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THE CONSISTENCY BETWEEN THE THEORY AND PRACTICE OF ISLAMIC BANKING IN SOUTH AFRICA

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Abstract
Since the first Egyptian experiment in 1963, Islamic banking has grown rapidly. The establishment of the Islamic Development Bank and the Dubai Islamic Bank in 1975 were watershed moments in modern Islamic economics. Its growth has been recorded at an average of 10-15% per year and the industry is worth over $1 trillion. Growth in the Middle Eastern countries has resulted in unprecedented growth which has further resulted in the introduction of Islamic banking products in conventional banks. This growth has equally been seen in the South African banking market with the establishment of Islamic banking products through most conventional banks.

This paper aims to establish if there is a mismatch between the ideal of Islamic banking and the practical application of it. To answer this question this paper seeks to establish a link between the rate of interest and the rate of profit and establish if there exists a long-term relationship between the South African interest rate and the rates of return offered on Islamic banking instruments. An empirical analysis which includes a cointegration test followed by an error correction model seeks to prove this hypothesis.

Results from the empirical analysis were consistent with the economic theory of the link between the rate of interest and the rate of profit. It was noted that within the South African model, the Islamic Sukuk has a long-term relationship with the STeFI which is used as a proxy for the South African interest rate. The subsequent error correction model shows that Islamic Sukuk lags the STeFI by one period and corrects for disequilibrium in the following period; this further compounds the economic theory on offer in that the Sukuk is always behind the STeFI and always needs to adjust to it.
Acknowledgements

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To My beloved Grand Father, my Parents and my Family who have always summoned the great spirit of education in My destiny. You will forever be owed a deep debt of gratitude. May we forever be filled with the timeless creed of *Lux, Vita, Caritas*.
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Chapter 1: Introduction

1.1 Background to Research
Since the first Egyptian experiment in 1963, Islamic banking has grown rapidly. The establishment of the Islamic Development Bank and the Dubai Islamic Bank in 1975 were watershed moments in Islamic banking and economics (Lawal, 2010, p. 95).

Since the 2008 financial crises, the conventional banking industry has seen many failure of banks within that industry. The lack of regulation and poor banking practices have led to these failures (Demyanyk & Hasan, 2010, p. 316). During this period, the Islamic banking industry has grown at a rate of 10-15% per year. The growth may be attributed to Shari’ah banking products being more strict and regulated allowing safeguards for both the bank and consumer. According to the Islamic Financial Services Board (hereafter referred to as IFSB), the industry is worth over $1 trillion and grown at 24% during 2013 (Lawal, 2010, pp. 95-96). The growth of Middle Eastern countries and the wealth created by petro-dollars have allowed for unprecedented growth, giving rise to the sale of Islamic banking products through conventional banks, such as Barclays and HSBC in Europe and America (Malik, 2011, p. 181).

The problem faced is that there is a mismatch between the ideal of Islamic banking and the practical application of it. Farooq (2012, p. 265) states that the cornerstone of any financial instrument is the concept of interest. The element of interest is present in all aspects of a person’s daily financial transactions. However, as Thambiah et al. (2011, p. 649) stipulate, Shari’ah prohibits a Muslim to engage in any financial transaction in which he/she is exposed to the element(s) of interest. The basic undertaking of an Islamic banking instrument is to engage in a profit/loss system (PLS) instead. The system advocates a basic understanding that banks may conduct business by making a profit on the purchase of physical assets with no certain rate of return, as prescribed by a conventional interest rate regime (Kula, 2008, p. 51).

One reason for the mismatch is that the PLS-method is sometimes argued to be inefficient. Šrámek (2009, p. 156) suggests that Islamic products of this nature are inherently inefficient. To avoid building new models that are efficient, Kula (2008, p. 46) asserts that designers of
Shari‘ah compliant instruments have found ‘creative’ ways to circumvent Shari‘ah. Designers have created instruments that have the same basis as interest.

Another concern is that designers of Islamic instruments are either unable to design Shari‘ah compliant instruments or do not have the tools to do so. In either case, there is a mismatch between inputs of Islamic banking and the outputs thereof. The designer of Islamic financial instruments is ultimately the group that has the ability to make changes to the products to ensure that the ideal and practical application and output of ‘Shari‘ah compliant’ funds are in harmony. The severity of the problem cannot be underestimated. The industry is growing at a phenomenal rate, and, with further growth expected over the coming decade; its survival will depend on the ability of all instruments and transactions being completely and undoubtedly, Shari‘ah compliant.

1.2 Research Problem and Question
At the centre of the modern economy is interest and, throughout time, economists have proposed different theories on, and offered definitions to, the role and effectiveness of interest in an economy (Afzal, 2005). Afzal (2005) further states that these theories, despite extensive differences, have one thing in common: they are all inherently in conflict with Islamic theories and Shari‘ah, both of which forbid any form of interest.

The prohibition of interest should be defined in terms of Shari‘ah. Farooq (2012, p. 266) defines Riba (the Arabic word that means ‘increase’, ‘addition’ and/or ‘augmentation’) as the claim in excess of the principle amount of money lent to a borrower. The Qu’raan and Hadith (the holy scriptures of Islam) strictly prohibit any circumstance in which people may engage in any business where they may be exposed to Riba. Farooq (2012, p. 266) states that there are three conditions under which transactions may be classified as Riba:

1. A predetermined rate (of return on investments or deposits);
2. A transaction that has a relationship to a principle amount of money; and
3. During a calculation, the period over which the use of a principle amount of money is considered.

In sum, deposits held by banks, mortgage loans and cash loans from banks, for any usage, are prohibited. The argument is that any individual who engages in postponed expenditure
(by saving) should not be rewarded financially as it is deemed immoral and without justification (Presley & Sessions, 1994, p. 586).

Islamic banking is fundamentally based on a PLS and mark-up method (Šrámek, 2009, p. 141). The PLS method is a partnership between the bank and the borrower, thereby ensuring that the risk is spread. An agreement is undertaken that the bank and borrower share in profits and/or losses and that these profits/losses are shared, in turn, by depositors. The instruments that make up the PLS-method model are *murabaha* and *ijarah*.

There are also other instruments that have been taken into Islamic banking, including: *musharakah*, *diminishing musharakah*, and the *sukuk* (Siddiqui, 2012, p. 40). However, these instruments differ from PLS-method instruments. These instruments are based on a second-line predetermined rate of return and have been designed as Islamic instruments; casting severe doubts over the *Shari’ah* compliance of these instruments.

The banking industry is, in its entirety, very competitive. Regardless of *Shari’ah* compliance, Islamic banks must offer rates of return that are comparative to or greater than their conventional counterparts in order to be effective in growth and viability. The problem faced by designers of Islamic financial instruments is that there is no specific model in the determination of the rate of return required for the implementation of the PLS method. In addition to this, no model for the determination of mark-ups is available either.

Šrámek (2009, p. 142) argues that designers circumvent the PLS method by relying on mark-up instruments, thus making it a questionable practice. Mark-ups that are correlated to the interest rate are placed on instruments to achieve profit. Such methods make it questionable and do not conform to a pure PLS model. A pure PLS model would be high risk as the bank itself is a partner in the venture of its client. Being a partner would entail the bank knowing exactly what the funds are being used for and this becomes problematic for them (Bashir, *et al.*, 1993, p. 639). To avoid the risk and to achieve competitiveness within the greater industry, designers of Islamic instruments appear to circumvent Islamic theory.

The financial stability of an Islamic instrument is also an area of great concern. Under a PLS method, Islamic banks appear to be less financially stable. Their inherent instability has
been attributed to the volatility and increased risk of PLS banking (Čihák & Hesse, 2010, p. 110). Facing these problems, designers turn to conventional models, calling them different names (Siddiqui, 2012, p. 39). They do this in order to achieve stability within the Islamic banking sector. In these instances, the fees, mark-ups and profits associated are ‘thinly veiled’ covers for interest (Firoz, 2011, p. 100).

Researchers - such as Afzal (2005), Farooq (2012) and Lawal (2010) - have extended into the theoretical sphere of Islamic finance. Empirical researchers, such as Siddiqui (2012) and Šrámek (2009), agree with the conclusions drawn pertaining to Shari‘ah and the instruments thereof, arguing that there is a mismatch between the theory of Islamic banking and the application thereof. Empirical research conducted by each of the abovementioned authors concludes that there exists a link between the conventional rate of interest and the rate of return on Islamic instruments.

However, it is within the empirical sphere where less research has been conducted about the inconsistency between the ideal and the practice of Islamic banking. Research studies conducted in Pakistan, the United Kingdom and Dubai expose Islamic financial institutions as engaging with interest-bearing instruments. It is argued that these institutions have found ‘creative’ ways to circumvent Shari‘ah through the use of mark-up methods within their instruments (Kula, 2008, p. 46). In fact, it seems that less than 10% of instruments used by Islamic institutions world-wide employ the PLS method; the rest being in mark-up methods (Shah, et al., 2012, p. 1023), which comply with this basic definition of interest (Riba). Shah et al. (2012) and Šrámek (2009) have found that the Islamic instruments have relationships to the local interest rate market, thus suggesting a possible inconsistency.

Whilst these findings are accepted for Pakistan, London and the United Arab Emirates; no empirical research exists within the South African market. Research in a South African context has been limited to the theory of Shari‘ah in the South African Islamic financial sphere or based in terms of measuring the number PLS and non-PLS based transactions done within Islamic banks, most notably by Vahed & Vawda (2008). Even though instruments used within the South African market are marketed as conforming to Shari‘ah, there is no research to determine whether these instruments are indeed Shari‘ah compliant.
Given the lack of research into the South African Islamic financial market, there exists a need to conduct research to establish whether Islamic financial institutions conform to Shari’ah. An investigation must reveal if Islamic banks within South Africa make use of the PLS method or favour the mark-up method. Furthermore, it should be investigated if any rates of return offered by the institution are similar or related to the conventional rate of interest.

The question is therefore: is there an inconsistency between the ideal theoretical foundations of Islamic banking and the practical application of Islamic banking in terms of Shari’ah within South Africa?

To answer this question, the following objectives need to be achieved:

- Establish a link between the rate of interest and the rate of profit; and
- Establish if there exists an empirical long-term relationship between the South African rate of interest and the rates of return offered on Islamic banking instruments.

### 1.3 Research Design

As this paper seeks to conduct an empirical analysis based on South African data, it also seeks to note if results within a South African context compare to results produced in other studies conducted worldwide. Global studies have largely focussed on two points: the first is that of attempting to establish a correlation; the second is to note the percentage of PLS assets being sold by an Islamic bank. By doing so, they go on to state that the instruments that do not conform to the PLS standard have a link to the interest rate and thereby establish a correlation. Studies undertaken by Šrámek (2009) and Siddiqui (2012) have both utilised the abovementioned methodology. Both have concluded that a correlation exists, and thus a relationship between the conventional rate of interest and the rate of returns on Islamic instruments is likewise present.

The data under consideration takes the form of two variables: the first is the South African STeFI index (herein referred to as SI); and the second is the South African Sukuk composite index. These variables are used as proxies for the actual variables that this paper wishes to
examine. The SI serves as a proxy for the South African short-term interest rate; the Sukuk composite serves as a proxy for the rate of return on Islamic financial instruments.

A brief overview of the proxies under consideration is provided. STeFI stands for the ‘Short-Term Fixed Interest Composite Index’. It includes the following benchmarks:

- The call deposit index, compiled by the SARB, based on the SA benchmark overnight rates on deposits (the SABOR);
- A three-month index with a duration of 45 days based on a three-month negotiable certificate of deposits (herein referred to as NCD or NCDs) using the South African Futures’ Exchange rates (herein referred to as SAFEX);
- A six-month index with a duration of 90 days based on six-month NCDs using the SAFEX rates;
- A twelve month index with a duration of 182 days based on twelve-month NCDs using the SAFEX rates;

The STeFI composite index is categorised by the above four indices and is weighted according to market capitalisation that is based on long-term supply. The Sukuk composite index is based on a similar set of benchmarks, except in terms of instruments used by the major Islamic financial windows in South Africa. These would include FNB, ABSA, Standard Bank and Al-Baraka. By using the Sukuk composite index, one is able to compare ‘like-for-like’, without the problem of bias and/or misspecification.

In assessing the data under consideration, the following tests were done on the time-series data:

- A regression on the variables to test for statistical significance;
- Test for unit root on both variables;
- Test for cointegration; and
- Construction of the ECM and the subsequent diagnostic tests.

By conducting these tests, one is able to establish if there exists a long-term relationship between the rate of interest and the rate of profit in a South African context. The results produced from this research may prove significant to Islamic banking in the South African market.
1.4 Significance of the Research
In his conclusion, Caeiro (2004, p. 375) states that Islamic jurists have devised methods to ‘incorporate contingency’. The argument is that if interest were to be abolished, banks would become inefficient: therefore they use disguise techniques to engage in interest instruments (Šrámek, 2009, p. 158). An even greater challenge is levelled with the diagnosis that interest-free Islamic banking, as an alternative to conventional banking, is yet to be proved in the United States (Firoz, 2011, p. 101). It can be argued that the application output of Islamic banking is either unproven or not conforming to strict Shari’ah. Without proper conformation to Shari’ah, the future of this $1 trillion industry is at stake. The growth experienced within this sector, especially in the last decade, would be unfounded if it were proven that Islamic instruments were trading under false pretences.

By providing a suitable answer to the problem described, this research will be able to illuminate opportunities for designers of Islamic products to conform products to Shari’ah, while also exposing frailties of current instruments on the market. The null hypothesis should be accepted if it can be proved that the output of Islamic products is strongly linked to the rate of conventional interest. The effects of any form of false perception given by designers and sellers of Islamic products may be far-reaching and will, needless to say, have negative effects on firms which promote Islamic products. By becoming aware of plausible models that may offer efficient methods for economic purposes, designers would benefit by having a deeper understanding of the economic requirements for Islamic instruments.

The research aims to fill the gaps in the research on Shari’ah banking in the South African market. It aims to provide a better understanding of the instruments offered by Shari’ah institutions. By doing so, the consumer market will have further information and analyses from which to draw adequate inferences.

1.5 Overview of the Research
This paper is organised as follows. Chapter 1 provides a background to the research problem in question. It outlines the problem and the objectives of this paper. A brief is provided pertaining to the research design that this paper seeks to produce. Finally, chapter 1 offers an explanation of the significance of the research this paper wishes to achieve.
Chapter 2 provides a literature review of research already conducted. It offers a review of the nature of an Islamic economy and how it operated 1400 years ago. This chapter illustrates the nature and determination of conventional versus Islamic banking instruments, after which it delves into the precise determination of the short-term interest rate in South Africa. A determination of profit and the link between the rate of profit and the rate of interest then follows.

Chapter 3 discusses the nature of the research design.

Chapter 3 is an important precursor to chapter 4 in that there is an understanding of the design.

Chapter 4 then builds on chapter 3, providing the empirical results and offering a discussion of the results achieved.

Finally, chapter 5 comprises concluding remarks and a summary of the preceding research.
Chapter 2: Literature Review

2.1 Introduction
Since its introduction into the modern banking system in 1975 in Dubai, Islamic banking has grown at a phenomenal pace. Afzal (2005, p. 58) and Kula (2008, p. 49) argue that at the heart of Islamic finance is the theory of the prohibition of interest (Kula, 2008, p. 49). Islamic banking has been established in Muslim and non-Muslim countries and operates parallel to the conventional banking system (Kula, 2008, p. 46). Through an Islamic banking system, there has been the establishment of Shari‘ah compliant instruments that are deemed to be free of Riba (Firoz, 2011).

An instrument is deemed inclusive of interest if it meets three conditions. It must have a pre-determined rate of return and a transaction that relates to the principle amount of money. In addition to this, during the financial calculations, the time value of the principle amount of money must be taken into consideration. These conditions are applicable to instruments found in unconventional banking systems.

Before evaluating the current nature of Islamic finance, a brief evaluation of an Islamic economy under Islamic rule is undertaken. This helps to establish the nature of how a pure Islamic economy worked historically. This is done in order to make an informed comparison with the status quo today.

2.2 The Moral Dimension of Islamic Economics
Islam is the religion of Muslims, a monotheistic faith believe to have been revealed through the Prophet Muhammad (S.A.W.). Islam is widely regarded as a ‘way of life’ and this includes economic life. As such, it is observed as a moral code of conduct through laws and teachings given to the Prophet Muhammad (S.A.W.) and codified in the Holy Qu’raan. It includes prescriptions on how business should conduct itself.
Religion has linked itself as a way of life between politics and the economy from the advent of religion itself. In assessing its role in Islam and its link in the economy, one should seek to define the basis of religion. Religion comprises the following three components (Tomic, 2010, p. 462):

1) Private satisfaction, which includes faith in the afterlife;
2) Public camaraderie, which includes the consumption of public goods, especially charity; and
3) Reputation, respect and social networking.

In evaluating religion in terms of the economy, points 2 and 3 are relevant. Islam is a way of life and its fundamentals are of an equitable economic system that is inclusive. It permits growth in all sectors of the economy; prohibits interest; and insists on fair trade practices, were built into the behaviour of every aspect of daily life (Maloney, et al., 2010, p. 451).

A large part of Islam deals with charity and it is law that Zakat (religious tax) must be given to the poor in a bid to uplift their social wellbeing. The Islamic system depends on every person behaving morally, and this is enforced by Shari’ah. Included in its prescriptions is the prohibition of interest, which is deemed to be immoral (Maloney, et al., 2010, p. 452). Despite the prescriptions, the Islamic system is flexible, as it allows for any person to capitalise on his/her talents regardless of prior social standing (Maloney, et al., 2010, p. 452).

Islam ensures, through the Qu’raan, that when a firm or person engages another in a business proposition, they are governed by a higher sense of moral etiquette. The Holy Qu’raan makes reference to this etiquette on at least two separate occasions. The first mention of this was, “O you who have believed, do not consume one another's wealth unjustly but only [in lawful] business by mutual consent.”(Surah Nissa; 4:29); and the second reference is supplied in Surah Hud (11:85), “And O my people, give full measure and weight in justice and do not deprive the people of their due and do not commit abuse on the earth, spreading corruption.” The interpretation of these verses speaks to a person’s moral responsibility when entering into a business partnership; asserting that the relationship should be fair and honest, free from any corruption or non-Islamic based products.
Economics revolves around what to produce, how to produce it and for whom to produce it. Each economic system established throughout history has provided potential solutions to these questions. Islam, too, has provided such a potential solution (Ökte, 2010, p. 181). In looking at economic activity, Islam introduces a moral dimension into economic choices made by economic agents. The intention is that a moral dimension should inspire responsibility and the motivation of others to build an inclusive economy (Wilson, 2008, p. 177).

2.3 The History of Islamic Economics

In analysing the origins of an Islamic economy, one must first identify the basis and structure of the Islamic law that govern the nature of the economy. Wilson (2008, p. 180) argues that to understand Islamic finance, one needs to understand that Islamic economics approaches economics from a moral standpoint. It rejects both the excesses of command systems and capital markets and also the maximisation of individual material satisfaction. Devout Muslims have the objective of serving Allah by promoting the social good, and, consequently, the acquisition of material goods is seen as a means and not as an end.

The implication Islamic law has on an economic structure is that the market place should operate in a morally equitable way which benefits all economic agents (Wilson, 2008, p. 180). Islamic law, even as far back as its origin, 1400 years ago, required that ethical finance and socially responsible investments be made. Investors were not only concerned with financial return, but emphasis was placed on how their money could be utilised and resources allocated in order to improve the economy (Wilson, 2008, p. 179).

The Arabic word for ‘economy’ is Iqtisad, which is best defined as ‘principle moderation’; meaning ‘neither too much nor too little’ (Ökte, 2010, p. 182). Within the economy, people are allowed to act as free economic agents within constraints that conform to the guidelines of Islam (Ökte, 2010, p. 183). The principles and guidelines were implemented through a two-fold system: the first is Islamic text law; and the second is supervision by a ruler over general activities, which entails the safeguard of private and public interests (Ökte, 2010, p. 184).
In pre-Islamic economies, the concern was that traders would use the marketplace to exploit market outcomes (Wilson, 2008, p. 181) and that this would lead to high levels of poverty and unemployment. To avoid this, Islamic law provided for the regulation of the marketplace, and this regulation was a key instrument in ensuring that the marketplace operated in a just manner that was equitable.

In terms of regulation of the economy, the *Muhtasib* was established. The *Muhtasib* was a person established to monitor and facilitate economic activity. Its establishment dates back to the time of the Prophet, and continued for centuries until the time of the Ottoman Empire. The *Muhtasib* was driven not only by secular means, but by Qu’raanic means, which repeatedly states the need to promote good and impede evil (Murtuza & Abdallah, 2007, p. 42). Its key role was to serve as the guardian of public interest.

Public interest implied and incorporated the regulation of the marketplace and the protection of consumers against exploitation. Amongst the functions performed by the *Muhtasib* were: those relating to protecting the rights of people; managing behaviour in the marketplace, such as honesty in dealings (Murtuza & Abdallah, 2007, p. 44); managing the market equilibrium; regulating the supply of goods to the market; creating price controls and managing credit structure (Murtuza & Abdallah, 2007, p. 46). By managing the public interest, it meant to develop the economy in terms of a Shari’ah compliant way.

In terms of the economic development, the Ottomans also developed the system called the *waqf*. This is best defined as the continuous allocation of assets to serve the public for charitable purposes (Demírhan, et al., 2012, p. 103). The *waqf* is also described as a fund that is used to lend money for the purposes of economic upliftment.

Whilst there are a number of different kinds of *waqfs*; the most important is the cash *waqf*. A cash *waqf*, by definition, implies that the capital of the funds is in the form of cash that would then be loaned out. The ‘interest’ revenue, (more accurately described as profit) generated from the loans is supposed to be utilised for social services and to pay for the expenses of running the *waqf* (Demírhan, *et al.*, 2012, p. 103). This again highlights the moral dimension, that is, if any profit is made, it is to be utilised for the public good.
A key area to analyse is the matter surrounding the definition of ‘interest’ as outlined in a *waqf*. The interest portion is better stated as being profit. This is because in the 16th Century the leader of the religious authority, Ebusuu Efendi, and the Sultan of the Ottoman Empire, Kanuni Sultan Suleyman, decreed that money was to be regarded as moveable property similar to house appliances or animals (Demirhan, *et al.*, 2012, p. 104). In this way, money lent to aid and develop the economy was to be paid back with a profit. The profit was a ‘fair’ amount that conformed to the *Shari’ah* stipulation that it was to cover for aspects such as inflation, and be enough to ensure that the expenses of running the *waqf* were covered. Loans made from the *waqf* were only deemed possible on a short-term basis, whereby the enterprise needed to have been a going concern and be able to pay the money quickly to conform to Islamic law (Demirhan, *et al.*, 2012, p. 104).

In determining the rate of profit that was acceptable, strict regulations were put in place. Before attempting to determine how the Ottomans determined such a rate of profit, the bases of a *waqf* should be outlined. These are outlined in brief below (Demirhan, *et al.*, 2012, pp. 105-106):

- *Waqfs* were formed as legal entities by private person(s) putting their properties in use for the benefit of the people who needed them to create employment and uplift themselves from poverty or general economic development, without seeking benefit in the form of interest. The profit attained from a *waqf* is to be used to cover expenses and provide additional revenue to social projects;
- To form a *waqf*, a court process needs to be followed in order to ensure it conforms to the legal structures of Islamic law;
- The *waqf* should either be managed by the founding person or managed by professionals in their field;
- Strict accounting measures need to be kept in place to ensure all proceeds are used appropriately.

Once this has been complied with, the court that issued the acceptance of the formation of the *waqf* should decree the rate of profit. In most cases, this would be to ensure that enough money was made from the investment to assist with community initiatives (Demirhan, *et al.*, 2012, p. 106). The general rate of profit between 1667 and 1786 was
between 9.96% and 12.5%. It did not alter much over a 120-year period - with the 12.5% upper limit having been set to conform to Islamic regulations of fairness and non-exploitation - even though inflation occurred during this period (Demirhan, et al., 2012, p. 108).

So, the Islamic economy, whilst free, hinged on fairness. The objective of profiteering was to be constrained and the profits utilised to re-invest in the community to ensure that the community was uplifted. To be uplifted would usually imply two outcomes: the first being to create employment; and the second to release people from poverty. The development of the economy under Islamic law is largely different from the developmental state of the present day, since the Islamic economy tends towards welfare and inclusivity, not capitalism and exclusivity.

2.4 Conventional Banking and the Role of Interest

Islamic banking is operated in parallel to the conventional banking system in around 75 countries. In identifying if the Islamic system has any similarities to the conventional system, we should outline the concepts of both spheres of banking. By discussing conventional interest, we are able to establish if there are similarities between the two spheres of banking, which will later assist when trying to establish if the Islamic banking system is based on the conventional banking system or not.

2.4.1 Conventional Rate of Interest

The examination of interest in a western economy can be represented using a graphical method or an algebraic method. For the purposes of thoroughness, both will be examined in this study.

The interest rate of a country is determined by the central bank of a country: in South Africa’s case, that is the South African Reserve Bank (hereafter referred to as SARB). The two key components in the theoretical determination of the interest rate are money supply and money demand. The central bank manages the supply of money, but the power over the demand for money is in the hands of individuals and firms. The nominal money demand curve is conventionally represented as in the following equation:

\[ M^d = P \cdot L(R,Y) \] 2.1
Where $M^D$ is the nominal money demand; $R$ is the interest rate; $P$ is the price level and $Y$ is the real gross national product (hereafter referred to as the GNP).

The interest rate is achieved in the money market, where equilibrium is established between money supply and money demand. The condition for equilibrium is:

$$M^s = m^d \quad 2.2$$

To express the relationship in real terms, both sides are divided by the price level; and the result is:

$$\frac{M^s}{P} = L(R,Y) \quad 2.3$$

Graphically, the rate of interest is shown at the intersection of the money demand and money supply curve, as shown in the figure 3 below.

![Figure 1: Determination of equilibrium interest rate. Source: Krugman & Obstfeld (2009, p. 358)](image)

Whilst the graph illustrates how the interest rate is determined, it is not entirely realistic. The econometric approach assists here since it encompasses real world factors and is more descriptive of the approach used by the SARB in their determination of the interest rate in South Africa.
2.4.2 The Econometric Approach
The econometric approach in the determination of the short-term interest rate is pertinent in understanding how interest is present in financial instruments. The short-term interest rate is usually used as a proxy and is crucial to pricing bonds, pricing interest rate derivatives and hedging interest rate risks (Aling & Hassan, 2012, p. 4). There are two popular models that are used in the classes of short-term interest models: CKLS (which is short for Chan, Karolyi, Longstaff and Sanders) and GARCH. However, in this study, only the CKLS method will be explained, because it is the method used by the SARB in their determination of the interest rate.

In their analyses of short-term interest rates, Chan, Karolyi, Longstaff and Sanders use a continuous generalised time short rate specification (Chan, et al., 1992, p. 1210). Their method exploits both single and multi-factor dynamics in the determination of short-term interest rates. They argue that the short-term risk-free rate is found within the following equation:

$$dr = (\alpha + \beta r)dt + \sigma r dZ$$  \hspace{1cm}  \text{(2.4)}

Where,

- $r$ is the interest rate;
- $dZ$ is the Brownian motion;
- $\alpha$ represents drift;
- $\beta$ is the parameter of mean reversal;
- $\gamma$ is a measure of volatility;
- $\sigma$ is a scaling parameter; and
- $t$ is time.

The dynamics of the above parameters imply that the conditional mean and variance that change in the short-term are dependent on the level of $r$. Chan et al. (1992 p. 1210) further assert that the parameters of the process in discrete time use the Generalised Methods of Moments (GMM). Depending on the calculation of the drift and volatility within the market, the rate would be worked out by the central bank of a country to a percentage that would revert the rate of interest in the short-term to its long-term mean.
Explained in more detail, the CKLS econometric approach takes the following form:

\[
\begin{align*}
\Delta r_t &= \alpha + \beta r_{t-1} + \varepsilon_{t+1} \\
E[\varepsilon_{t+1}] &= 0, \quad E[\varepsilon^2_{t+1}] = \sigma^2 r_t^{2\gamma}
\end{align*}
\]

Equations 2.5 and 2.6 above are used as a test for over-identifying restrictions on the system of moment equations using GMM. The economic approach is used to determine the short-term interest rate, because the GMM estimators and their standard errors are consistent, even if the change in the rate is abnormal or heteroskedastic. Chan et al. (1992, p. 1213) use the unrestricted process given from equation 2.6 above. Using this as a basis, they are able to estimate the parameters of the continuous-time model using discrete-time econometric specification. The advantage, as argued by Chan et al. (1992, p. 1213) is that this allows the variance of the interest to change the level of interest directly, which is consistent with the continuous-time model.

The model above is used as a basis for the determination of the short-term interest rate by the SARB (Aling & Hassan, 2012). The SARB defines the equation as:

\[
\begin{align*}
dr_t &= (\alpha + \beta r_t)dt + \sigma r_t^\gamma dW_t
\end{align*}
\]

Where, \( r_t \) is the stochastic interest rate process; \( W_t \) is the standard Brownian; and \( \alpha, \beta, \gamma and \sigma \) are structural, but unknown parameters. In this specification Alling and Hansen (2012, p. 9) state that the parameters are identified as: \( \frac{\alpha}{\beta} \) being the unconditional mean to which the interest rate reverts; \( \beta \) being the speed of the reversion; and \( \gamma \) measuring the sensitivity of the variance to the level of interest rate. They further note that drift and conditional variance are processes of the function of the level of the interest rate. The formula measures the reversion from the natural mean of the interest rate in the short-term. It also gives an indication of the rate required to return to the natural or mean rate of interest. Outside of other uses of the short-term rate of interest, the central bank of a country would seek to ensure that the rate of interest reverts back to the mean.
The presence of $r_f$ and volatility in the above formula is what is important to establish a correlation to an Islamic banking product. If, by means of theory, it can be argued that these factors are considered in a profit determination of a non-PLS product, then it can be argued that these products have inherent characteristics of interest, and are therefore unlikely to conform to Shari’ah.

This study will attempt to establish a long-term relationship between the conventional rate of interest and the rate of profit required by an Islamic bank. To do so, it must be established whether conventional banking instruments and Islamic banking instruments are based on the same determinants.

The short-term interest rate is used in the calculation and determinants of the most conventional banking instruments. If it is found that the determinants of the conventional rate of interest are present in Islamic banking instruments, a correlation may be established between the calculation of interest and the calculation of profit. This would show that non-PLS Islamic banking methodology is flawed in that it contains elements of the conventional rate of interest and thus does not conform to Islamic law.

2.4.3. Conventional Banking Instruments
Conventional banking has many instruments, most of which have a positive correlation to the rate of interest. The instruments that are considered for analysis – which are theoretical and also involve data analysis – are those instruments that demonstrate similarities to their Islamic counterparts. These instruments include:

1) Hire-purchase instruments;
2) Bonds; and
3) Loans (for business enterprise use).

Theoretically, each of these instruments above considers the principle amount of money in its calculation of determination. Financial institutions are sellers of such instruments, and, to attain a profit on this sale, they charge interest on the principle amount of money borrowed by a lender. To maintain profitability, the rate of interest charged may depend on the risk
profile of an individual and the time horizon of the instrument in question. Interest charged by financial institutions is compounded, using the following basic formula:

\[ FV = PV (1 + i)^n \]  

This formula is applicable to hire-purchase and loan instruments. Whilst it is accepted that bonds demonstrate exposure to interest, they shall not be evaluated in this study as it falls outside the parameters of conventional banking instruments.

The formula, when applied in reality, assumes that the rate applied is pre-determined, but not necessarily constant. As general economic theory suggests, the principle amount of money and the time period of money is considered in applying conventional modes of interest. The model suggests that a bank lends money to borrowers for a period of time at an agreed rate of interest.

The following model offered by Firoz (2011, p. 93) illustrates a conventional banking model:

Figure 2 illustrates the conventional banking process and how interest is generated therein. It begins at point 1, at which point depositors provide the bank with money. The process is followed as illustrated with the bank lending money to enterprises at a predetermined rate.

Figure 3 Conventional Banking. Source: Firoz (2011, p. 93)

Figure 2 illustrates the conventional banking process and how interest is generated therein. It begins at point 1, at which point depositors provide the bank with money. The process is followed as illustrated with the bank lending money to enterprises at a predetermined rate.
of return. Upon collecting the interest on the loan, the bank pays the depositors and retains the rest of the money. Firoz (2011) and Afzal (2005) both corroborate that conventional instruments have a predetermined rate of return. Therefore conventional instruments are not Shari’ah compliant. Conventional banking instruments differ substantially from the ideal of an Islamic banking product, which would be a product that is Shari’ah compliant.

2.5. The Ideal of Islamic Banking

The circumstances and laws regarding Shari’ah compliance are far more complex than their conventional counterparts. A key prerequisite for an Islamic bank to engage in any investment is that the business enterprise that it invests in conforms to Shari’ah. This means the business does not engage in activities like: the trade of alcohol, gambling, manufacturing or selling pork; or indulging in any illegal trade (e.g. drugs). Once these strict rules have been adhered to, a financial institution may provide assistance, by means of its financial instruments, to an enterprise (Kula, 2008, p. 51).

Shari’ah requires that the bank share the risk with the investor. It further advocates that the bank should buy a share in the business enterprise. Upon receiving profits (or losses) from that enterprise, Shari’ah advocates that these profits (or losses) must be shared with the depositors of the financial institution. A strictly Shari’ah compliant instrument would be based on the profit/loss-system (hereafter referred to as the PLS-system or PLS-method) (Firoz, 2011, p. 91).

The PLS-method is closer to a partnership between the banking institution and entrepreneur because the institution shares in the profits and losses of the enterprise (Zanian & Movassaglili, 2002, p. 2437). The ‘loan’ issued to the asking enterprise is better described as an investment, and not a loan, given with a predetermined rate of return and repayment (Šrámek, 2009). In applying the PLS-method, Bashir et al. (1993, p. 639) concurs that the PLS-method of Islamic banking is Shari’ah compliant.

We should examine the modes of products offered by an Islamic institution before assessing their determination of profit therein. Islamic banking offers two types of products: the PLS and non-PLS based products (El Gindi, et al., 2009, p. 522). If it can be shown that a predetermined rate of interest is present in the determination of profit of a non-PLS
product, it can be argued that Islamic banking instruments are characteristically based on interest. Before doing so, we examine Islamic banking instruments themselves in order to distinguish between the types of Islamic instruments before concluding which, if any, are characteristic of the conventional rate of interest.

2.5.1. Islamic Banking Instruments

There are two modes of Islamic banking instruments: PLS and non-PLS based instruments. Both shall be outlined, starting with the PLS based instruments. The PLS modes of financing are mainly equity-based investments through means of partnerships. These partnerships are in the forms of the Islamic instruments of *Mudaraba* and *Musharakah*. Of key importance is that, within these two instruments, the rate of profit or loss is shared by both the bank and the firm. A basic PLS model is illustrated in figure 3 below.

**Figure 3: Islamic banking.** Source: Firoz (2011, p. 93)

Figure 3 outlines how Islamic banking operates using the PLS-system. There are two main features of the PLS-system. The first aim of the PLS-system is to achieve business enterprise goals by achieving profit. Should a loss be incurred, the financial institution should also share in it (Khan, 2012, p. 27). The second feature is the nature of the enterprise, and what
it intends to sell before the PLS-method can be considered Shari’ah compliant. With regard to this, it should be made certain that the business venture invested in is not an undertaking that sells alcohol or pork, nor is it to be a business involved in any form of gambling (Kula, 2008, p. 51). In developing instruments for the PLS-system, designers of the instruments have to consider these, and other, factors.

Other factors that ought to be considered, when developing instruments under the PLS-system, are the following:

1. The enterprise should be a socially productive economic activity;
2. Loans should be used to finance socially productive economic activities only;
3. Financial risk should rest with the lenders; and
4. Loans must be free of interest.

Upon these basic conditions being met under the PLS-system, an instrument is considered to be free of Gharar and be Shari’ah compliant (Khan, 2012, p. 28). Under these sets of strict rules, the PLS-method and the associated PSR can be declared to conform to pure Islamic banking.

The PSR, or profit sharing ratio, is that which the Islamic bank and the enterprise share from the enterprise’s realised profits and/or losses. Under the PLS method, the bank would take a share as a partner in the enterprise and would be entitled to a share of the profits at the percentage agreed. In this manner, the bank would recoup its invested amount over a period of time. Importantly, should the enterprise suffer any losses, the bank would equally incur the loss in terms of the agreed percentage (Hasan, 2008, p. 6).

The banks share of profits differs under the non-PLS method of Islamic banking. The conditions for a Shari’ah compliant or PLS-system of instruments differ from the non-PLS based instruments. This is best described by the following instruments (El Gindi, et al., 2009, p. 523):

- **Bai’bithamin Ajil**, which implies deferred payment sales;
- **Murabaha**, which is the mark-up method;
- **Ijarah**, which is the hire-purchase agreement; and
- **Istisna’a**, which is the sale of non-existing objects;
Under the non-PLS based system, the PSR is different. Each of the above involves a profit ratio of some sort; which is different from a PSR under the PLS-system in which the bank shares in the losses. Under this system, the bank would, in effect, be entitled to a profit on its instruments, regardless of whether the borrower makes a loss. In determining the PSR, an Islamic bank would have to take cognisance of the conventional rate of interest and its own level of deposits before deciding on the rate offered (Haron & Ahmad, 2000, p. 2). Hasan (2008, p. 1) argues that the main determinants of a profit sharing ratio (PSR) for a bank to consider are:

- The expected rate of profit on an investment;
- The proportion of bank money in total capital firms employed in business;
- The market rate of interest; and
- The risk value estimate.

It can be hence seen that there is a distinct difference between PLS and non-PLS based systems. It can be accepted that a pure PLS based system conforms to Shari’ah. However, the non-PLS based system is called into question with regard to the role of the PSR in non-PLS system. The argument is made that, as 90% of instruments in South Africa are non-PLS based; a PSR of a non-PLS system is similar to the role of interest in a conventional instrument, and is therefore not Shari’ah compliant (Vahed & Vawda, 2008, p. 460).

This study focuses on the non-PLS sphere of Islamic banking instruments. In principle, PLS-based instruments are compliant with Shari’ah. Although it is accepted that conventional economic and financial factors affect PLS products, an Islamic bank itself is not responsible for passing these factors onto the enterprise directly. Instead the bank, under the PLS system, shares in the profits and the losses of the enterprise, regardless of the market forces at play. This differs from non-PLS based instruments. However, when it comes to non-PLS products, the bank is directly responsible for passing any external factors onto the enterprise. The PSR is a predetermined rate of the required profit by the bank. In this regard, the bank does not share in the profits and/or the losses of the enterprise, and it demands a profit, regardless of the performance of the enterprise. Thus, the Shari’ah compliance of non-PLS products is in doubt, and this study aims to establish if there is, in
fact, a relationship between the non-PLS based products in Islamic banking in South Africa and the rate of interest.

2.6 The PSR of non-PLS Based Instruments

In examining the PSR of the non-PLS based system, we are able to see if there is a correlation between this PSR and the conventional rate of interest. To achieve this, we examine two PSR models: the first by Halim et al. (2012) and the second by Hasan (2008).

Halim et al. (2012) uses a formula from Malaysia that is regarded as the leader in the Islamic banking market to test the hypothesis that there is indeed a correlation between the PSR and the rate of interest in modern Islamic banking. The basic profit determination formula offered by Halim et al. (2012, p. 54) is based on a commonly used instrument already mentioned above: the *ijarah*. Whilst, in this case, the formula may be specific to the *ijarah* instrument, Halim et al. (2012) argues that this may be extended for use across all the non-PLS based instruments.

Halim, et al. (2012, p. 57) assert that their formula is described from the lessee’s point of view. They make the following key assumptions:

- The lessor’s profit from the contract must at least be equal to the risk-free rate of return;
- The risk-free rate is equal to the government bond/treasury bill;
- The lessee is indifferent to the rate of profit; and
- The terms of the profit rate considered should change within the bounded set given by the Base Financing Rate; which is drawn from the rate of interest from the central bank (hereafter referred to as BSR or the BSR).

The idea from the bank is that the PSR for both parties must be decided at the beginning of the term period. The PSR equation considered by Halim et al. (2012, p. 57) is given by:

\[
\theta_t^{pp}, u_{t-1}(\omega)r_f \geq 0; \forall t
\]

Where:

- \( P \) is the principle investment;
• $\alpha$ or $\alpha_{t+1}$ is the principle periodic payment at interval $t + 1$;
• $X$ is the lessor’s ownership, as a %;
• $\theta_{t}^{pp}$ is the lessor’s PSR at time interval, $t$;
• $r_{f}$ is the risk free rate of return (government bond);
• $u_{t+1}$ is the profit rate at time $t + 1$; and
• $\omega$ is the BFR (or interest rate from the central bank).

The formula above represents key components that would be derived from the short-term interest rate, as the risk free rate, which is inherent in the conventional rate of interest, is considered. Also, $\omega$ is the BSR that Halim et al. (2012, p. 57) state is the rate at which the bank borrows funds from the central bank. In sum, this amounts to a standard hire-purchase agreement, and at least one of the determinants is derived from the conventional rate of interest, notably, $\omega$. One can therefore conclude that this instrument does not conform to Shari’ah.

The second theory considered is offered by Hasan (2008). Hasan (2008) also claims that the conventional interest rate is inherent in the determination of the PSR model, specifically with respect to the murabaha instrument. In a murabaha contract, the bank provides the funds to an enterprise in order to invest in a business venture.

The model offered by Hasan (2008, p. 5) is that the bank provides a certain portion of capital to an enterprise. Therefore Hasan (2008, p. 5) defines the PSR as:

$$\sigma = \frac{\lambda}{r} (r_i + \alpha)$$

Where:

- $\sigma$ is the total profit;
- $\lambda$ is the capital provided by the bank;
- $r_i$ is the rate of interest; and
- $\alpha$ is the risk premium.

In sum, Hasan (2008) argues that $\sigma$ goes to the bank and $1 - \sigma$ stays with the firm, and thus a PSR is established. The PSR model offered by Hasan (2008) includes $r$ as a determinant of profit: if $r$ is taken into consideration, the PSR cannot conform to Shari’ah.
Having shown that the PSR is based on the predetermined rate of interest, a brief overview of the link between profit and interest is examined. This leads to the question of whether the current practice of Islamic banking is simply the flawed implementation of a sound system; or whether the theory of non-interest-based, profit-based lending itself may be defective.

If a correlation between the profit and interest exists, then there would be good reason to call the Shari’ah compliance of non-PLS based Islamic bank instruments into question. This will be the case as long as the profit rate is determined, not by the market mechanism, but by external authorities.

2.7 The Link Between the Interest Rate and Profit

The difference between the rate of interest and the profit earned by a business enterprise has plagued economists for over 200 years (Gootzeit, 2006, p. 49). We have shown that interest is included in the determination of the PSR in the case of non-PLS instruments used by Islamic banks. The purpose of this section is to explore the interrelatedness of profit and the interest rate; and show that, in the modern economy, an Islamic bank cannot issue any non-PLS based instrument without having a link to the interest rate. In this regard, one would expect a relationship between the rate of profit and the rate of interest as all Shari’ah banks and windows in South Africa in fact operate in a conventional economy and not a fully Shari’ah compliant economy.

An economy is made up largely of consumers and producers both of whom are affected by rates of interest and profit. An analysis should occur to show how changes in the financial markets, where the interest rate is determined, may affect producers’ decisions in their determination of the rate of profit. In assessing their cost of production, a producer will take cognisance of their cost of capital in ensuring that they achieve a certain level of profit (Panico, 1985, p. 37).

Panico (1985, p. 37) argues that, in order to properly evaluate this link, one should consider ‘The General Theory’ by Keynes (specifically Chapter 17). It presents a case where producers’ pricing decisions are related to the events occurring on financial markets, where: deposits, short-term interest rates and long-term bonds are available (Panico, 1985, p. 37).
The group we look at is that of assets grouped as real capital; that is, commodities that are to be produced in the production process (Panico, 1985, p. 47). In analysing the position of profit and interest on a real capital asset, one should also take note of a definition. In defining a real capital asset, Panico (1985, p. 49) believes that it is best defined as an ‘investment project’ (or an enterprise), as it is more easily believed that the entity is one single asset that is purchased - as an alternative to holding money at the risk-free rate. Enterprises would generally prefer to invest their money in other assets, instead of holding their money at the risk-free rate as this would generate a better return. The elements to consider as an alternative to the risk-free rate are:

- An associated prospective yield on a project;
- The expected appreciation on the enterprise; and
- The risk premium on the capital asset.

If an asset is considered an alternative to the risk-free rate, Panico (1985) asserts that there are two ways of pricing the required rate of return. The first is to take the investment and calculate its own rate of return: that is, the rate of return is dependent on the proceeds from the sale and the associated costs of the sale, which are incorporated into the total cost. The second way of pricing is that which entails taking each capital good separately. The idea is that, in this way, the specific contribution of the capital good to production should be specified and identified. Capital goods are used instead of services, as with goods, one is able to separate the phases of the item between the production phase, the selling phase and the purchasing phase. Thus, we are able to establish the change in capital formation.

By conducting the second process, Keynes (1973a, p. 629) argues that the change in capital formation is influenced by the rate of interest. He describes that money (and, by extension, interest) is a source of rigidity that affects the market’s determination of prices. The argument made by Keynes (1973a, p.629) is that movements in the financial market affect real prices in the goods’ market. Therefore a non-PLS based instrument would inevitably capture these movements too. Thus, given the fact that, with a non-PLS instrument; the bank would be responsible for passing these factors onto the enterprise directly; such an instrument falls short of Shari’ah compliance.
Following the argument made by Keynes (1973a), Panico (1985) assumes that, if the prices in the goods market are affected by the financial market, the profit on those goods are also affected. Panico (1985) assumes that prices and profit move in the same direction as interest. Therefore, Panico (1985, p. 56) argues that there is equilibrium between the production and the banking sectors. Panico (1985, p. 57-58) notes that, if a change in the financial sector takes place, a change in the production sector follows. Panico (1985, p. 58-59) uses the example that if the interest rate were to increase, the price level in the production sector would increase. In light of this, it can be argued that non-PLS based instruments are inherently influenced by the rate of interest, thereby failing to comply with Islamic law.

The discussion surrounding the link between profit and interest above essentially speaks to an enterprise having to increase their prices should the rate of interest increase. Hasan (2008) argues that an Islamic bank is no different to an enterprise when it utilises instruments such as the *murabaha* (a mark-up instrument). Inherent in the costs of a producer is interest, thus when the Islamic bank purchases these products with the intent of reselling it to its client; the price mark-up is therefore also influenced by the rate of interest. This is so much so that Hasan (2008) suggests that interest is a determinant of profit in the non-PLS based profit sharing ratio determination in the previous section.

The hypothesis put forward by Panico (1985) above is corroborated by Hasan (2008, p.14). In Hasan’s analysis, which was referred to in the previous section, he argues that in a dual economy, when the central bank alters the interest rate; the Islamic bank will alter the profit on their *Murabaha* instruments accordingly. Recalling equation 4.18 by Hasan (2008, p. 5), in the earlier section of this text, Hasan (2008 p. 13-14) provides a graphical illustration of the link between the rate of interest and profit.
Figure 4. The relationship between profit and investment via interest rate. Source: Hasan (2008, p. 14)

Figure 4 above has two sections: A and B. Section A illustrates the relationship between the PSR and the expected profit rate. The curve described as $\beta$ is set as a constant by Hasan, which equals $\lambda(r_i + \alpha)$. Section B pertains to macroeconomic theory and presents a 4-quadrant diagram. The diagram is divided into sections 1, 2, 3 and 4.

As an example, Hasan (2008, p. 14) describes a reduction in the interest rate by the central bank. He argues that if the interest rate is lowered from $I_0$ to $I_1$, a new equilibrium is established. Conventional macroeconomic theory suggests an increased output may be achieved and this is shown on the diagram. However, of importance is the effect that the change in the interest rate has on the rate of profit. Hasan (2008, p. 15) argues that the rate of profit is likely to change too. Graphically, this is illustrated by the link between section A and B on figure 4 above. Beginning with a change in the interest rate from $I_0$ to $I_1$ in diagram B of figure 4, Hasan (2008, p. 14) states that a certain level of profit is required for any given
level of interest. This is denoted by the link of line C, which Hasan (2008) suggests is the level of profit associated with interest rate $I_0$. A change in the interest rate, as illustrated, would imply a change in the rate of profit. This change is noted as line D on the diagram.

Hasan (2008) endorses Panico’s (1985) assertion in the analysis of the link between interest and profit. Despite the evident links, the question is why does Islamic banking still prefer non-PLS based instruments, given their obvious lack of Shari’ah compliance? Aziz et al (2011) believes that Islamic banking prefers the non-PLS based instruments because they are more efficient and stable than the PLS-based instruments.

2.8. Stability and efficiency

Islamic banking instruments, specifically those that conform to the PLS-system, are found to be unstable and inefficient (Aziz, et al., 2011, p. 769). Efficiency usually relates to how quickly and accurately an asset adjusts itself when new information arrives. This ties into stability, which implies how cost effective a financial instrument is to manage from the bank’s point of view. The instability and inefficiency of the PLS-method is believed to arise from the PLS-method being defined by a higher degree of risk as a result of a variable rate of return (of profit and potential losses) to the investor (Bashir, et al., 1993, p. 639). A higher degree of risk would imply a higher possibility of losses occurring. If an Islamic instrument made a loss, it would result in its being less marketable. Furthermore, in terms of costs, Beck et al. (2013, p. 436) suggest that a PLS instrument is unstable because it may result in higher costs as a result of the complexities surrounding the instrument to make it a pure PLS instrument; thus making it costly and unstable. The instability and inefficiency occur as PLS products cannot compete with the conventional banking industry. The non-PLS products appear to be better placed as a result of their characteristic similarities with conventional products.

It is therefore not that surprising that no losses have ever been recorded under a PLS-system. As Aziz (2011) found, which has the most unlikely implication, every business venture partnership across the world has been successful and that the rates of return from these ‘successful’ businesses were pre-determined. Successes in Pakistan and Dubai have been through giving investors a certain rate of return through the use of non-PLS based instruments (Aziz, et al., 2011, p. 769).
Islamic banks that engage in more non-PLS based instruments do so to allow for greater risk aversion, as PLS based instruments are subject to increased risks and volatility (Čihák & Hesse, 2010, p. 110). Risk aversion is argued to be the main reason behind Islamic banking using the non-PLS based instruments as these offer greater efficiency and stability (Čihák & Hesse, 2010, p. 110). The prevalence of non-PLS based instruments is investigated through studies conducted worldwide. This research focuses on the preference of PLS to non-PLS based instruments.

2.9 Results Worldwide

In reporting results of studies concluded about the theoretical application of pure Islamic banking, different methods of evaluation were used to assess the prevalence of the PLS method in Islamic banking with regards to the utilisation of non-PLS instruments. There are three approaches that test the degree to which Islamic banks conform to pure Islamic banking. These three approaches are (Siddiqui, 2012, p. 51):

1. The percentage share of PLS-based instruments in Islamic banks of total implementations utilised by enterprises;
2. The weighted average of returns offered by Islamic banks versus the rates offered by conventional banks; and
3. The returns offered upon the change of the conventional interest rate.

In terms of the first approach, it was observed in a worldwide study that, by 2007, less than 10% of instrument assets comprised PLS instruments across 18 Islamic banking institutions (Šrámek, 2009, p. 146). When looking specifically at Pakistan, it is further observed that less than 8% of assets conform to PLS (Shah, et al., 2012, p. 1023). In fact, by 2012, only 7.4% of instruments were PLS based (Siddiqui, 2012, p. 49). The results drawn can be attributed to the PLS-method being volatile and unstable. To remain competitive against conventional banks, it is suggested that Islamic banks offer certain rates of return to gain or keep the market share (Čihák & Hesse, 2010, p. 110).

Reporting on the second approach is more difficult and less research was carried out here. In asserting that there was very little pure Islamic banking in the market, it was observed that the remaining 92% of instruments that were described as PLS-based were reported to
show a strong correlation to the KIBOR rate (Shah, et al., 2012, p. 1023). This is endorsed by the average rate of interest return in Pakistan being 8.4%, whilst the average rate of PLS return was 8.3% for the one-year period up until June 2011 (Siddiqui, 2012, p. 49).

Thirdly, when the conventional interest rate changes, as per the central bank, correlated changes appeared within Islamic instruments.

It has been reported that, in Pakistan, the mark-up rate applied had a high correlation to the KIBOR (Karachi Inter Banks Offered Rate) rate (Shah, et al., 2012, p. 1023). In verifying this claim, it was found that, in Dubai, the Dubai Islamic Bank also calculated mark-up fees based on their inter-bank interest rate.

To further illustrate the deviation from a pure PLS market, the UK Islamic financial deposits take the form of Murabaha and Ijara instruments. Both instruments have been allowed to use the LIBOR index in the calculation of rents and mark-ups (Malik, 2011, p. 182). The LIBOR index is interest-based and is deemed a pre-determined rate and is rejected under the form of pure Islamic banking.

In the infancy stages of Islamic banking, it was accepted that a pre-determined rate of return could be used while Shari’ah compliant instruments were being developed. The idea of initially using a pre-determined rate was in the hope that, over time, designers would find methods to make instruments conform to Shari’ah. However, according to Siddiqui (2012, p. 40), this has not happened as the PLS method has been found to be inefficient and unstable when having to compete in the modern financial system. The profitability and ability to be competitive in the banking market has been easier to manage and maintain through the use of mark-up instruments.

Afzal (2005) acknowledges that it was easier to grow Islamic banking through the use of the non-PLS method. However, no concerted effort has been made by Islamic institutions to design pure PLS instruments. A key reason behind this lack of effort is because pure PLS instruments are found to be unstable and inefficient (Aziz, et al., 2011, p. 639).

The results of Islamic banking worldwide show strong correlations between its interest rate and the conventional banking market. Given the growth of Islamic banking in South Africa,
research has been undertaken in the past five years to establish whether South Africa suffered from similar traits found within Islamic banks worldwide.

As argued by Vahed and Vawda (2008, p. 459), approximately 90% of all Islamic banking transactions in South Africa are non-PLS based. This study seeks to establish if there is a long-term relationship between the required rate of profit at an Islamic bank and the rate of interest at a conventional bank. This method is better placed than any of the three methods used in this section as it goes further into establishing if the relationship is significant and if it is noted in the long-term. It also has not been conducted in a South African context, which makes it more important to do so.

2.10 Islamic Banking in South Africa
The biggest Islamic bank in South Africa is the Al-Baraka Group. Having established itself in South Africa in 1989, the group has grown at a phenomenal pace. They grew by 500% during the period 1995-2006, servicing more than 40 000 clients’ countrywide and having advanced approximately R1 billion worth of ‘loans’ (Vahed & Vawda, 2008, p. 460). Al-Baraka’s Islamic instruments offered to clients use both the PLS and mark-up methods.

The Murabaha instrument, a pure mark-up instrument, makes up 90% of all Al-Baraka transactions (Vahed & Vawda, 2008, p. 459). Vahed and Vawda (2008, p. 459) go on to state that they regard this as an interest-based statement. They assert that any instrument that has a correlation to the interest rate is not Shari’ah compliant as the bank shares no risk with enterprise.

If 90% of all transactions are based on this type of instrument, the remaining 10% of transactions may have a basis in PLS. As a result of inefficiency, the PLS-based instruments have been used less (Vahed & Vawda, 2008, p. 459).

Vahed and Vawda (2008, p. 468) assert that, as a result of the strategy adopted by Al-Baraka – that is engaging in 90% of their transaction in the non-PLS based instruments – the bank, as a whole, ‘does not to comply with Shari’ah’ and is therefore ‘flawed’. The results found in this study conform to earlier studies, such as those conducted by Shah et al. (2012), that found that less than 10% of Islamic bank instruments offered by Islamic banks are PLS-based.
This study seeks to conduct empirical research on the claim made by Firoz (2011, p. 100) that the non-PLS instruments are a ‘thinly veiled subterfuge for interest’. Neither Firoz (2011) nor Vahed and Vawda (2008) test this hypothesis empirically to establish if there is indeed a relationship between the rate of profit and the rate of interest in terms of a cointegration model.

The previous studies (and their empirical research) have been based on the three methods described in the previous section. By using a cointegration model, we are able to establish significance and whether or not there is a long-term relationship between the rate of profit and the conventional rate of interest for non-PLS based instruments in a South African context. This approach is better suited and will provide more accurate and statistically significant results in terms of a correlation, when compared to the others that fail to question whether or not there’s a long-term relationship.
Chapter 3: Research Design

3.1 Introduction
The growth of Islamic banking since 1975 has been rapid. As established, Islam prohibits interest (Afzal, 2005, p. 58). However, empirical analysis conducted around the world - most notably in Pakistan, England and Dubai - has revealed adverse results. Shah et al., (2012); Aziz et al. (2011) and Malik (2011) all have found positive correlations between the respective interest rates of the countries and the Islamic instruments within. As such, worldwide, tests of Islamic financial institutions have been investigated to establish if the Shari’ah banking instruments conform to pure Shari’ah or whether they have exposure to interest.

As described in the previous section, an instrument is deemed inclusive of interest if it meets the following conditions: a pre-determined rate of return; a transaction that relates to the principal amount of money; and that, during the financial calculations, the time value of the principal amount of money is taken into consideration.

If any of the above criteria is met by an instrument, the instrument is deemed not be Shari’ah compliant. The Islamic Sukuk can be argued to be Shari’ah compliant if it is backed by a physical asset that will be repurchased by the Sukuk bond. However, if the rates of repurchase are linked to the conventional interest rate, it cannot be deemed Shari’ah compliant.

3.2 Research Design
To effectively conduct research within South Africa, it needs to be analysed as to the nature of research that has already been conducted. Worldwide, much research has focussed on the theory of Islamic banking. However, the little research that is quantitative has produced alarming results, some of which are highlighted below.

In Pakistan, three tests were conducted: a test of proportion; a test of efficiency; and, lastly, a test of comparison of interest spreads. The first test is a test of proportion of the non-PLS method to the PLS-method of finance on total assets where it is found that the majority of assets is based on the non-PLS method of Islamic banking (Šrámek, 2009). The second test,
also conducted in Pakistan, is a test of efficiency of the non-PLS and PLS-methods of finance by testing if the ‘profit’ earned on transactions is above the rate of conventional interest, therefore making it inefficient (Firoz, 2011, p. 99). In this case, it was found that the returns of the conventional rate of interest were 8.4%, and Shari’ah institutions amounted to 8.3%. Thirdly, a comparison of the banking spreads - which is the average yield a bank receives from loans and the average rate it pays on deposits - between the two spheres is conducted (Siddiqui, 2012). We are able to conclude that the rates between the two spheres are quite similar.

Tests of a similar nature may be applied to the South African banking and financial market; although delimitations to the study, which are focussed on the relationship between the Short Term Fixed Interest Composite Index (STeFI) and the Sukuk composite, must apply. Within the South African market, the Al-Baraka group and the conventional banks that offer Islamic instruments are taken into consideration. These include: First National Bank (FNB), ABSA and Standard Bank; all of which are linked to the Sukuk index.

The information required to perform this investigation is made up of the types of instruments sold by Islamic institutions in South Africa. The information is drawn from the STeFI index and the Islamic Sukuk index in South Africa. The STeFI index is used as a proxy for the conventional interest rate as it is utilised widely across South African banks as a benchmark. The Sukuk composite index is used as a proxy for the South African Islamic Sukuk. Using data sets for these two indices, we aim to establish if a long-term statistically significant relationship exists between the two. We do this by conducting a cointegration test. If it is found that the two indices are highly correlated, it will be possible to argue that the Sukuk is not Shari’ah compliant.

3.2.1 Choice of Design
Unlike approaches used in other countries to check/establish if products are Shari’ah compliant, this paper uses a quantitative approach. The objective is to establish if Islamic banking products sold in South Africa are related to the conventional rate of interest. As discussed, approximately 90% of all Islamic banking transactions in South Africa are based on the non-PLS system. A cointegration test is conducted in order to establish if there’s a long-term relationship between the interest rate charged on non-PLS products and the
conventional rate of interest. This will enable us to test the theory suggested in the prior chapter that the rates of interest are positively correlated. Such nature of research is lacking in South African literature.

### 3.2.2 Data

The data to be used in this research is obtained from the South African Reserve Bank (SARB). Data from SARB will be on monthly intervals from July 2009 to October 2015. The data is restricted to this period because *Sukuk* was only introduced into the South African market as an index in 2009.

#### 3.2.3 Sample

The data under consideration takes the form of two variables. The first is the South African STeFI index and the second is the South African *Sukuk* composite index. These variables are used as proxies for the actual variables that this paper wishes to examine. *The STeFI* serves as a proxy for the conventional South African short-term interest rate and the *Sukuk* composite serves as a proxy for the rate of return on Islamic financial instruments.

Before going into the analysis, a brief overview of the proxies under consideration is provided. STeFI includes the following benchmarks:

- A call deposit index based on the SA benchmark overnight rates on deposits, the SABOR rate, which is compiled by the SARB;
- A three-month index with a duration of 45 days based on a three-month negotiable certificate of deposits (NCDs) using the South African Futures Exchange rates (SAFEX);
- A six-month index with a duration of 90 days based on six-month NCDs using the SAFEX rates;
- A twelve-month index with a duration of 182 days based on twelve-month NCDs using the SAFEX rates;

The STeFI is composed of the above four indices and is weighted according to market capitalisation, which is based on the long-term market supply. The *Sukuk* composite index is based on a similar set of benchmarks; except in terms of instruments used by the major Islamic financial windows in South Africa. The South African *Sukuk* is best described as an *Al-Ijara Sukuk*. This is based on cash flows against the country’s infrastructure; but with a
coupon rate that is linked to the conventional rate of interest. These would include FNB, ABSA, Standard Bank and Al-Baraka. By using the Sukuk composite index, we are able to compare ‘like with like’, without the problem of bias and/or misspecification.

3.2.4 Translation into Design

The theoretical research which has been concluded in this field of study has resulted in non-PLS based Islamic banking instruments being created. These instruments are supposedly Shari’ah compliant. By assessing them against the conventional instruments, we will find out if they are compliant by testing if a long-term relationship exists. To do this, we need to assess the relationship between the conventional benchmark of interest and the benchmark used by the Islamic windows all at South Africa’s banks.

Research conducted in Pakistan and the Middle East suggests that there is a relationship between the Islamic bank instruments and the conventional rate of interest (Šrámek (2009) and Firoz (2011)). Specifically, a relationship exists between the LIBOR, KIBOR and Dubai interbank rates. This research will provide a basis to compare the South African model with research already conducted worldwide. In assessing the South African model, this paper seeks to analyse if there exists a long-term relationship between the rate of interest and the returns of profits on Islamic instruments.

In assessing the data under consideration, the following assumption was made: the SA Sukuk composite index was placed as the dependent variable in the time series. The implication is that its outcomes would depend on the outcomes of the STeFI. The full results are attached in the appendix; whilst the pertinent overview of results is presented in this section. In most cases, where evaluation is done against the use of the p-value, this is done at the 5% level or 0.05, as stipulated. The hypothesis and decision rules are provided for each of the foregoing tests for the purposes of completeness. The following tests were concluded on the time series under evaluation:

1. Summary statistics are discussed;
2. Test for unit root on both variables;
3. Test for cointegration; and
4. Construction of the ECM and the subsequent diagnostic tests.
The above steps are followed to test for a long-term relationship or cointegration between the variables under consideration. However, before this can occur, the time series needs to be stationary of the same order. Once this is concluded, the next step would be to test for cointegration. Finally, an ECM is built to establish if there is disequilibrium in the short-term; and, if yes, how is it corrected. For the purposes of completeness, these tests are described in detail; before going to the empirical analysis, which uses the tests described in this section.

The data under consideration is time series data. In assessing the objective and the hypothesis of this paper, the analysis of the data should be econometrically sound. In ensuring this is the case, this section seeks to provide the pertinent econometric background for the tests that will be conducted. The data under consideration aims to create a suitable model to run a test for cointegration and build an error correction mechanism. In evaluating time series data, the data should be stationary to avoid elements of a spurious regression having weight in an econometric model (Gujarati & Porter, 2009, p. 739).

In terms of a stationary process, Gujarati & Porter (2009, p. 740) define this as a stochastic process, which has its mean and variance constant over time. They further assert that the value of the covariance between the two time periods depends only on the lag between the two time periods and not the actual time at which the covariance is computed. In a stationary process, it is argued that the time series will exhibit mean reversion. Mean reversion implies that the mean, variance and autocovariance remain the same no matter at which point they are measured.

3.2.4.1 Unit Root Test
In evaluating time series for stationarity, the unit root test is widely accepted as a pertinent test. The starting point for the unit root test is:

\[ Y_t = \rho Y_{t-1} + u_t \tag{3.1} \]

\[-1 \leq \rho \leq 1 \]

Where, \( u_t \) is a white noise error term.
Before going further, it is worth noting in brief that the above model is example of a random walk model (RWM). An RWM is distinguished into two types: the first type is a random walk without drift, which means that there is no constant or intercept term present; while the second is a random walk with drift, which means that there is a constant term present.

It is asserted by Gujarati & Porter (2009, p. 754) that if \( \rho = 1 \), in equation 3.1, then this would become an RWM without drift. By implication, this is a nonstationary process. To enable us to avoid creating a bias equation, it should be manipulated.

In testing for unit root, the Augmented Dickey-Fuller (ADF); DF-GLS and KPSS are utilised. The null hypothesis in testing for unit root is \( \delta = 1 - \rho \) with the alternative hypothesis being \( \delta < 1 - \rho \). The decision rule, if \( \delta = 0 \), then the time series under examination has a unit root and is nonstationary.

The ADF assumes that the error term is correlated with the variable under consideration. The idea behind the ADF is that the test is conducted by augmenting the preceding equations by adding the lagged values of the dependant variable. By doing so, it becomes ADF; and, without the added lagged values, the ADF would not be possible (Gujarati & Porter, 2009, p. 757). This is identified in the equation below, as presented by Gujarati & Porter (2009, p. 757).

\[
\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + u_t + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \epsilon_t
\]

3.2

Where, \( \epsilon_t \) indicates pure white noise error term; and \( \Delta Y_{t-1} = (Y_{t-1} - Y_{t-1}) \), \( \Delta Y_{t-2} = (Y_{t-2} - Y_{t-3}) \), and so on. The number of lagged difference terms to include is usually determined empirically; and there should be enough terms included so the error term in equation 5.4 above is serially uncorrelated.

3.2.4.2 Transformation of Nonstationary Series

Having established why it is important to test for stationarity in a time series, the question that is raised is what to do if a unit root test shows that a series is nonstationary. The suggested solution is to difference the time series one or more times to make it stationary;
and hence avoid a spurious regression problem. When a series is differenced to become stationary, then it is known as ‘Difference Stationary Process’ (DSP).

3.2.4.3 Cointegration

Given that the time series under consideration is proven to be stationary at a certain level, there exists the possibility to regress the variables. Gujarati & Porter (2009, p. 762) argue that subjecting an individual time series in the group of variables to a unit root test, one may find that they are all stationary at the same level. Should this be the case, they further argue that there exists a possibility that they share the same common stochastic trend. If this is the case, the regression of one variable on the other will not be spurious. The test for cointegration may then be conducted.

When two variables are cointegrated, this means that there exists a long-term relationship between the two variables. In testing for cointegration, the test that is utilised in this paper is the Engle-Granger test (hereafter referred to as EG). Having applied the unit root tests to the variables under consideration, Gujarati & Porter (2009, p. 763) assert that one should estimate a regression of the form of:

\[ Y_t = \beta_1 + \beta_2 X_t + u_t \]  

And obtain the residuals and again apply the ADF test to the residuals. Testing the residuals is important to assess if the residuals are also stationary. If stationary, it can be argued that regression is not spurious, and hence cointegration exists. Once the long-term relationship between two variables is established, the last question that is posed in the data analysis is what happens in the short run.

3.2.4.4 Error Correction Mechanism

Whilst two variables may be cointegrated in the long run, in the short-term there may be some disequilibrium (Gujarati & Porter, 2009, p. 764). The error term is treated as the disequilibrium error and this is used to tie the short-term behaviour to the value of the cointegration model in the long run. The error correction mechanism (hereafter referred to as ECM) corrects disequilibrium, so we are able to tie in the short-term dynamics in the long run. The Granger representation theorem states that if two variables are cointegrated, the relationship may be expressed as ECM.
In expressing this econometrically, the following equation is utilised:

\[ \Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 u_{t-1} + \varepsilon_t \]  

Where, \( \varepsilon_t \) is the white noise error term and \( u_{t-1} \) is the lagged value of the error term. In sum, the ECM states that the dependent variable that changes in \( Y_t \) is dependent on the variable change in \( X_t \) and also on the equilibrium error term. Gujarati & Porter (2009, p. 764) argue that if the latter is nonzero then there exists a disequilibrium. Should disequilibrium exist and \( \alpha_2 u_{t-1} \) be negative; the implication is that the dependent variable is above equilibrium and will start falling in the next period. If it is positive, the opposite shall occur; and will do so until equilibrium in the model is restored.
Chapter 4: Empirical Analysis

To test the hypothesis that there is a long-term relationship between the Islamic Sukuk and the STeFI index, a series of econometric tests must be computed as outlined in the previous chapter. This chapter serves as the empirical analysis, after which the associated discussions follow, evaluating the hypothesis of this paper. The chapter begins with descriptive statistics produced from both time series’ in question. The paper then conducts the stationarity tests followed by the test for cointegration; and finally an ECM is built. The chapter concludes with an overview of the results produced and the associated discussion.

4.1 Descriptive statistics

In keeping with the above stated assumption that the Sukuk Index is the dependent variable; a test for statistical significance was conducted. Table 1 presents the descriptive statistics of the two series’, the STeFI and Sukuk composite indexes; followed by a graph to show the graphical relationship between the two variables. The descriptive statistics are produced in Table 1 below.

<table>
<thead>
<tr>
<th></th>
<th>STEFI</th>
<th>SUKUK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.004936</td>
<td>0.004612</td>
</tr>
<tr>
<td>Median</td>
<td>0.004724</td>
<td>0.004677</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.006842</td>
<td>0.008267</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.003864</td>
<td>0.002300</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.000648</td>
<td>0.000779</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.860237</td>
<td>0.685112</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>3.189336</td>
<td>9.250820</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>9.486954</td>
<td>129.6758</td>
</tr>
<tr>
<td>Probability</td>
<td>0.008708</td>
<td>0.000000</td>
</tr>
<tr>
<td>Sum</td>
<td>0.375144</td>
<td>0.350496</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>3.15E-05</td>
<td>4.55E-05</td>
</tr>
</tbody>
</table>

Source: Authors’ own.
From the statistics produced above, we are able to conclude through the Jarque-Bera result that the data is not normal. The null hypothesis for the normality test is that the residuals are normally distributed. The null hypothesis is accepted if the p-values of the Jarque-Bera test are greater than 0.05. From the table above, we draw the conclusion that the data is not normal as the p-values are less than 0.05. We are also able to see from the kurtosis and the skewness that the data of both the STeFI and the Islamic *Sukuk* are not normal. Given that the data is not considered to be normal, the regression itself may suffer from bias, have inefficient estimators and lack consistency. Further testing, such as to test the statistical significance of the regression and subsequent unit root tests, will show if this regression is spurious or not. Other descriptive statistics that were noted were the mean values produced: both data sets are quite similar and better explained by the standard deviations, which show that the variance of the STeFI and *Sukuk* are closely spread around the mean values produced. As noted, a graph showing the statistical relationship between the STeFI and the *Sukuk* is now produced.

![Graph](image)

**Figure 5: Graph to show trends between the STeFI and Sukuk Indexes.** Source: Authors’ own.

Overall, the graph in figure 5 shows that the *Sukuk* composite index follows the STeFI index and there appears to be a graphical correlation, suggesting that there may be driven by similar factors. Overall, the series’ appear to be volatile, though this is not surprising given the economic climate during the period under consideration. There is more volatility noted
within the *Sukuk* index. This is typical of a financial time series that is affected by financial market conditions such as the effect of share prices and central bank decisions.

We are able to break the graph in Figure 5 into three segments. The first segment is 2009 to mid-2010. The second is from mid-2010 to the end of 2013. The final segment is 2014 to 2015. We are able to see that, for the most part, the *Sukuk* composite index mirrors the STeFI index. We find that in the middle of 2010, an anomaly occurs that spikes the rate of the *Sukuk* and then subsequently corrects itself in the second segment. This anomaly may be as a result of the financial crisis. The same occurrence of there being a spike and correction is repeated between the second and third segment. However, we cannot definitively conclude from here if a long-term relationship exists.

### 4.2 Stationarity tests

To properly evaluate the relationship between the *Sukuk* and STeFI indexes, a cointegration test is necessary. However, before doing so, we first test the statistical significance of the relationship between the *Sukuk* on the STeFI index; then assess the stationarity of the variables in question; and, finally, build an error correction mechanism. Equation 4.1 below shows the statistical relationship between the two variables.

\[
\text{sukuk}_i = 0.001443 + 0.64199\text{STeFI}_i \\
se = (0.000588) \quad (0.118170) \quad \text{adj} - \text{r}^2 = 0.2754 \\
t = (2.4528) \quad (5.4328) \quad D. W. = 1.5903 \quad p(F - \text{Stat}) = 0.00
\]

Our null hypothesis is that there is a positive significant relationship between *Sukuk* and STeFI. Based on the test of significance using the t-test, we reject the null hypothesis and conclude that there is a statistically significant relationship between *Sukuk* and STeFI indexes. Using the F-statistic, we also find that the overall model is significant since the p-value of F-stat is zero. According to the R-squared, the STeFI index explains approximately 27 per cent of variations in *Sukuk*. We proceed, in section 4.3, to show that the regression is not spurious and that the relationship between STeFI and *Sukuk* is true/real by conducting a cointegration test.
Before we perform unit root tests, we first plot each series individually to get a glimpse of the trend. Figure 6 shows a plot of each series at level, while Figure 7 shows the series’ at first difference. It is worth noting that, at level, STeFI first trends downward, and then, from mid-2013, it trends upward. The Sukuk does not seem to exhibit a clear trend. Both series’ appear to be non-stationary at level as there is no evidence of mean reversion as shown in Figure 6. However, when we graph the series’ at first difference as shown in Figure 7, they appear to be mean reverting and hence stationary. This suggests that the result of the statistical relationship observed above using series’ at level may be spurious.

![Figure 6 Graphs to show STeFI and Sukuk at level non-stationary](image)

Graphically, it is worth noting that the graph of both variables, when produced at level, does not exhibit mean reversion. By exhibiting mean reversion, the data shows itself to be stationary when graphically produced. This would be in line with economic and econometric theory already discussed in Chapter 3. The graphs are produced in Figure 7 below.

![Figure 7 Graphs to show STeFI and Sukuk at first difference and stationary](image)

Given that, at level, the data appears to be nonstationary, we conduct a formal test of stationarity to establish the order integration. The results of the stationarity tests of Sukuk
and STeFI at level can be found in the Appendix. Here, we move to the first difference below.

Table 2 below shows the tests for stationarity completed at first difference for STeFI using the augmented Dickey-Fuller test (ADF); Dickey-Fuller Generalised Least of Squares (DF-GLS) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS); using the intercept only first; while Table 3 uses both the trend and intercept. The level of significance used is at 1%, 5% and 10%.

**Table 2: Stationarity Test for STeFI at first difference – Intercept**

<table>
<thead>
<tr>
<th>Dependent Var.</th>
<th>Coefficient</th>
<th>ADF</th>
<th>DF-GLS</th>
<th>KPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STeFI</td>
<td>-6.20E-06</td>
<td>-2.09 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1.92E-05</td>
<td></td>
<td>-0.71 **</td>
<td>0.849 ****</td>
</tr>
</tbody>
</table>

- Significant at 1%; ** - Significant at 5%; *** - Significant at 10%; **** - Not Significant.

**Table 3: Stationarity Test for STeFI at first difference – Trend and Intercept**

<table>
<thead>
<tr>
<th>Dependent Var.</th>
<th>Coefficient</th>
<th>ADF</th>
<th>DF-GLS</th>
<th>KPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STeFI</td>
<td>-0.000382</td>
<td>-5.582 **</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.00017</td>
<td></td>
<td>-3.516 **</td>
<td>0.057</td>
</tr>
</tbody>
</table>

- Significant at 1%; ** - Significant at 5%; *** - Significant at 10%; **** - Not Significant.

The results above show that when the test for stationarity is done with only the constant, the series is not stationary; even at first difference. However, when the trend is accounted for, all the results conclusively show that the series is stationary at first difference. The same procedure is followed for the Sukuk composite index below in Tables 4 and 5. The ADF testing may be altered or suffer as a result of structural breaks. John et al. (2007) find that, only if there is a significant economic shock to the market, will the long-term equilibrium be altered. However, they conclude that there is no definitive conclusion that the standard ADF test cannot suffice for a unit root test where structural breaks may be present (John, et al., 2007, p. 75). It should be noted that the outcomes shown in the tables above and below are supported by the graphical analysis, which showed the upward and downward trend at level at the mean reversion at first difference; though the data and unit root tests are affected by the structural breaks observed in 2010.
Table 4: Stationarity Test for Sukuk composite at first difference – Intercept

<table>
<thead>
<tr>
<th>Dependent Var.</th>
<th>Coefficient</th>
<th>ADF</th>
<th>DF-GLS</th>
<th>KPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sukuk Comp.</td>
<td>2.06E-06</td>
<td>-10.04*</td>
<td>-12.66*</td>
<td>-7.71E-07</td>
</tr>
</tbody>
</table>

* - Significant at 1%; ** - Significant at 5%; *** - Significant at 10%; **** - Not Significant.

Table 5: Stationarity Test for Sukuk composite at first difference – Trend and Intercept

<table>
<thead>
<tr>
<th>Dependent Var.</th>
<th>Coefficient</th>
<th>ADF</th>
<th>DF-GLS</th>
<th>KPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sukuk Comp.</td>
<td>-0.000103</td>
<td>-10.02*</td>
<td>-9.5422*</td>
<td>-6.79E-05</td>
</tr>
</tbody>
</table>

* - Significant at 1%; ** - Significant at 5%; *** - Significant at 10%; **** - Not Significant.

We can therefore conclude that both variables are integrated of order I (1); where, at first difference, there is no unit root present. Therefore, the cointegration test may proceed as the results produced will not be spurious.

The regression of the Sukuk composite and STeFI index done previously (equation 4.1) may be spurious. We therefore proceed to test for a long-term relationship by using the Engle-Granger single equation. Having established that the time series’ under examination are both stationary and of the order I (1), the test may proceed.

4.3 Testing for cointegration between Sukuk and STeFI

A regression of a non-stationary series on another non-stationary series may result in a spurious regression. In section 4.2 above, we observed that both Sukuk and STeFI are non-stationary series’, and hence have unit roots. It is quite possible that the two series’ share a common trend, so that regression of one on another is not necessarily spurious (Gujarati & Porter, 2009, p. 762). As shown in Chapter 3, section 3.2.4.3, even though two series’ may have a unit root, a linear combination of them may be stationary (having no unit root). The linear combination cancels out the stochastic trends in the series, and the regression would be meaningful. Sukuk and STeFI would be cointegrated if they have a long-term relationship of equilibrium between them.
We test for cointegration using the Engle and Granger (EG) test. In this test, we obtain the residual from regression, testing it for a unit root. The regression result can be seen below.

Results of the unit root test on the residual at level:

\[
\Delta \hat{u}_t = -1.5528 \hat{u}_{t-1}
\]

\[
t = (-8.877)^*
\]

\[
adj - R^2 = 0.6134 \quad d = 2.0046
\]

* - Significant at 1%; ** - Significant at 5%; *** - Significant at 10%; **** - Not Significant.

The t-statistic is now the Engle-Granger tau-statistic. In evaluating the tau-statistic, we note that, in absolute terms, the tau-statistic of 8.877 is greater than the critical value, 3.51, and is statistically significant at the 1% level; so we can conclude that the null hypothesis is rejected. In this case, the conclusion that can be reached is that there exists a long-term relationship between the STeFI and the Sukuk indexes. Economically, this makes sense as the argument put forward is that the rates of return on Islamic instruments are determined by the rate of conventional interest. This is clearly exhibited in the above model. Furthermore, it could not be the other way around as the analysis suggests that, if STeFI was the dependent variable; then the null hypothesis would be accepted and no cointegration would be present between the two variables. In sum, by showing that there is a long-term relationship between the STeFI and the Sukuk, we are able to show that there are inconsistencies between the theoretical and practical applications of Islamic banking in South Africa.

We can conclude that the residual from the regression between Sukuk and STeFI is free from unit root; hence, the two variables are cointegrated. We now proceed to the construction of the ECM, which will help us understand the short-term relationship between the variables. All data and models can be found in the Appendix.

4.4 Error correction model

Whilst a long-term relationship may have been established, there is importance in evaluating the short-term responses to any disequilibrium in the market between the series’. The ECM has both long- and short-term characteristics built into it (Koop, 2005, p. 172). The short-term dynamics are captured by the equilibrium error term. This asserts that
if the dependent variable is not in equilibrium, it will be pulled towards its long-term equilibrium in its next period. To investigate this dynamic, an ECM must be constructed. Once again, using the Sukuk index (at first difference), as a dependent variable; a regression is produced with the STeFI (at first difference) and the lagged residual series as the independent variables in the series. The results produced are as follows:

$$
\Delta \text{sukuk}_t = 1.0003 \Delta \text{stefi}_t - 0.4845 \hat{u}_{t-1}
$$

$$
t = (3.5899) (-4.5661)
$$

$$
\text{adj} - R^2 = 0.271 \quad d = 2.3165
$$

Apart from the given t-stats, which show that the variable is statistically significant, the area of importance is the coefficient of the residual. To effectively interpret this coefficient we note that the basic premise suggests that a change in the STeFI (independent variable) will result in a change in the Sukuk (dependent variable). The error term is related to the change in the dependent variable. Here, the coefficient is -0.484, and the implication is that the negative leads us to conclude that the Sukuk index is above its long-term equilibrium value and will fall to its natural equilibrium in the following period; thus, the error will be ‘corrected’. It appears as though the Sukuk lags in the STeFI by one period. Therefore, disequilibrium found in the short-term is corrected in the following period. Once again, this makes economic sense as the Sukuk index would be behind the STeFI in that it would always need to adjust to the STeFI.

4.5 Overview of results

This paper assumes that the Sukuk is the dependent variable (as stated in section 3.2.4). However, in a bid to establish if there is a long-term relationship between the Sukuk and the STeFI indices, a cointegration test and subsequent ECM was built.

In doing the cointegration test, it was first established that both variables are stationary at the order I(1). Following the Engle-Granger cointegration test, it was established that there is a long-term relationship between the indices. Subsequently, an ECM was built. This concluded that, in the short–term, the Sukuk is above the STeFI index. The Sukuk will therefore fall in the next period and equilibrium will be ‘corrected’ in the following period. The results produced are in line with the economic theory offered within this paper, in Chapter 2, section 7.
The assumption made by this paper is that the Islamic Sukuk is dependent on the STeFI index. The cointegration test shows the existence of such a long-term relationship. The economic theory outlined in Chapters 1 and 2 speaks to Islamic finance that conforms to Shari’ah being based purely on the PLS system. Given that there is this long-term relationship between the Sukuk and STeFI, it can therefore be argued that the Sukuk composite index contains elements that do not conform to Shari’ah. These elements include there being a pre-determined rate of return if the transaction relates to the principal amount of money.

4.6 Conclusion

The econometric analysis proves that there is a long-term equilibrium relationship between the Sukuk and STeFI. This outcome states, in sum, that there is a long-term relationship between the practical application of Islamic banking and conventional banking in South Africa. In short, the analysis answers the initial question posed by this paper: showing that there is an inconsistency between the theoretical foundations of Islamic banking and the application thereof within South Africa. This outcome may have serious consequences on the Islamic banking market in South Africa, having shown up the inconsistencies of its application.
Chapter 5: Conclusion

5.1 Overview
Since 1975, Islamic financial institutions have grown in stature. As of 2013, the industry is estimated to be worth over $1 trillion. With the growth of Islamic banking, there have been questions raised about whether Islamic banking instruments are flawed; in that, if they suffer from a relationship with the conventional banking market.

In establishing an Islamic financial instrument, one must take cognisance of the need to examine its consistency to Shari’ah. Shari’ah is the basis of Islam. Within the laws of Islam, it is accepted that the use of interest is prohibited under all circumstances. Given that basis, the requirement is that Islamic financial instruments should conform to Shari’ah, and, as a result, one would expect it to have no correlation with the conventional rate of interest. Should such a link exist in the long run, it is very likely that the instruments do not conform to Shari’ah and thus should not be described as Islamic instruments.

Islamic banking instruments come in two broad forms. The first is the PLS-method; and the second is the mark-up method. Under the umbrella term of PLS, the two modes of instruments which are widely used are the Mudaraba and Ijarah. These instruments operate on the basis of the bank acting as an investor with an enterprise and sharing in the profits and losses of that business. This, in turn, is passed on to its depositors. The more widely used application is the mark-up method, which includes Murabaha and the diminishing Musharakah instruments.

Within a South African context, the Islamic banking industry has grown phenomenally. Apart from Al-Baraka, which is South Africa’s only Islamic Bank, conventional banks (such as FNB, ABSA and Standard Bank) each has an Islamic financial window. But, it has been argued that in South Africa, less than 10% of Islamic instruments conform to the PLS-method of banking. From this, the implication is that the majority of instruments on offer are based on the non-PLS method. The non-PLS method, as stated, largely uses a predetermined rate of profit from the bank that is selling the instrument. Hence, this profit-sharing ratio is argued to be correlated to the conventional rate of interest.
The question therefore posed by this paper was if there were inconsistencies between the theoretical foundations and the application of Islamic banking in South Africa. This was investigated by establishing whether there is a long-term relationship between the conventional rate of interest and the rate of profit earned at or by Islamic banks in South Africa. In conducting a data analysis in a South African context, the conventional rate of interest was proxy to the STeFI index; whilst the rate of profit earned by the major South African Islamic instruments was proxy to the South African Sukuk composite index.

This paper can conclude that there is indeed a significant long-term relationship between the two variables under consideration. Placed in a time series, a cointegration test was successfully conducted on the two variables and proved with statistical significance that there is a long-term relationship. The analysis went further in constructing an ECM. By doing so, it showed that any short-term disequilibrium is corrected; and, usually, the Sukuk index falls in the periods following the measurement to reach its long-term equilibrium to the STeFI index.

5.2 Summary and conclusions
The overall conclusion was that there is a correlation and a long-term relationship between the STeFI and the Islamic Sukuk. The initial question posed by this paper was if there are inconsistencies between the theoretical framework and actual application of Islamic banking in South Africa. The data analysis answers this question in that there clearly is an inconsistency between the theory and application of Islamic banking in South Africa.

The inconsistency arises when the PSR used by an Islamic bank is based on the Islamic Sukuk composite index. The Sukuk index, being correlated with the STeFI, shows the inconsistency with the theory of Islamic banking. In this case, Islamic banking does not conform to Shari’ah; and shows that the Islamic banking industry is operating on the non-PLS method. This has serious implications for designers of Islamic banking instruments in South Africa and worldwide.

5.3 Recommendations
Recommendations would include Islamic banks advising their clients that their PSR is based on the Islamic Sukuk composite index. By doing so, clients are able to understand how their
PSR is determined and thereby have a sound comprehension of this and accept the fact there is a relationship between the Islamic Sukuk and STeFI on the conventional rate of interest.

A further recommendation is that designers of Islamic instruments try to make their instruments conform to Shari’ah. It may be possible to design a profit-sharing ratio that does not consider the Islamic Sukuk, but operates in a similar way to the waqf. By doing so, it would consider the rate of inflation, the expenses of the bank and an acceptable rate of profit; and, in so doing, might not have a correlation to the conventional rate of interest.

In terms of policy implications, this research could affect current Islamic banks and Islamic windows within conventional banks as it would imply that the banks would have to inform their consumers that non-PLS products are not Shari’ah compliant. It would also affect consumer agencies as they might have cause to conduct investigations to see the validity of some banks that advertise themselves as Shari’ah compliant institutions.

5.4 Future research
This study is limited in the sense that it uses the Sukuk composite index as a proxy for all major Islamic financial windows in South Africa. Whilst this is convenient as an accurate measure of the rates of return on Islamic instruments countrywide, there is an argument that would suggest not all Islamic instruments would have a relationship to the rate of interest in South Africa.

Future work would consider applying the methodology of this paper to specific Islamic windows in all the pertinent banks in South Africa, showing what percentage of instruments have a link to the rate of profit and how much is therefore based on the PLS and non-PLS methods, respectively. Given that the major banks in South Africa carry their own Islamic financial windows, this study, and the study by Vahed & Vawda, (2008) is limited in getting the intricate details of each institution. By doing so, one may be able to establish the most Shari’ah compliant institution in comparison with each institution which carries the Islamic instruments. This would be similar to the study conducted by Firoz (2011) which sought to break down the types of Islamic instruments used by the State Bank of Pakistan. A
comparison of a like nature between local Islamic banks and windows may prove to be very insightful.
# Appendix

Results of stationarity test for STeFI at level:

**Table A.1: Stationarity Test for STeFI at level – Intercept**

<table>
<thead>
<tr>
<th>Intercept</th>
<th>Coefficient</th>
<th>ADF</th>
<th>DF-GLS</th>
<th>KPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STeFI</td>
<td>0.000326</td>
<td>-1.6567****</td>
<td>-0.6765****</td>
<td>0.004936</td>
</tr>
</tbody>
</table>

* - Significant at 1%; ** - Significant at 5%; *** - Significant at 10%; **** - Not Significant.

**Table A.2: Stationarity Test for STeFI at level – Trend and Intercept**

<table>
<thead>
<tr>
<th>Trend and Intercept</th>
<th>Coefficient</th>
<th>ADF</th>
<th>DF-GLS</th>
<th>KPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STeFI</td>
<td>0.000219</td>
<td>-1.8443****</td>
<td>-0.8950****</td>
<td>0.0054</td>
</tr>
</tbody>
</table>

* - Significant at 1%; ** - Significant at 5%; *** - Significant at 10%; **** - Not Significant.

Results of stationarity test for Sukuk at level:

**Table A.3: Stationarity Test for Sukuk composite at level – Intercept**

<table>
<thead>
<tr>
<th>Intercept</th>
<th>Coefficient</th>
<th>ADF</th>
<th>DF-GLS</th>
<th>KPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sukuk Comp.</td>
<td>0.0028</td>
<td>-5.7240*</td>
<td>-2.0688**</td>
<td>0.2279*</td>
</tr>
</tbody>
</table>

* - Significant at 1%; ** - Significant at 5%; *** - Significant at 10%; **** - Not Significant.

**Table A.4: Stationarity Test for Sukuk composite at level – Trend and Intercept**

<table>
<thead>
<tr>
<th>Trend and Intercept</th>
<th>Coefficient</th>
<th>ADF</th>
<th>DF-GLS</th>
<th>KPSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sukuk Comp.</td>
<td>0.0029</td>
<td>-5.7163*</td>
<td>-5.5176*</td>
<td>0.1558**</td>
</tr>
</tbody>
</table>

* - Significant at 1%; ** - Significant at 5%; *** - Significant at 10%; **** - Not Significant.
References


Koop, G., 2005. *Analysis of Economic Data*. 2nd ed. Chichester: John Wiley & Sons Ltd.


