihood = -255.74532
Iteration 1: log pseudolikelihood = -54.748408
Iteration 2: log pseudolikelihood = -33.869966
Iteration 3: log pseudolikelihood = -24.499348
Iteration 4: log pseudolikelihood = -23.263959
Iteration 5: log pseudolikelihood = -22.852331
Iteration 6: log pseudolikelihood = -22.850413
Iteration 7: log pseudolikelihood = -22.850412
```

```
Number of obs      =          400
Wald chi2(14)      =          58.77
Prob > chi2        =          0.0000
Pseudo R2          =          0.9107
```

Err.	z	P> z	[95% Conf. Interval]	Robust	engage_in_betting	Coef.	Std.	
	Raw_Price		5.888589	1.79565	3.28	0.001	2.36918	9.407998
Sex_Male	6.458384	1.230457	5.25	0.000	4.046733	8.870035		
Education_Polytechnic		.5631415	1.561544	0.36	0.718	-2.497429	3.623711	
Education_FirstDegree		-.0632839	.9087639	-0.07	0.944	-1.844428	1.717861	
Education_SecondDegree		.311129	1.449142	0.21	0.830	-2.529138	3.151396	
Age_Below20		-1.592544	1.134134	-1.40	0.160	-3.815406	.6303182	
Age_21_to_40		-2.519751	1.207421	-2.09	0.037	-4.886252	-.1532491	
Married		-.7443764	.867075	-0.86	0.391	-2.443812	.9550593	
Unemployed		6.782716	2.730996	2.48	0.013	1.430063	12.13537	
Earn_below500		6.311368	1.774737	3.56	0.000	2.832947	9.789788	
Earn_500_to_999		7.25698	3.068555	2.36	0.018	1.242722	13.27124	
Earn_1000_to_2999		5.579486	2.077741	2.69	0.007	1.50719	9.651783	
Earn_3000_to_4999		8.167185	2.338846	3.49	0.000	3.583131	12.75124	
Won_Before		6.018824	1.495808	4.02	0.000	3.087094	8.950554	
cons		-13.85396	3.456492	-4.01	0.000	-20.62856	-7.079363	

. mfx

Marginal effects after logit y =
 Pr(engage_in_betting) (predict)
 = .99751499

	dy/dx	Std. Err.	z	P> z	[95% C.I.]	X	variable
Raw_Pr~e	.0145969	.02975	0.49	0.624	-.043714	.072908	1.1155		
Gen~Male*	.4412921	.42141	1.05	0.295	-.38466	1.26724	.8925		
Educat~c*	.0011097	.00473	0.23	0.815	-.008169	.010389	.0675		
E~Firs~e*	-.0001552	.00195	-0.08	0.937	-.003974	.003663	.6775		
E~econ~e*	.0006846	.00399	0.17	0.864	-.007131	.0085	.1025		
Age_B~20*	-.0087153	.02147	-0.41	0.685	-.05079	.033359	.0625		
Age_2~40*	-.0027238	.00655	-0.42	0.678	-.01557	.010123	.93		
Married*	-.0025751	.00593	-0.43	0.664	-.014193	.009043	.08		
Unempl~d*	.0666798	.0685	0.97	0.330	-.067586	.200946	.495		
Earn~500*	.0083104	.01703	0.49	0.626	-.025072	.041693	.1925		
Earn_5~9*	.006829	.01346	0.51	0.612	-.019548	.033206	.14		
Ear~2999*	.0052431	.01097	0.48	0.633	-.016253	.026739	.135		
Ear~4999*	.0030453	.00698	0.44	0.662	-.010629	.016719	.025		
Won_Be~e*	.0722894	.10532	0.69	0.492	-.134139	.278718	.5725		

(*)

dy/dx is for discrete change of dummy variable from 0 to 1



Appendix 2

QUESTIONNAIRE

DEMAND FOR SPORTS LOTTERY IN GHANA

This survey is being conducted by an MPhil Economics student at the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi to analyse the demand for sports lottery in Ghana. This is purely an academic exercise and every information gathered will be treated with utmost confidentiality. The researcher would greatly appreciate your compliance in filling out this simple questionnaire. Thank you for your time.

DEMOGRAPHICS

1. Sex ☐ Male ☐ Female
2. Age ☐ below 20 ☐ 21-40 ☐ 41-60 ☐ 61-80 ☐ above 80
3. Religion ☐ Christianity ☐ Islam ☐ Other.....
4. Educational level
- ☐ None ☐ Primary ☐ JHS ☐ SHS ☐ Polytechnic ☐ Teacher Training
- ☐ 1st Degree ☐ 2nd Degree
- Other
5. Marital Status ☐ Single ☐ Married ☐ Divorced ☐ Widow/ widower

SOCIO-ECONOMIC DETAILS

6. Are you self-employed or do you work for someone? ☐ Self-employed ☐ Employed by someone ☐ Do not work

7. How much do you earn in a month? (This question is for those who are employed)

- ☐ Below GHC 500.00
- ☐ GHC 500.00- GHC 999.00
- ☐ GHC 1,000- GHC 2,999.00
- ☐ GHC 3,000.00- GHC 4,999.00
- ☐ GHC 5,000 and above

8. How much money do you spend in a month? (This question is for those who are unemployed)

- ☐ Below GHC 100.00
- ☒ GHC 100.00- GHC 499.00
- ☐ GHC 500.00- GHC 999.00
- ☐ GHC 1,000- GHC 2,999.00
- ☐ GHC 3,000.00- GHC 4,999.00
- ☐ GHC 5,000 and above

SPORTS BETTING

9. Do you engage in sports betting? ☐ Yes ☒ No

10. (a) If no, why not? (Kindly indicate your reason)

.....

.....

.....

(b) Are you likely to engage in sports betting in the near future? ☐ Yes ☐ No

(c) What would make you want to engage in sports betting in the future if you presently do not engage in it?

.....
.....

11. If yes, how often do you engage in the activity?

☐ Daily ☐ Weekly ☐ Monthly ☐ Yearly

☐ Other.....

12. How long have you been betting on sports?

☐ One week ☐ 1 month- 6 months ☐ 6 months- 1 year ☐ 1 year- 3 years

☐ More than three years

13. Which type of sports betting do you engage in?

☐ MyBet ☐ SupaBet ☐ SoccerCash (NLA) ☐ Safari ☐ Premier

☐ Other.....

14. Which type of sport do you usually bet on?

☐ Football ☐ Boxing ☐ Horse racing ☐ Basketball ☐ Cricket

☐ Other.....

15. What is the least price for staking a bet? (Kindly specify)

.....

16. How much do you often place on a single bet? (Kindly specify; you could give a range)

.....

17. Have you ever won a bet before? ☐ Yes ☐ No

18. How many times have you ever won a bet?

- ☐ Once ☐ Twice ☐ 3-5 times ☐ more than five times
☐ Other.....

19. How often do you win?

- ☐ Every time I place a bet ☐ Once in a while ☐ Seldom ☐ Never
☐ Other.....

20. Why do you engage in sports bets?

- ☐ To supplement my income ☐ For entertainment ☐ For investment
☐ Other.....

21. What is the least amount you have ever won on a bet? (Please specify)

.....

22. What is the highest amount you have ever won on a bet?

.....