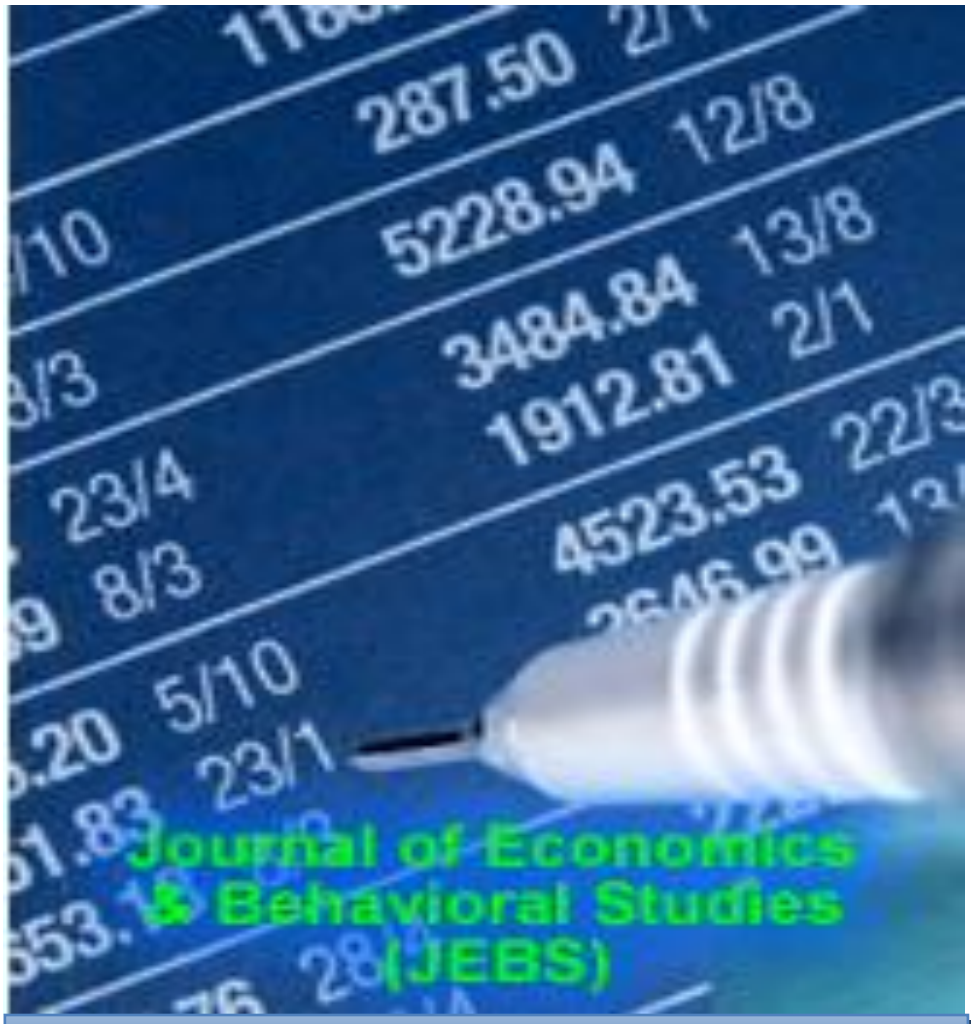

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Editorial

Journal of Economics and Behavioral Studies (JEBS) provides distinct avenue for quality research in the ever-changing fields of economics & behavioral studies and related disciplines. Research work submitted for publication consideration should not merely limited to conceptualization of economics and behavioral developments but comprise interdisciplinary and multi-facet approaches to economics and behavioral theories and practices as well as general transformations in the fields. Scope of the JEBS includes: subjects of managerial economics, financial economics, development economics, finance, economics, financial psychology, strategic management, organizational behavior, human behavior, marketing, human resource management and behavioral finance. Author(s) should declare that work submitted to the journal is original, not under consideration for publication by another journal, and that all listed authors approve its submission to JEBS. Author (s) can submit: Research Paper, Conceptual Paper, Case Studies and Book Review. Journal received research submission related to all aspects of major themes and tracks. All submitted papers were first assessed by the editorial team for relevance and originality of the work and blindly peer-reviewed by the external reviewers depending on the subject matter of the paper. After the rigorous peer-review process, the submitted papers were selected based on originality, significance, and clarity of the purpose. The current issue of JEBS comprises of papers of scholars from South Africa, Namibia, Zimbabwe, Japan, Tanzania, Uganda, Ethiopia and Indonesia. Human capital development and economic growth in BRICS countries, the effect of fiscal policy on capital flight, feeding management and extent of commercialisation among the smallholder dairy farmers, analysis of macroeconomic determinants of remittances, consideration of future consequences on financial behavior, challenges/barriers preventing the youth in becoming entrepreneurs, effect of climate change on agricultural crop returns, estimation of technical efficiency of micro and small-scale manufacturing enterprises and strategy of strengthening food and beverage industry were some of the major practices and concepts examined in these studies. Current issue will therefore be a unique offer where scholars will be able to appreciate the latest results in their field of expertise, and to acquire additional knowledge in other relevant fields.

Prof. Sisira R N Colombage, Ph. D.
Editor In Chief

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PAPERS

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Human Capital Development and Economic Growth in BRICS Countries: Controlling for Country Differences

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Abstract: This paper investigates the effect of human capital development on economic growth, as well as controlling for country differences, in the BRICS economies – from 1990 to 2017. Ordinary Least Square (OLS) and Generalized Method of Moments (GMM) were used as the estimation techniques. We use one-way ANOVA and Scheffe pairwise comparison tests to understand how human capital development differed between each pair of countries. Findings suggest that the effect of human capital development on economic growth, though significant, was limited in these countries. A comparative analysis of results showed that China, Brazil and Russia were able to utilise their human capital to enhance economic growth more efficiently than South Africa and India. Consequently, this study observed that a 1% increase in government expenditure on education would result in a 0.13% increase in GDP for China, a 0.06% increase in Russia, a 0.07% increase in Brazil, a 0.04% increase in South Africa, and a 0.01% increase in GDP in India. In addition, the study concluded that human capital development practices differ in all the countries. Although this result was previously implied in the literature, comparison of a comprehensive list of human capital development practices among countries was lacking. Overall, the paper argues that the classical theory of economic growth, in combination with the new theory, and also the theory of market value, will not only help sustain a strategy tripod, but also shed significant light on the most fundamental questions confronting human capital development and economic growth in many developing economies.

Keywords: *Human Capital Development, Economic Growth, OLS, GMM, BRICS Economies.*

1. Introduction

Human beings are the most important source of growth in productivity and economic growth (Pelinescu, 2015; Ahmad & Schroeder, 2003; Mankiw, Romer & Weil, 1992). This is on the premise that equipment and technology are products of human ingenuity. And consequently the success of any productive programme depends on human innovative ideas and creativity (Asikhia and Awolusi, 2015; Mustapha, Fakokunde and Awolusi, 2014; Adelakun, 2011; Pelinescu, 2015). According to Adelakun (2011), human capital can be described as the abilities and skills of human resources. Although sometimes used interchangeably the term 'human capital development', this term refers to the process of acquiring and increasing the number of persons who have the education, skills, and experience which are critical for the economic growth of any nation (Harbison,1962; Adelakun, 2011; Abramowitz, 1981). Corroborating these assertions, the growth theory also emphasises the influence of human capital development on economic growth (Romer, 1986; Lucas, 1988), as the global economy shifts towards more knowledge-based sectors (Adelakun, 2011; Pelinescu, 2015). Today, researchers and practitioners agree that human resources can be a source of competitive advantage that should be managed strategically (Asikhia and Awolusi, 2015; Awolusi, 2013a; Awolusi, 2013b; Ahmad & Schroeder, 2003; UNCTAD, 2015).

Hence, human capital development is imperative for policy makers in their quest for economic growth and development – both at the national and regional level (RSA, 2013; OECD, 2010). Based on the above background, the BRICS economies have been strategically positioned – not only to increase world growth, but also to serve as a reference model for other developing economies (UNCTAD, 2015; UNDP, 2014). BRIC is a grouping acronym, coined in 2001 by Goldman Sachs analyst Jim O'Neill, and refers to the countries of Brazil, Russia, India and China, which are all deemed to be at a similar stage of newly advanced economic development (Goldman Sachs, 2001). However, after the BRIC countries formed a political organisation among themselves, they later expanded to include South Africa – becoming BRICS (UNDP, 2014). These countries occupy more than 25% of the habitable surface area of the planet altogether, and 40% of the world's population live in them (UNCTAD, 2013). China is known as the factory of the world, Brazil as the garden of the world, Russia as the gas station of the world, while the back office of the world is India and

South Africa is the jeweler of the world and a gateway to Africa (RSA, 2013). The collaboration of these countries is aimed at meeting the economic needs of this Century.

Which include infrastructure development, consumption and increased trade they also have much in common in terms of population, GDP and unemployment? BRICS' collective contribution to world GDP has increased from 11% in 1990 to 25% in 2011. According to Goldman Sachs (2001), these countries are collectively expected to overtake the major economic powers over the next few decades. Their growth is expected to shape a new economic order – replacing the one currently dominated by advanced economies (UNCTAD, 2015; RSA, 2013). However, the BRICS economies are still confronted with numerous problems (e.g. poor investment in road, rail, ports and energy; obsolete capital equipment; very large public debt as a percentage of GDP; environmental issues as obstacles to sustainable growth; increasing income inequality; high unemployment rates; rising labour costs; and a high lending interest rate) that could jeopardise the attainment of these noble objectives (UNCTAD, 2015; UNDP, 2014). Therefore, there is an urgent need to put in place strategies aimed at empowering the citizenry to acquire the required skills and knowledge that would prepare them for the vast challenges ahead (Aregbesola, 2014; Adelakun, 2011). Moreover, various macro-empirical works on the relationship between human capital and economic growth have shown the probable positive impact of human capital development on overall economic growth (Ozturk, 2007). The findings of David Ricardo (comparative advantage), Heckscher-Ohlin (factor proportions), and Porter's Competitive Advantage also establish the inevitability of human capital and other factors as the foundation upon which a nation's economic growth can be built (Aregbesola, 2014; Anyanwu, 2012).

Consequently, the vast literature on human capital development in developing countries clearly indicates the importance of education, improved health facilities, skills, infrastructure, innovation and macroeconomic stability as imperatives for economic growth (Pelinescu, 2015; Ozturk, 2007; Mahe, 2005). While many scholars concur about the positive influence of human capital on economic growth – given government investments and appropriate policies – others also highlight the potential drawbacks (De la Fuente & Doménech, 2000, 2006; Benhabib & Spiegel, 1994; Pelinescu, 2015). For instance, De la Fuente and Doménech (2000, 2006) observed a positive and significant statistical correlation between production and human capital, both in level and in first-order differences. Ncube (1999) observed an increase of 6% in GDP per capita given a corresponding increase in duration of schooling by one year in the OECD countries for the period 1971 to 1998. Bundell et al. (1999) also analysed the impact of human capital on economic growth, and established positive relationships between economic growth and the rate of accumulation of human capital and innovation. This is on the premise that higher human capital intensity will permit developing countries to increase their productivity (growth rate) (Aregbesola, 2014; Adelakun, 2011). Consequently, it is imperative for developing economies to maintain a high level of educational attainments via massive investment in human capital (e.g. education, health, law and order, social infrastructures). However, contrary to the above positive sentiments, Benhabib and Spiegel (1994) observed an insignificant effect of human capital on growth of GDP per capita.

Although many of these studies have examined the influence of human capital development on economic growth – with most reporting mixed results – there seem to be only a few empirical analyses on this phenomenon (Pelinescu, 2015; De La Fuente & Domenéch, 2006; Durham, 2004). In addition, several studies in the literature also investigated the impact of Foreign Direct Investment (FDI) on economic growth (Saggi, 2002; Johnson, 2006; Madsen, 2007; Ozturk, 2007; Durham, 2004; Agrawal & Khan, 2011), with some of the studies related to improved economic growth. However, they paid little attention to human capital development. This lack of attention is surprising when one considers the critical role of human resources in achieving superior growth and poverty reduction (Pelinescu, 2015; De La Fuente & Domenéch, 2006). Thus, Pelinescu (2015) specifically suggests the need for a survey of relationships between human capital development and economic growth. In addition, empirical validation of the findings across countries is virtually non-existent and very limited at best (Aregbesola, 2014; Anyanwu, 2012). While recent trends toward globalisation make the study of human capital practices in the context of country a necessity (UNCTAD, 2015; UNDP, 2014; Anyanwu, 2012), the literature has also emphasised the need for generalisability of the relationship between human capital development and economic growth (Ahmad & Schroeder, 2003; UNCTAD, 2015). Juxtaposing the limited empirical examination of broad-based human capital practices across countries in the literature, Ahmad and Schroeder (2003) observed that previous

empirical studies which were related to human capital development, have been conducted using data from a single industry within one country; at best.

Some studies used data from multiple industries in one or multiple countries (Pelinescu, 2015; Ahmad & Schroeder, 2003; Anyanwu, 2012). In addition, unlike previous studies which largely considered either developed and developing economies, or a group of both developed and developing economies, our study focuses solely on developing countries (the BRICS countries)? Hence, the analytical focus was premised on developing countries, due to Wyk and Lal's (2008) submission. According to Wyk and Lal (2008), the practice of pooling developed and developing economies together in analysing the impact of human capital development on growth, is inappropriate. This is because developed economies have substantial amounts of two-way human capital flows – unlike the developing nations (El-Wassal, 2012). The above considered, the main objective of this study was to investigate the effect of human capital development on economic growth – as well as controlling for country differences – in the BRICS economies from 1990 to 2017. First, we investigate whether human capital development differs by country. Next, we assess the impact of human capital development on economic growth.

The first step is important, since we intend to identify the generalisable influence of human capital development practices on economic growth across countries, and it is important to understand the differences in human capital development practices in various countries (Pelinescu, 2015; Mustapha et al., Asika and Awolusi, 2013; Awolusi, 2013a; Ahmad & Schroeder, 2003). By investigating BRICS economies, this study contributes to the existing body of literature on human capital and the economic growth nexus, due to the significant amount of foreign direct investments into these countries during the last few decades. With the abundant natural resources in BRICS and other developing economies, this study also creates an opportunity for strategic improvements in trade, skills, knowledge transfers, and economic growth in these countries (Johnson, 2006; Madsen, 2007). Increased human capital would also stimulate economic growth – thereby enabling the BRICS nations to address some of their persistent problems of high unemployment and poverty (RSA, 2013). Section two of this paper is the literature review; section three details the adopted methodology; section four includes the analysis of the various data collected, and results and discussion of findings; while section five presents the conclusion and implications of the study.

2. Review of Literature

Theoretical Framework: A single theoretical perspective could not adequately explain the influence of human capital development on economic growth (Pelinescu, 2015; Mahe, 2005). Consequently, among the most commonly applied theories are classical theory of economic growth and the new theory of economic growth. These two theories are used as the theoretical foundation for almost 70% of the previous studies on the human capital-growth nexus (Riley, 2012; Lucas, 1988). In addition, the neoclassical models of growth and endogenous growth models also support most of the empirical work on the human capital-growth relationship (Ozturk, 2007; De Mello, 1996, 1999). According to the neoclassical growth theory, economic growth normally comes from strategic accumulation of factors of production and total factor productivity (TFP) growth (Felipe, 1997). That notwithstanding, these two derivatives also depend on the host country's bargaining power in providing the supporting human capital, policies, and infrastructural development (Fedderke & Romm, 2005). However, the deficiencies noticed in the neoclassical growth theory (difficulties in the measurement of TFP growth and lack of appropriate econometric modeling techniques), gave rise to the endogenous growth theory (Johnson, 2006; Madsen, 2007).

This theory, on the other hand, strengthened the contributions of human capital to the growth debate. The endogenous theory also posits an improvement in economic growth through knowledge transfers and capital formation (Asikhia and Awolusi, 2015; Borensztein et al., 1998; Blomstrom et al., 1996) – but also cautioned on the need to augment the level of knowledge via skill acquisition and labour training (De-Mello, 1997, 1999). Moreover, the importance of technological diffusion and innovation in enhancing economic growth in developing economies was also advanced by other endogenous growth theorists (Asikhia and Awolusi, 2015; Awolusi, 2013b; Eaton & Kortum, 1999; Young, 1991). Ultimately, the importance of technological change on economic growth is often emphasised in the new growth literature (Grossman & Helpman, 1990). According to the new growth theory, the growth rate of less developed countries is seen to be greatly dependent on the

rate at which any developing economy can easily adopt and implement new technologies from developed nations (Ozturk, 2007). However, previous studies (Riley, 2012; De la Fuente & Doménech, 2000, 2006) indicate that the existing theories do not sufficiently explain.

The influence of human capital development on economic growth, and they have called for either the extension of existing theories or the development of new theories to explain this phenomenon (Mankiw et al., 1992). In addition, much of the existing literature does not agree on the conceptual framework and constructs that should be used to explain the relationships between human capital and economic growth, while a theoretical framework can be based on more than one theory (De la Fuente & Doménech, 2006). Consequently, the theoretical framework for this study was based on the four (classical theory of economic growth, the new theory of economic growth, the theory of market value, and human capital theory) most common theories of economic growth-human capital nexus (Pistorius, 2004; Siggel, 2000, 2001; Horwitz, 2005). This study was positioned as a step ahead of Funke and Strulik (2000), who adopted a model that incorporates aspects of the classical theory with the new theories of economic growth. However, considering the Grossman-Helpman model and the level of technological growth as an endogenous factor, many studies posit for increased expenditure on research and development to realize the desired economic growth (Pelinescu, 2015; Ahmad & Schroeder, 2003).

According to Pistorius (2004), the classical theory of economic growth regards labour productivity as an exogenous factor, which often fails to reflect the beneficial influence of education on the potential growth of productivity. This shortcoming was corrected by the new theory of economic growth, with emphasis on the influence of education and innovation on long-term economic growth (Riley, 2012). This is on the premise that – as physical capital contributes to improvements in income per capita in the early stages of development – the accumulation of knowledge (through continuing education and training) ultimately leads to higher stages of development (Ahmad & Schroeder, 2003). These investments are usually in the form of government expenditure on education, health, infrastructure, nutrition and social protection (Asikhia and Awolusi, 2015; Awolusi, 2013a; Siggel, 2001; Horwitz, 2005). Adelakun (2011) also maintains that government provision of education is seen as being a productive investment in human capital development, an investment which is sometimes preferred to physical capital acquisition. This assertion is also corroborated by the modernisation theory, with a focus on the transformational capabilities of education and institutions (such as schools, factories, and mass media) on individual's beliefs, values, and behavior (Aregbesola, 2014).

According to this theory, the greater the number of people exposed to modernisation institutions, the greater the level of economic growth and development (Adelakun, 2011). However, differing to the above theories, the theory of market value extended these imperatives to intangible assets such as patents and intellectual capital, and research and development (De la Fuente & Doménech, 2000, 2006). The human capital theory views education and training as an investment in skills and competences (Schultz, 1992). According to Aregbesola (2014), individuals make decisions on the education and training they receive in order to improve their productivity. Consequently, the human capital theory posits that a more educated or skilled workforce makes it easier for an organisation to adopt and implement new technologies and innovative capabilities (Adelakun, 2011). In addition to recognising employee experience, skills, and knowledge as assets with the potential to generate economic rent; the human capital theory evaluates human resources through productivity gains (Ahmad & Schroeder, 2003).Ahmad and Schroeder (2003), while drawing on a behavioural psychology-perspective, highlighted the strategic aspect of human capital practices and argued why these practices can lead to competitive advantage in many developing nations. Consequently, the four human capital indices suggested by Pelinescu (2015) are expected to foster such inimitable attributes in human capital development and thereby help developing countries attain a competitive advantage.

Human Capital Development and Economic Growth: Human capital is an important factor in the production process (Pelinescu, 2015; Ahmad & Schroeder, 2003). Consequently, the development and utilisation of human capital is important in a nation's quest for economic growth and poverty reduction (Adelakun, 2011). On the other hand, GDP (proxy for economic growth) indicates the amount of economic production taking place in an economy, calculated as the total output within a specific year (Pelinescu, 2015). A number of interesting studies on the role of FDI in stimulating economic growth have appeared in the past three decades. Notable are the broad methodological series, starting from the Solow structural econometric

models, to the convergence analyses proposed by Barro and Sala i Martin (1995) – through to the panel models in cross-country data analysis (Islam, 1995; Pelinescu, 2015). That notwithstanding, Bhagwati (1978) was the first to present a theory on the influence of FDI and human capital on growth in a given host country. An extension of the theory (popularly referred to as "Bhagwati hypothesis") highlighted the role of cheap human capital (labour) as a catalyst to increased competitive and export-oriented products in a relatively free environment (Bhagwati, 1985, 1994; Brecher & Findlay, 1983). In addition, economic growth can also be accelerated via employment, and through sharing of knowledge and management skills' integration in the host country (Frenkel et al., 2004). Government investment in innovation, R&D, and learning, may also generate productivity spillovers for the host economy (Temple, 1999; Blomstrom & Kokko, 1998). As an extension to the literature on FDI, the impact of human capital development practices on economic growth has also been the subject of much attention over the years. A large body of literature has revealed the influence of human capital on economic growth (Riley, 2012; Lucas, 1988; Mankiw et al., 1992; De la Fuente & Doménech, 2000, 2006; Serena & Freire, 2001) – with regard to both the effect of level (so called level effect).

Its decisive influence on production through labor productivity (Romer, 1990; Mankiw, Romer & Weil, 1992) and the rate effect by contributing to increased competitive advantage through innovation and diffusion of technology (Pistorius, 200; Siggel, 2000, 2001; Horwitz, 2005). For instance, the positive influence of quality education more than quantity was highlighted by Hanushek and Kimko (2000) and Hanushek and Woessmann (2007) in these studies, human capital development was proxied by the results of PISA and TIMS tests. Similarly, Hanushek and Schultz (2012) showed that a 100 point divergence in PISA test results would lead to a 2% difference in the growth rate of GDP per capita (Pelinescu, 2015; Okojie, 1995). Other studies also show the positive influence of human capital development on economic growth (Odusola, 1998; Barro & Sala-i-Martin, 1995). However, in a deviation from previous studies, Filmer and Pritchett (2001) specifically show lack of significant relationships between improved human capital via higher educational attainments and the rate of growth of output per worker.

Control Variable: Part of the objectives of this study was the need to identify the influences of human capital development practices on economic growth that can be generalized across countries, but the effects of the country need to be ascertained prior to evaluating the relationships (Ahmad & Schroeder, 2003; Anyanwu, 2011, 2012). This study therefore included the following country control variables in the regression analyses: Russia (Russia compared to China), Brazil (Brazil compared to China), South Africa (South Africa compared to China) and India (India compared to China), are used to represent the five countries. This is on the premise that studies have argued that human capital development practices can differ across countries for several reasons (e.g. cultural idiosyncrasy, governmental regulations and policies, competitive priorities), and its adoption for both managerial and theoretical practices (Pelinescu, 2015; Ahmad & Schroeder, 2003; Aregbesola, 2014; Anyanwu, 2012; Gustav & Stewart, 2001). These studies also juxtaposed previous emphasis on the generalisability of the relationship between human capital development and economic growth.

For example, Pelinescu (2015) and Ahmad and Schroeder (2003) raise concerns that the results of previous studies on human capital practices and economic growth may not be valid in other countries. These studies urged and advised the need to validate and some of these studies in other countries in order to rule out country effects. Consequently, the impact of human capital development on economic growth in the BRICS economies can be generalised across many developing countries, if we find support for the set of hypotheses below: **H1.** After controlling for the country effects, economic growth will be positively related to each of the following seven human capital practices:(a) government expenditure on education;(b) government expenditure on health; (c) weighted average of the population registered in primary, secondary and tertiary education; (d) number of employees with secondary education; (e) exports of goods and services; (f) registered patents and intellectual capital, and (g) expenditure on research and development.

3. Methodology

Given that the economic model specification is based on economic theory and on the available data relating to the human capital being studied (Mankiw et al., 1992), the study employed a modified model from the works of Pelinescu (2015), Adelakun (2011), and Mankiw et al. (1992). Based on the availability of data, the time-

series data (annual data, stationary by logarithm) of the BRICS countries (Brazil, Russia, India, China, and South Africa) from 1990 to 2017, were estimated using Ordinary Least Squares regression (OLS) and the Generalised Method of Moments (GMM). Firstly, to control for country differences, we use one-way ANOVA and Schaffer pairwise comparison tests to understand how human capital management differed between each pair of countries. Secondly, we performed an OLS with time fixed effects. In addition, due to a probable endogeneity and serial correlation of the error term (Coe & Helpman, 1995; Keller, 2002), the second stage was complemented with the GMM technique to provide consistent estimates (Keller, 2001). The data set was collected from the following sources: United Nations Conference on Trade and Development, United Nations Development Programme Database, World Bank Databank, World Economic Forum database, the International Monetary Fund (IMF), the United Nations Statistics Database (UN data), and publications of national central banks and other agencies of the governments of the BRICS countries.

OLS and GMM Estimation Techniques: The source model for this study was based on the work of Pelinescu (2015), Adelakun (2011), and Mankiw et al. (1992)-as stated in equation 1.

$\ln RGDPGR_t = \alpha 0 + \alpha 1, \ln I_t + \alpha 2 \ln EMP_t + \alpha 3 \ln H_t + u_t$ ……equation 1

Given α1, α2, α3>0, RGDPGR is the growth rate of real gross domestic product, I is investment to GDP ratio, EMP is employment rate, H is human capital proxied by total capital expenditure on health and education, and ln stands for logarithm transformation. However, it is important to note that the source model was constructed from the basic production function below:

$Y = f(K, L)$……..…..equation 2

Where:

Y= Output level (i.e. GDP),

K= Capital (Gross Capital Formation (GCF) as percentage of GDP), and

L= Labour (Country's labour force).

Equation 2 is based on the assumption that K and L determine the level of output in an economy (Ogutcu, 2002). Consequently, given constant technology, an increase in labour and/or capital will increase output level in the economy. However, based on the new growth theory (Barro & Sala-i-Martin, 1995; Ogutcu, 2002), to analyze the effect of human capital on economic growth, the Coub-Douglas Production Function (equation 2) was expanded with the addition of human capital (H). Consequently, the augmented production function can be stated thus:

$Y = f(K, L, H)$……..equation 3.

Alternatively, equation 3 can be stated thus:

$\text{Log}(GDP\_PPP) = \alpha \log H + \beta \log X + \theta i + \gamma t + \varepsilon$……..…..equation 4

In the abridged equation 4, the dependent variable is the logarithm of real per capita GDP (GDP_PPP), and is a direct function of human capital (H) and other relevant factors (X). γt and θi are dummy variables capturing the time and country fixed effects, and ε is the error term. In summary, given the small sample (selected BRICS countries) size, the assumptions of the GMM dynamic estimator also applies:

$s = 2$ and $t = 3,...,T$,

$E[Y_{i,t-s}.(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0$, where $s \geq 2$; $t = 3,...,T$,……..equation 5

$E[Z_{i,t-s}.(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0$, where $s \geq 2$; $t = 3,...,T$ ……..equation 6

Therefore equation 4 can be translated and expanded to our multiple regression equation:

$Y_{i,t} = \beta_0 + \beta_1 GEE_{i,t} + \beta_2 GEH_{i,t} + \beta_3 PPST_{i,t} + \beta_4 ESE_{i,t} + \beta_5 EXP_{i,t} + \beta_6 P\&I_{i,t} + \beta_7 R\&D_{i,t} + \mu_i + \varepsilon_{i,t}$……..equation 7.

Where Y = real per capita GDP (GDP_PPP),

GEE = Total government expenditure on education

GEH= Total government expenditure on health

PPST = Weighted average of the population registered in primary, secondary and tertiary Education,

ESE = Number of employees with secondary education

EXP= Exports of goods and services

P&I= No of registered patents and intellectual capital

R&D= Expenditure on research and development

β_0 = Total Factor Productivity

μ_i = country specific effects, and
$\varepsilon_{i,t}$ = the error term.

Surprisingly, government attention to the health sector was highest in South Africa and lowest in Brazil. Another surprising result was the attitude of government expenditure and management of research and development, and patent and intellectual capital, despite huge government expenditure on education in Russia. This seems to support Awan (2013), who found that Russia, which was endowed with human capital right from the beginning, has not been able to utilise her human capital potential during the transitional period from planned economy to market economy since the 1990s. In summary, this study found that human capital practices vary widely by country. The differences may not be unconnected with the level of natural resources, national culture, location variables, and institutional capabilities (Pelinescu, 2015; Awan, 2013).

Operationalisation of the Dependent and Explanatory Variables: A stochastic element ε and β are parameter to be estimated. GDP (PPP) is measured using the World Bank's Purchasing Power Parity (PPP) levels. GDP at PPP uses exchange rates to benchmark the sum value of all goods and services produced in a country valued at prices prevailing in US$. This makes possible comparisons amongst different countries (Pelinescu, 2015; Adelakun, 2011; Grammy & Assane, 1996). Measurement of human capital development was based on the human capital index, which in determination of the European Union, is based on four groups of areas (investment in education, the use of human capital stock, the productivity of human capital, and employment of human capital). This is similar to the human capital index determined by the World Economic Forum (includes 4 pillars: Education, Wealth and Wellness, Workforce, and Employment and Enabling Environment– which includes infrastructure, legal and other factors that ensure valuing of human capital). All the constructs and their measures are shown in Table 1 (below). However, log values of the variables were used to facilitate the use of the ordinary least square method (Agrawal & Khan, 2011; Bils & Klenow, 2000).

Table 1: The Measure of Constructs (Dependent and Explanatory Variable)

Variable	Measure	Theory	Author
GDP_PPP	Real level of GDP per capita		Riley, 201; Lucas, 1988; Mankiw et al. 1992; Pelinescu, 2015
GEE	Total government expenditure on education	Classical	De la Fuente and Doménech, 2000, 2006; Pelinescu, 2015
GEH	Total government expenditure on health	Classical	De la Fuente and Doménech, 2000, 2006; Pelinescu, 2015
PPST	Weighted average of the population registered in primary, secondary and tertiary education	New theory	Murthy and Chien, 1997
ESE	Number of employees with secondary education	Classical/New theory	Mankiw, Romer and Weil, 1992; Pelinescu, 2015
EXP	Exports of goods and services	Market value	Romer, 1990;Pelinescu, 2015
P&I	No of registered patents and intellectual capital	Market value	Pistorius, 2004; Siggel, 2000, 2001
R&D	Expenditure on research and development	Market value	Pistorius, 2004; Siggel, 2000, 2001; Horwitz, 2005

4. Results and Discussion of Findings

We here first present the unit root test results. Second, we conduct a statistical analysis to determine the extent to which human capital development practices differ across countries. Third, the estimated regression results are presented to test the hypotheses. Lastly, the discussion of findings is presented based on the hypotheses stated earlier.

Unit Root Test: A standard augmented Dickey-Fuller (ADF) test and Phillips Perron (PP) test was conducted to test for non-stationarity (presence of unit roots), to eliminate autocorrelation, and whiten noise and

uncorrelated error terms (Hair et al., 1998). These tests were conducted at level, first difference and second difference series (Hair et al., 1998; Ozturk, 2007). The results of the unit root tests are presented in Table 2 (below).

Table 2: Summary of Unit Root Test Results

Variables	ADF Test: 2nd Diff. Statistics	PP Test: 2nd Diff. Statistics	Order of Integration
China			
Ln GEE	-5.467644	-3.765446	1(2)
Ln GEH	-7.345327	-5.765237	1(2)
Ln PPST	-5.754635	-3.697335	1(2)
Ln ESE	-3.763453	-4.573655	1(2)
Ln EXP	-2.675434	-3.662856	1(2)
Ln P&I	-3.243677	-3.345335	1(2)
Ln R&D	-4.355767	-5.356754	1(2)
RUSSIA			
Ln GEE	-5.375645	-3.945567	1(2)
Ln GEH	-4.456567	-4.945567	1(2)
Ln PPST	-2.445456	-6.793456	1(2)
Ln ESE	-3.455673	-4.565554	1(2)
Ln EXP	-3.546354	-5.193452	1(2)
Ln P&I	-4.566644	-3.234566	1(2)
Ln R&D	-4.675744	-5.356754	1(2)
BRAZIL			
Ln GEE	-5.865475	-3.334556	1(2)
Ln GEH	-4.735495	-5.334526	1(2)
Ln PPST	-3.554456	-1.456745	1(2)
Ln ESE	-4.767556	-6.745637	1(2)
Ln EXP	-3.564667	-3.352567	1(2)
Ln P&I	-4.456357	-5.733453	1(2)
Ln R&D	-2.566654	-3.356754	1(2)
SOUTH AFRICA			
Ln GEE	-3.655725	-3.845557	1(2)
Ln GEH	-3.655657	-3.845637	1(2)
Ln PPST	-4.777678	-4.848579	1(2)
Ln ESE	-3.754567	-2.774538	1(2)
Ln EXP	-3.767754	-4.845683	1(2)
Ln P&I	-3.455432	-5.467545	1(2)
Ln R&D	-4.653555	-4.356754	1(2)
INDIA			
Ln GEE	-3.455676	-5.345637	1(2)
Ln GEH	-4.564656	-4.345637	1(2)
Ln PPST	-3.554678	-3.898547	1(2)
Ln ESE	-4.985686	-3.234256	1(2)
Ln EXP	-3.786877	-4.239657	1(2)
Ln P&I	-5.755464	-2.395557	1(2)
Ln R&D	-3.655465	-5.356754	1(2)

Note: Critical Values: (ADF): 1% -3.45639; 5% -2.98834; 10% -2.3444; (Phillips-Perron): 1% -3.3435; 5% -2.74564; 10% -2.27782. The results of the unit root test simply assumed stationarity of the series for all the variables (by rejecting the null hypothesis for second difference at all the critical values). Therefore, the models follow an integrating order of 1(2) process and are a stationary process (Ozturk, 2007).

One-Way Anova and Scheffe Pairwise Comparison Tests Result: One of the main strategic intents of this study was to identify generalisable impacts of human capital development practices on economic growth across countries. The study used one-way ANOVA to identify differences in human capital development practices among the five BRICS countries. The output of this test is shown in table 3 (below). From Table 3, *F*-statistics for all the human capital development practices were found to be highly significant. This simply implied differential in the mean efforts expended in all the human capital development practices in all the BRICS countries. It could be concluded that human capital development practices differ in all the countries, due to the statistical significance of the *F*-statistics (Ahmad & Schroeder, 2003). The variations may be because human capital development is a set of interrelated and internally consistent human capital practices that are expected to create mutually reinforcing and synergistic impacts on economic growth (Adelakun, 2011; Ahmad & Schroeder, 2003). Although this result was previously implied in the literature (Pelinescu, 2015; Ahmad & Schroeder, 2003), comparison of a comprehensive list of human capital development practices among countries was lacking. This is a unique finding of this study, since it empirically validates ideal-type human capital development in many developing countries.

Table 3: Human Capital Development Practices across Countries

Human Capital Practice	Countries					Pairwise differences	*F*-value	Significance
	RUSSIA (1)	BRAZIL (2)	SOUTH AFRICA (3)	INDIA (4)	CHINA (5)			
GEE	7.20	7.56	5.87	5.67	12.42	(1, 2)**(1, 4)**(2,4)**(5, 3)**	6.29	0.01
GEH	6.33	2.34	9.21	3.29	8.76	(1, 2)**(1, 3)**(3, 4)**(5, 3)**	12.28	0.01
PPST	23.43	6.31	5.12	6.01	18.21	(1, 3)**(3, 1)**(3, 4)**(4, 5)**	18.08	0.01
ESE	20.41	13.38	4.38	5.38	17.38	(1, 2)**(1, 4)**(3, 2)**(4, 2)*	7.24	0.00
EXP	23.32	13.11	3.11	4.15	33.11	(1, 2)*(3, 4)**(4, 2)*	11.27	0.00
P&I	3.44	8.34	6.58	6.56	13.37	(1, 2)*(3, 2)**(3, 5)**	6.36	0.01
R&D	4.12	7.33	6.15	5.33	8.65	(1,4)**(2, 3)**(3, 2)**(4, 2)*	12.46	0.00

Note: *, **, *** denote significance at 1%, 5%, 10% levels.

Additionally, to control for country differences, the Scheffe pairwise comparison tests of mean differences were conducted to better understand how human capital practices differed between each pair of countries (Pelinescu, 2015; Ahmad & Schroeder, 2003). Based on the output in Table 3, the comparison revealed several key aspects of human capital development practices, as they are used in different countries. Compared to other countries in this sample, South Africa and India seem to be significantly lacking in their efforts in several human capital development practices. Although South Africa performed better in the health sector, the country recorded the least effort on variables like GEE, PPST, and ESE. India also performed poorly on variables like GEH, P&I, and R&D, when compared with South Africa. Moreover, government expenditure on education was given highest priority in China and the lowest in South Africa. In addition, China performed better than other countries on variables like GEH, EXP, P&I and R&D.

OLS and GMM Results and Discussion of Findings: In all the human capital development measures, the assumption of independent errors was tested with the Durbin-Watson statistics, which monitor for serial correlations between errors (Akinlo, 2004). Estimated values of 1.99, 2.03, 1.98, 2.03, and 2.10 for China, Russia, Brazil, South Africa, and India respectively, complies with the assumption of no independent errors (Coe & Helpman, 1995).

Table 4: OLS and GMM Estimation Regression Results for Human Capital Development

		OLS		GMM		
CHINA	**Variable**	**β–Coefficient**	**t-Statistic**	**β –coefficient**	**t-Statistic**	**Probability**
	GEE	0.13**	3.67	0.22*	3.76	0.07
	GEH	0.13**	3.17	0.21**	4.98	0.08
	PPST	7.56*	7.30	8.45**	7.44	0.05
	ESE	6.53**	9.19	3.34***	2.75	0.00
	EXP	15.33*	8.33	16.11*	2.39	0.00
	P&I	9.34*	9.78	7.23*	4.67	0.09
	R&D	7.34*	9.42	4.33*	3.62	0.06
	Constant	144.61*	23.11	111.27**	12.28	0.00
		r= 0.62 R^2 = 0.69 Adjusted R^2 =0.61 Durbin-Watson = 1.99				
RUSSIA	***Variable***	OLS		GMM		
		β–Coefficient	***t-Statistic***	***β–Coefficient***	***t-Statistic***	***Probability***
	GEE	0.06**	1.33	0.02	4.91	0.03
	GEH	0.09*	3.34	1.66**	3.97	0.07
	PPST	9.21**	6.51	9.94**	3.87	0.00
	ESE	14.38**	6.51	13.04**	2.98	0.00
	EXP	5.19*	4.24	4.15**	4.39	0.00
	P&I	5.85**	5.34	-4.26	2.64	0.01
	R&D	-1.35**	7.31	2.21***	3.22	0.06
	Constant	113.29**	22.81	129.29**	19.20	0.02
		r= 0.56 R^2 = 0.57 Adjusted R^2 =0.51 Durbin-Watson = 2.03				
BRAZIL	***Variable***	OLS		GMM		
		β–Coefficient	***t-Statistic***	***β–Coefficient***	***t-Statistic***	***Probability***
	GEE	0.07**	4.63	0.10*	3.98	0.09
	GEH	0.05**	3.63	0.06**	7.99	0.00
	PPST	5.43***	10.51	8.34***	3.28	0.03
	ESE	6.76***	9.66	5.56**	2.77	0.01
	EXP	11.61***	7.39	-4.11**	-2.31	0.00
	P&I	12.76***	5.06	5.26**	1.69	0.00
	R&D	9.73***	6.01	7.23**	2.34	0.06
	Constant	83.42***	15.42	42.21***	20.72	0.00
		r= 0.51 R^2 = 0.71 Adjusted R^2 =0.66 Durbin-Watson = 1.98				
SOUTH AFRICA	***Variable***	OLS		GMM		
		β–Coefficient	***t-Statistic***	***β–Coefficient***	***t-Statistic***	***Probability***
	GEE	0.04**	1.33	0.04***	2.44	0.08
	GEH	0.10***	3.45	0.12*	3.91	0.07
	PPST	3.33***	3.18	4.98**	3.19	0.10
	ESE	5.44***	4.38	5.94***	5.94	0.00
	EXP	5.66**	4.34	3.11** *	2.31	0.00
	P&I	6.32**	4.88	5.23***	1.63	0.01
	R&D	5.62**	5.11	4.21*	3.64	0.03
	Constant	91.33***	23.33	55.44**	18.31	0.00
		r= 0.45 R^2 = 0.56 Adjusted R^2 =0.49 Durbin-Watson = 2.03				
INDIA	***Variable***	OLS		GMM		
		β–Coefficient	***t-Statistic***	***β–Coefficient***	***t-Statistic***	***Probability***
	GEE	0.01	1.32	0.05***	0.21	0.00
	GEH	0.06**	4.31	2.11* *	3.25	0.08
	PPST	-1.32	-0.13	-3.55	-5.28	0.00
	ESE	2.44***	5.37	2.34***	1.22	0.04
	EXP	-3.62**	4.76	3.11 **	-2.44	0.07
	P&I	4.39**	2.77	4.23 ***	-1.66	0.09
	R&D	2.33**	2.77	-4.23 **	-1.66	0.10
	Constant	91.22***	14.99	105.21**	19.21	0.00
		r= 0.29 R^2 = 0.35 Adjusted R^2 =0.29 Durbin-Watson = 2.10				

Note: *, **, *** denote significance at 1%, 5%, 10% levels.

It also shows the absence of autocorrelation (Keller, 2001, 2002). The OLS and GMM estimation regression results for all the BRICS countries are shown in table 4 (below). Human capital development has played a vital role in the fast economic growth of the BRICS countries – especially China, Russia and Brazil. All the results have significant relationships with economic growth at varying levels except the influence of total government expenditure on education and the proportion of the population registered in primary, secondary and tertiary education in India. In general, the impact of human capital development on economic growth in BRICS countries is limited, and in some cases negligible for both OLS and GMM estimators. In the model of China, all the human capital development variables were positive and significant for both OLS and GMM, at varying levels of significance. In fact, China had the best results among the BRICS countries during the study period. The correlation coefficient (r) at 0.62 denotes a positive relationship between economic growth and human capital development. The adjusted R^2at 0.61 implies that about 61% variations in economic growth can be explained by human capital development practices, while the remaining 39% were due to other variables outside the regression model.

Although China recorded the best results in our study, the estimate of human capital development variables was limited, especially GEE and GEH, for both OLS and GMM. This indicates that human capital development contributed minimally in explaining the level of economic growth in China during the study period. For instance, a coefficient of 0.13 implies that a 1% increase in total government expenditure on education would result in a 0.13% increase in GDP for China. Russia also recorded minimal results in our study. Although the correlation coefficient (r) at 0.56 also implied a positive relationship between economic growth and human capital development, while the adjusted R^2 of 0.51 implied explanation for about 51% variations in economic growth, the estimate of human capital variables was also limited (especially GEE and GEH) for both OLS and GMM estimators. Specifically, the coefficient of 0.06 for government expenditure on education implies that a 1% increase in total government expenditure on education would result in a 0.06% increase in GDP for Russia. In fact, the influence later reduced to 0.02 over the years, judging by the result of the GMM estimator. Another surprising result was the inability of Russia to improve the contribution of R&D and P&I to economic growth – despite the country's human capital endowments right from the beginning through its transitional period from planned economy to market economy since the 1990s.

According to Awan (2013), this was attributed to policy failure to capitalise on the value of human capital in accelerating economic growth. This also resulted in the scaling down of the Russian Federation to a middle income economy. Corroborating this stance, Agrawal and Khan (2011) also observed that government policies and programmes should always take cognisance of the expectations for sustained economic and population growth, by constantly comparing the quality of education and training needs of its citizens (Hailu, 2010; UNESCO, 2005). The estimated result for Brazil was relatively better than the results for Russia, South Africa and India. The human capital estimates were all positive and significant at varying levels for OLS and GMM. This was also corroborated with a correlation coefficient (r) of 0.51. The adjusted R^2 was also high at 0.66. This implied that about 66% variations in economic growth could be explained by human capital development during the study period, while the remaining 34% were due to other variables outside the regression model. The coefficients of government expenditure on education and health were also minimal at 0.07 and 0.05. For instance, 0.08 implies that a 1% increase in total government expenditure on education would result in a 0.07% increase in GDP for Brazil during the study period. The results from the model of South Africa were also not as impressive as those of China, Russia and Brazil.

Although all the variables were positive and significant, at varying levels, for OLS and GMM estimators, the impact of government expenditure on education in terms of economic growth, was very low. Specifically, at 0.04 coefficients, this implies that a 1% increase in total government expenditure on education would result in a 0.04% increase in GDP for South Africa. Another disturbing trend was the stagnation in the contribution of GEE to economic growth, judging by the GMM estimate of 0.04. India recorded the least estimated results in our study. Both GEE and PPST were not statistically significant in influencing economic growth. Although total government expenditure on education significantly improved over the years (GMM= 0.05) in terms of stimulating economic growth, the result at the initial stage was very low. For instance, a coefficient of 0.01 implied that a 1% increase in total government expenditure on education would result in a 0.01% increase in GDP for India during the study period. Another disturbing trend was the inability to improve the contributions of PPST to growth, judging by the second lag which was not significant at the GMM and had a

negative sign. The correlation coefficient (r) was also very low at 0.29, and the adjusted R^2very low at 0.29. This implied that about 29% variations in economic growth could only be explained by human capital development, with the remaining 71% due to other variables outside the regression model.

In general, the OLS and GMM results suggest that the effect of human capital development on economic growth though significant, was limited in the BRICS countries over the past two decades. A comparative analysis of results for all the countries showed that China, Brazil, and Russia were able to utilise their human capital to enhance economic growth more efficiently than South Africa and India. Specifically, within the bloc, China has made the greatest progress in human capital development. Both Brazil and Russia have also recorded some improvement – especially in the contributions of PPST and ESE to economic growth. After India, South Africa had the second lowest human capital development (r=0.45) based on the result from this study. This is not surprising, given similar results from previous studies (Awan, 2013; Cleeve, 2008; Ikiara, 2003; Fedderke & Romm, 2005). Although Fedderke and Romm (2005) reported a direct positive relationship between human capital, economic openness, and infrastructure and economic growth in South Africa, Awan (2013) was not too optimistic.

According to Awan (2013) and Aregbesola (2014), South Africa is the only country that has not had noticeable improvements in human capital development – which might not be unconnected with a drop in life expectancy that has resulted from high Human Immunodeficiency Virus (HIV) prevalence rates during the study period. Export is also on the decline. India has the lowest human capital development compared to the other BRICS members at r=0.29. Consequently, Cleeve (2008) maintained that the high level of poverty, unemployment, crime and poor infrastructure in South Africa and India could be traced to the less impressive utilisation of human capital during the study period. However, despite the low level of human capital utilisation in both South Africa and India and the attendant negative impact on economic growth, our study still observed moderate positive improvements over the years – judging by the result of the GMM indicators. This notwithstanding, both India and South Africa still need to keep up the pace with other BRICS members if they are to achieve similar human capital development (Aregbesola, 2014; Anyanwu & Yameogo, 2015).

5. Conclusion and Implications of the Study

Conclusions: This paper investigates the effect of human capital development on economic growth – as well as controlling for country differences – in the BRICS economies from 1990 to 2013. Ordinary Least Square (OLS) and Generalized Method of Moments (GMM) were used as the estimation techniques. We also used one-way ANOVA and Scheffe pairwise comparison tests to understand how human capital development differed between each pair of countries. Findings suggest that the effect of human capital development on economic growth, though significant, was limited in these countries during the study period. Consequently, all the hypotheses were supported at varying levels of significance. Specifically, all the results were significant except the influence of government expenditure on education (β–Coefficient=0.01, t-Statistic= 1.32) and the proportion of the population registered in primary, secondary and tertiary education (β–Coefficient= -1.32, t-Statistic= -0.13) on economic growth in India. The findings therefore provide overall support for the four human capital dimensions, by confirming strong positive relationships between human capital development and economic growth. In general, the impact of human capital development on economic growth in BRICS countries is limited and sometimes negligible for both GMM and OLS estimators.

For instance, this study observed that a 1% increase in government expenditure on education would result in a 0.13% increase in GDP for China, a 0.06% increase in Russia, a 0.07% increase in Brazil, a 0.04% increase in South Africa, and a 1% increase in GDP in the India. In econometrics, these results imply a minimal or negligible impact of human capital development on economic growth. Alternatively, the low level of coefficients also leads us to confirm the validation of our results against those of Nonnemen and Vanhoudt (1996) – which were used as a proxy for human capital share of total government expenditure on education. In addition, a comparative analysis of results also showed that China, Brazil and Russia were able to utilise their human capital to enhance economic growth more efficiently than South Africa and India. In addition, our analyses show that these countries use and emphasise different human capital management practices. Our study therefore provides possible reasons for China's better use of human capital, and the lessons other

developing countries could learn from BRICS countries, especially China, Brazil and Russia. Lastly, this study empirically validates an ideal-type human capital development for many developing economies.

Theoretical and Managerial Implications of the Study: This paper contributes to the existing literature in many ways. First, it provides overall support for the four human capital dimensions, by confirming strong positive relationships between human capital development and economic growth. It was an attempt to generalise the efficacy of four human capital dimensions proposed by European Union (investment in education, the use of human capital stock, productivity of human capital and demographics, and also employment of human capital) and the World Economic Forum (Education, Wealth and Wellness, Workforce and Employment, and Enabling Environment). Overall, the paper argues that the classical theory of economic growth, combined with the new theory of economic growth and the theory of market value, will not only help sustain a strategy tripod, but also shed significant light on the most fundamental questions confronting human capital development and economic growth in many developing economies. Second, unlike previous studies which largely consider either developed and developing economies, or a group of both developed and developing economies, our study focuses solely on developing countries (BRICS countries), this paper therefore argues that the practice of pooling developing and developed economies together in analysing the impact of human capital development on economic growth is inappropriate.

This is because developed economies have substantial amounts of two-way human capital flows, when compared to developing nations (Wyk & Lal, 2008; El-Wassal, 2012). Third, this study empirically validates an ideal-type human capital development for many developing economies. The findings are expected to help developing economies and human capital managers recognise the potential of these four human capital development practices and assist them in designing human capital to achieve the desired growth. In addition, many developing countries are going through globalisation to take advantage of critical resources such as human capital (UNCTAD, 2015; Appleton & Teal, 1998). These trends pose a unique challenge for many policy-makers and human capital managers (Benhabib & Spiegel, 1994; Pelinescu, 2015). This study provides a window of opportunity for restructuring human capital development practices. Another policy implication derived from this study is that a country's capacity to improve economic growth will depend on its capacity to formulate policies to promote human capital development. According to UNDP (2014) and De la Fuente and Doménech (2000, 2006), policy issues like investment in education, the use of human capital stock, productivity of human capital and demographics and employment of human capital, are all imperatives for improving economic growth.

Based on the findings in this study, there is urgent need for policy-makers in Russia to prioritise government spending on education and health, for the desired growth to be achieved. There is also a need to prioritise the quality of education and training to improve the contribution of R&D and P&I to economic growth, while taking advantage of its wealth of natural resources, skilled labour force and relative political stability (Awan, 2013). There is a need for South African policy-makers to increase government expenditure on education to boost economic growth, and sustain a government drive in building infrastructural facilities, employment provision and crime reduction (Cleeve, 2008; Ikiara, 2003). Lastly, India recorded the least estimated results in our study. Consequently, there is need for the Indian government to increase expenditure on education, and to have a gradual reduction in public debt, and to free resources needed for infrastructural facilities and access to qualitative primary, secondary and tertiary education (Fedderke & Romm, 200; Awan, 2013). However, care must be taken in using the output of this study, due to some inherent limitations. One of the main methodological problems is the choice of indicator used to measure human capital development. Past studies have used varied measures, which many believed could influence the outcome of their studies.

For instance, Nonnemen and Vanhoudt (1996) used as proxy in the MRW model, the share of education expenditure in GDP, while, Islam (1995) used average number of years of schooling of the population over 25 years as a proxy for human capital (Pelinescu, 2015). However, the use of Murthy and Chien's (1997) weighted average of the population registered in primary, secondary and tertiary education in this study was deliberate. It was based on a gap identified and positioned for future studies by Pelinescu (2015) and Adelakun (2011). The use of cross-sectional data to empirically show which human capital development practices are expected to enhance economic growth could suggest little regarding the process of implementation of human capital development practices or the causal relationship between human capital

development measures and economic growth. According to Ahmad and Schroeder (2003), two countries may correctly identify which human capital development practices to implement, and yet only one may successfully attain higher economic growth because of dissimilarity in the implementation process. However, a future longitudinal study could focus on the dynamic nature of human capital development practices.

In addition, similar to most empirical literature on the human capital-growth relationships using cross-country evidence (Anyanwu, 2012; Hailu, 2010), the study suffers from the problems of endogeneity (since most explanatory variables are likely to be jointly endogenous with economic growth). This may lead to biases from simultaneous or reverse causation, since human capital development may cause higher economic growth as opposed to the opposite. There is also the presence of periods and country-specific omitted characteristics or variables affecting both human capital development and economic growth (El-Wassal, 2012). Although the GMM approach was adopted in this paper to address any potential endogeneity, a well-designed research study using longitudinal or panel data can also address the issue of causality (El-Wassal, 2012; Barro & Lee, 1993). Lastly, due to data limitation, further studies might consider the inclusion of omitted variables. Chief among the omitted variable are infrastructural facilities, and educational and institutional quality (Anyanwu & Yameogo, 2015; El-Wassal, 2012; Barro, 1991). Further research is also needed to understand how educational and institutional quality influence the choice of human capital development practices and its effect on economic growth, and the ability to generalise these findings across countries.

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The Effect of Fiscal Policy on Capital Flight in Namibia

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Abstract: The occurrences of capital flight continue to be of great concern for many developing countries and Namibia is not an exception to this. This study aimed at examining the effect of fiscal policy on capital flight in Namibia for the period, 2009-2018. To assess this, the Auto-Regressive Distributive Lag (ARDL) bound test to cointegration technique was employed. The finding revealed that there is a long-run relationship between the selected macroeconomic factors and capital flight. In particular in the long-run government expenditure and its interaction with debt stock are found to positively affect capital flight. In the short-run however, past capital flight, previous period tax rates, previous external debt, current debt stock, previous inflation rate, as well as previous financial deepening were found to bear a positive effect on capital flight. Estimate of capital flight using the residual approach shows that Namibia lost about N$ 42 billion in 9 years through capital flight. This means on average Namibia lost close to N$ 5 billion in capital flight. These empirical findings, call for serious policy interventions in order to minimize and contain the issue of capital flight in the country.

Keywords: *Capital Flight, Fiscal Policy, ARDL, Namibia.*

1. Introduction

Background to the Study: Empirical literature characterises the late periods of 1970s and 1980s as years of abject debt crisis and huge capital flight. Some Latin America countries (such as, Mexico, Argentina, Venezuela and Uruguay) experienced persistent uncertain macroeconomic conditions at the time (Muchai & Muchai, 2016; Okoli, 2008; Le & Zak, 2006; and Mohamed & Finnoff, 2005) and in order to avert these catastrophes, the countries affected deemed it necessary to deploy much focus on how they handled their fiscal policy instruments. Policy measures that achieved to curb the outflows of funds by domestic residents were thus implemented. One of the major root causes of slower domestic investment, which might be responsible for staggering economic development for most developing and emerging economies, is hypothesized to result from capital flight (Okoli, 2008). Various economists have defined the phenomenon of capital flight rather differently, depending on what they aim to achieve. This study defines capital flight as the movement of financial assets due to perceptions that these assets face an unusual level of financial risk if they are domestically retained (Cooper & Hardt, 2000). Theoretical literatures offer more than one method of measuring capital flight. This is due to differences in the way in which different authors choose to define this phenomenon. The following measuring techniques are generally debated within the literatures: most notably, the Residual Method, the Morgan Guaranty Method, the Hot Money Method, the Dooley Method, the Trade Miss Invoicing Method, and the Asset Method.

Despite the variations in the way capital flight is measured, this study employs the Residual Method to calculate capital flight in Namibia. This approach is primarily suitable as it is straight forward to employ and because it is difficult for one to establish whether the amounts for capital flight could be utilised in a more productive and beneficial way. The issue of capital flight is of great concern to the African continent and it is believed to be amongst the leading factors deterring the continent's much need development. Kar and Spanjers (2014) revealed that between period 2003- 2012 the Sub-Saharan African region, consisting of 48 countries, lost US$ 528.9 billion in the form of capital flight. The loss represented 35.7 % of their combined GDP in the year 2012. With regards to Namibia, the accumulated amount for illicit capital outflows between 2003- 2012 was estimated at US$ 6032 million. In comparison to other member countries of the Common Monetary Area, Namibia is ranked second (in terms of capital flight) to South Africa, followed by Swaziland and Lesotho (Allum et al., 2008). The loss of capital is absolutely deplorable to Namibia's economy as it impedes the much needed level of investment that would assist the country to attain its desired growth and developmental targets stipulated in the various National Development Plans - the documents which serve as the blue print towards industrialisation by the year 2030. Besides this, it is also suspected that Namibia's pursuit for an expansionary fiscal policy over the past years might have well contributed to capital flight. In

general, fiscal policy is refers to adjustments by the government on its levels of spending and taxation in order influence a country's economy.

In essence, a sound fiscal policy is vital in order to promote price stability and sustain growth of the economy. Since attaining independence in 1990, the Namibian government has been struggling to increase its revenues collection such that it outweighs its expenditures, mainly because of its narrow tax base and the recent shortfalls in the SACU revenue receipts. For instance, the total expenditure outturn for 2010/11 financial year was N$27.3 billion, but by the year 2016/17 it stood at N$62.3 billion. The corresponding total revenue collection was N$ 23.4 billion and N$50.9 billion in 2010/11 and 2016/17 respectively. As a result of the imbalances in revenues and expenditure, government has been exploiting the option of continuous borrowing from both domestic and foreign sources to finance its budget deficit. In 1992 the combined outstanding domestic and external debt was N$ 786.2 million. By the year 2009, the total debt stock stood at N$ 11.6 billion due to deficit financing of its budget. From 2009 to 2018 the debt stock amount increased from N$ 11.6 billion to N$ 86.7 billion, respectively. Meaning in a space of 9 years, the level of debt stock grew by approximately 646%. In fact, recent data for Namibia shows that total debt as a percentage of GDP stood at 46.3 % in 2018/19 financial year, which is above the 35% bench mark, as compared to 16.6% in 2010. Namibia is reputably known for its high level of domestic saving; however, it is also characterised by high capital flight (Ogbokor & Musilika, 2014). Moreover, it diverge a country's savings away from funding real domestic investment. It also negatively affects the country's balance of payment.

Capital flight can be detrimental to any economy in many ways; namely, the loss of funds through capital flight minimizes the domestic tax base by affecting the redistribution of income. In spite of the unwanted implications of capital flight, empirical literatures that examine how fiscal policy (such as its tax rate, external debt, government spending and etcetera) affects capital flight do not exist for Namibia. Whenever the effect of fiscal policy on capital flight is left unexamined, it is likely to jeopardise government efforts in addressing its development agenda. This study therefore is highly crucial for Namibia, especially now that the country has entered into a period of stringent fiscal consolidation. The contribution of this study is uniquely to the Namibian sphere and it is indispensable for a country that is believed to suffer from massive capital flight. It is against this background that this study will not merely examine the effect that fiscal policy has on capital flight, but it will as well propose how best the fiscal policy tools can be used to curb and mitigate the problem, thereby boosting government revenues, enhancing the welfare of societies and that of the entire economy. This paper contributes uniquely to literature by addressing the following specific objectives;

- To evaluate the relationship between the fiscal variables and capital flight.
- To test for the long-run and short-run relationship between the selected macroeconomic variables and capital flight.

The rest of the paper is organised as follows: the section which hereafter covers the literature review. Section 3 discusses the methodology. The empirical findings are presented in section 4 and section 5 concludes the study.

2. Literature Review

Theoretical Literature: According to Wujung and Mbella (2016) and Henry (2013), there are four main theories related to capital flight: Namely, a) the investment diversion theory, b) the debt-driven theory also known as debt overhang theory, c) the tax depressing theory and d) the austerity generation theory.

The Investment Diversion Theory: The investment diversion theory stipulates that there are two factors that give rise to capital flight; namely, the macroeconomic and political uncertainties in developing countries as well as better returns on investment activities in advanced economies. Better investment opportunities are brought about by a high return on investment abroad, a variety of financial instruments to invest in, a political and economic stability, an amicable tax regime system (i.e. lower taxes or tax exemption), and concealment of accounts in tax haven countries. The argument of favourable tax climate seems to suggests that countries would be better off, in terms of capital flows, had they framed their tax policies towards a lower or even a tax-free system. However, Muchai and Muchai (2016) cautioned that lowering tax and offering tax incentives in order to attract or retain capital causes market distortions and tax favouritism,

which in turn lead on to further capital losses. What is more aggravating is that in the eve of tax break uplift, international capital repatriate their funds to regions that have a favourable tax regime. The persistent increase in the levels of capital flight exerts a negative effect on a country's economic development. This is so that they avoid paying high taxes, and in the same instance contributing to a country's capital flight. The consequences of these actions are: a decrease in the overall investment, low economic growth which in turn causes the level of unemployment to rise, thereby increasing the dependency ratio and the level of poverty.

The Debt Driven or Debt Overhang Theory: The debt driven theory is simply an extension of the investment diversion theory. This theory propagates external debt as a catalyst for capital flight. It advocates that in the event of a country's huge external debt, residents tend to smuggle their financial resources outside the country. Furthermore, the theory postulates that capital flight discourages people from saving and investing since it leads to a devaluation of the domestic currency, a rise in fiscal instability and expropriation of assets for debt repayments (Wujung & Mbella, 2016). Therefore, any attempt by the central bank to hedge its currency from being devaluating will only leads to further losses in the levels of its foreign reserves.

The Tax Depressing Theory: The tax depressing theory stipulates that capital flight causes a significant loss of government tax revenue. This is to say that government has no power whatsoever to tax the wealth held abroad by its domestic residents since it is beyond their control. This potentially diminishes government's capacity to service its debt, thereby increasing the debt burden which limits economic growth and development. By all means, it implies that capital flight cripples government revenue generating power.

The Austerity Theory: The austerity thesis can be described as strict fiscal stance by the government aimed at narrowing its debt and budget deficit. Persistent deficit spending have far-reaching repercussions since it causes distortions in the taxes system for most developing economies by, for instance, increasing the expected tax rates; thereby, leading to capital flight (see Ndikumana & Boyce, 2003). In order to attain a narrow debt and budget deficit, austerity measures, like a decrease in government spending or rise in taxes, are put in place in order to align government revenues closer to the expenditures. The resultants of these harsh measures are obviously not without controversies. In fact, those against it often contend that austerity measure lowers economic growth and development. Moreover, it increases the level of Gini-coefficient (gap between the rich and the poor), thereby creating an unequal distribution of wealth in the country. In simpler terms, the austerity thesis observes the poor being dragged into further debts because of the hostile policies, such as high taxes, adopted to service the debt obligations from the international financial markets.

Empirical Literature: There is a considerable volume of empirical literature emanating from the developing nations with regards to capital flights and its probable determinants exist. However, it is not without ambiguities. Kollamparambil and Gumbo (2018) conducted a study to examine the macroeconomic and institutional determinants of capital flight using panel data for 29 Sub-Saharan African Countries from 1996-2010. Upon applying the Arellano–Bover/Blundell– Bond System GMM dynamic estimator, the tests results revealed that external debt, inflation and economic growth were found to be key determinants of capital flight. Similarly, Muchai and Muchai (2016) examined the relationship between fiscal policy and capital flight in Kenya using annual time series data between the period 1970 to 2010; the ARDL bounds test for co-integration was applied and the findings revealed that previous capital flight, change in debt stock, and government expenditure had no significant effect on capital flight. Nevertheless, external debt, taxation, and expenditure practices taken under different political regimes are found to have a substantial effect (External debt and taxation had positive affected whereas expenditure practices was found to be negative) on capital flight. Likewise, Ndiaye and Siri (2016) employed the instrumental variable-two stages least squares technique in order to establish the determinants of capital flight in Burkina Faso between periods 1970 to 2012. Their findings illustrated that external debts positively affected capital flight.

In the same vein, Ahmad and Sahto (2015), Henry (2013), Al-Fayoumi, AlZoubi, and Abuzayed (2012), Okoli (2008) investigated the determinants of capital flight in Pakistan, Nigeria, Middle East and North Africa (MENA) countries and Nigeria respectively. Their results revealed that a long-run relationship exists between capital flight and the selected determinants (external debt, inflation, amongst others variables) but in the short-run there was no relationship. Whereas the high levels of: fiscal deficits, interest rate, political instability and external debt servicing GDP ratio were found to exacerbate capital flight in Nigeria.

Correspondingly, supportive evidences with regards to the causes of capital flight in MENA countries were found to mainly being driven by previous capital flight, foreign direct investment, real GDP growth rate, external debt and political uncertainty. The findings are in line with those obtained by Makochekanwa (2007), who carried out a similar study in Zimbabwe and found external debt and foreign direct investment to explain capital flight. Nevertheless, Makochekanwa (2007) found economic growth to be negatively related. Additionally, Le and Zak (2006) also examined the relationship between political uncertainty and capital flight on 45 developing countries over a period of 16 years, by relating capital flight to return differentials, risk aversion, economic risk, political, instability.

Their results revealed political instability as the most important factor to influencing capital flight, and three types of risk were found to be statistically significant in affecting capital flight. Mohamed and Finnoff (2005) estimated the wealth lost as a result of capital flight in South Africa during the period 1980-2000 and found that capital flight as a percentage of GDP was higher after the realisation of the democratic elections in 1994 as opposed to the apartheid era (1980-1993). This finding is in concordance with a study conducted in Kenya by Muchai and Muchai (2016) who found that a change in political regime has a substantial effect on capital flight. In another investigation by Ndikumana and Boyce (2003) in which they uncovered the determinants of capital flight from 30 sub-Saharan African countries, of which 24 of them were categorised of being highly indebted low-income countries, for the period 1970–1996. The results found external debt to be of vitality in determining capital flight, suggesting that capital flight is debt driven. Furthermore, their study divulged that for every dollar borrowed externally, about 80 cents of it escaped in the form of Capital flight in that same year.

On the other hand, the results of fiscal policy indicators turned out to be ambiguous. Lastly, political environment and governance turned out to have a weak explanatory power. These findings agree with those obtained by Hermes and Lensink (2001) who investigated the relationship between the uncertainty of government policies and its influence on capital flight, whose findings illustrated that policy uncertainty, tax payments, government consumption and the inflation rate, proved to be statistically significant with a positive impact on capital flight. It is evident from these discussions that in most cases political uncertainty is a significant root cause of capital flight in many developing countries (Le & Zak, 2006), Likewise, Muchai and Muchai (2016); Al-Fayoumi, AlZoubi, and Abuzayed (2012), found capital flight to be positively influenced by increase in taxes, high interest rates, lower GDP growth rate, and external debts. This is to say that the fiscal instruments used in these studies support the claim that fiscal policy triggers capital flight.

However, this conclusion contradicts Ndikumana and Boyce (2003) who noted that the results of fiscal policy indicators turned to be ambiguous in nature. Similarly, inflation and lagged capital flight were found to positively explain capital flight by (Ndikumana & Boyce, 2003) and (Hermes & Lensink, 2001). Meanwhile, Muchai and Muchai (2016) found these variables to affect capital flight negatively. From the aforementioned empirical literature studies, it is evident that there are mixed findings with regards to the factors that could potentially cause capital flight in a country. This encompasses those that agree to have found a positive relationship, those that obtained a negative relationship to those that did not find any relationship at all amongst the determinants of capital flight. Different empirical studies with different data frequencies in different (or same) countries have employed different methodological approaches. But it has not yet been established where Namibia stands in the midst of this conflicting debates. This study therefore contributes to the literature gap for Namibia as it will establish where the country's position is, amongst these contradictory views.

3. Research Methodology

In order to capture the study's objectives, quarterly time series data (1993 to 2014) from Bank of Namibia are utilised. The modelling approach used by Muchai and Muchai (2016) is adopted in this study but with some slight modification on it. The functional linear equation semi-log model is specified as follows:

$$KF_{rt} = \beta_0 + \beta_1 \ln ED_t + \beta_2 CD_t + \beta_3 \ln T_t + \beta_4 \ln GX_t + \beta_5 \ln GD_t + \beta_6 \ln INF_t + \beta_7 \ln FD_t + \xi_t \quad \text{.....(1)}$$

Where, KF_r = capital flight according to the residual approach is measured as ratio of capital flight to GDP; *ED* = external debt is measured as ratio of total external debt to GDP; *CD* = change in debt stock measured as ratio of the change in debt stock to GDP; *T*= the multiplicative inverse of company tax rates; *GX*= government

expenditure measured as ratio of government expenditure to GDP; GD is the interaction term of GX with CD; *INF* = average multiplicative inverse of inflation rate; *FD* = financial deepening measured as ratio of money supply(M2) to GDP; ξ is the stochastic error term possessing its usual properties; *t* is time, *ln* represent logarithm and the rest are parameters. The basis for including the variables in the above regression model is presented next:

External Debt (ED): According to the debt driven theory, a rise in levels of external debt propels residents in an economy to transfer their funds abroad. This implies that there is a positive relationship between capital flight and external debt.

Debt Stock (CD): The debt driven theory also stipulates that the more a particular country accumulates its debt stock, the greater the capital flight due to debt serving. Hence, the coefficient of CD is expected to be positive.

Company Taxes Rates (T): In line with the investment diversion theory, an unfavourable tax policy, such as higher taxes on corporate income, diverts investments from unfriendly tax regions to more friendly tax destinations. Therefore, a positive relationship between increase in taxes and capital flight is expected.

Government Expenditure (GX): The Keynes theory of government spending states that an increase in government expenditure enhances economic growth due to the level of employment that is created in the process. It further propagates that an expansionary fiscal spending stimulates the desired growth of a country's economy as well as shielding it from any recessionary pressures. The outcome of increased government spending with regards to capital flight is as follow: Firstly, a boost in the economy's growth guarantees investors' trust, thereby diminishing capital flight. Secondly, it enhances aggregate demand which in turn fosters domestic investment, to which international capital will be attracted. Notwithstanding, in most developing countries deficit spending have caused far-reaching repercussions on their economies. Particularly, a high budget deficit may distort the tax system since it means a rise in the expected tax rates, thereupon leading to capital flight.

Average Inflation (INF): Inflation which is a persistent rise in the general price level of domestic goods and services vis-à-vis foreign price levels results into a faster decline of the real value of domestically held assets as compared to similar assets abroad. Under these circumstances, rational residents hedge their assets against losses by transferring them to countries with least inflation rates (Cuddington, 1986).

Financial Deepening (FD): Not many studies have focussed on the role played by financial intermediation with respect to capital flight. In essence as the degree of the financial sector deepens, capital flight becomes more contained. However, some researchers argue that financial deepening may spur capital flight, especially if it facilitates international capital transfers. This may be the case especially if financial markets are liberalised and international capital movements are deregulated, then domestic capital may be expected to flow abroad provided the risk-returns are greater in those markets (Okoli, 2008). With regards to Namibia, it has experienced some levels of financial deepening as evidenced through improvements in the areas of financial sector service provision, which is well regulated. Hence, a negative relation between financial deepening and capital flight is expected. Subsequent to the discussions above are the *a priori* expectations of the coefficients of the regression model: $\beta_1>0$, $\beta_2>0$, $\beta_3>0$, $\beta_4>0$, $\beta_5>0$,and $\beta_6>0$, and $\beta_7<0$.

Estimation Techniques: To investigate the effect of fiscal policy on capital flight, this study employed the Auto-Regressive Distributed Lag Bounds Test (ARDL BT) to cointegration technique as developed by Pesaran, Shin, and Smith (2001). This is an advanced approach used to validate the existence (or inexistence) of a long-run association between variables. The ARDL BT possesses numerous advantages as when compared to other cointegration techniques (such as, Engle and Granger and the Johansen and Juselius cointegration approach). One advance of the ARDL BT method is that it can be used irrespective of ambiguities in the order of integration of variables i.e. irrespective of whether they are purely I(0), purely I(1) or a combination of both which is not acceptable under the aforementioned traditional approaches. Another benefit for using the ARDL BT approach is that, it provides better results for studies consisting of a smaller sample size and produces unbiased estimation of the short and long-run parameters simultaneously.

Besides it being suitable when handling smaller sample sizes, the ADRL BT allows estimations to be carried out even if the explanatory variables being considered are endogenous. That is; it is sufficient to simultaneously correct for residual serial correlation. Before employing the ARDL BT it was crucial that some pre-conditions be satisfied: Firstly, it was necessary to determine the optimum lag length as suggested by various information criteria. The selected optimum lag length was then used in all unit root tests. This requirement ensured the choice of the best long-run equation model and it was necessary in order to have a standard error term that is normally distributed, homoscedastic and without serial correlation. Secondly, the time series properties of the data were examined in order to determine whether or not the data was stationary in levels, thereby determining the order of integration of the variables. The stationarity step is indispensable when dealing with time series data in order to mitigate spurious results.

This study used the Augmented Dickey Fuller (ADF) together with the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test to check for unit root. The KPSS test was used to check the robustness of the ADF test since it is superior to the ADF test. Thirdly, the ARDL BT to cointegration was estimated. This means, other supportive tests should be carried out in order to reach a conclusion. This was examined under the null hypothesis of no co-integration through a joint significance test of lagged levels of the variable. Letting $\boldsymbol{Z_t}$ to represent the capital flight model specified in equation (1) as:

$$Z_t = \left(KF_{rt}, \ln ED_t, CD_t, \ln T_t, \ln GX_t, \ln GD_t, \ln INF_t, \ln FD_t \right) \ldots\ldots(2)$$

The selected ARDL (k) long-run reduced-form equation becomes:

$$\Delta KF_{rt} = \alpha_0 + \alpha_1 KF_{rt-1} + \alpha_2 \ln ED_{t-1} + \alpha_3 CD_{t-1} + \alpha_4 \ln T_{t-1} + \alpha_5 \ln GX_{t-1} + \alpha_6 \ln GD_{t-1} + \alpha_7 \ln INF_{t-1} + \alpha_8 \ln FD_{t-1} + \sum_{i=1}^{k} \delta_i \Delta Z_{t-1} + \xi_{1t} \ldots\ldots(3)$$

Where: k is the optimum lag length as proposed by the various information criterions; Δ denotes the first difference operator; δ is the parameter meant to capture the short-run relationship and the rest of the variables are as defined previously.

The null hypothesis of no cointegration amongst is expressed as;
H_0: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0$ (Null, i.e. no long-run relationship).
H_1: $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq 0$ (Alternative, i.e. there is a long-run relationship).

The above hypotheses are tested by means of an F-test (Wald test). Pesaran et al. (2001) provides two sets of critical value for different model specifications. The first set assumes that all variables are I (0), entailing no cointegration amongst the underlying variable. The second set assumes that all variables are I (1), implying the existence of cointegration amongst the variables. Based on the sample size of this study (88 observations), this paper finds it appropriate to use the critical value provided in Narayan (2005) and Pesaran, et al. (2001) study. The critical value in Pesaran, et al. (2001) are mostly suitable for larger sample sizes whilst those in Narayan (2005) are based on a relatively smaller sample size of 30-80 observations. Based on the Wald test, if the computed F-statistic for the joint significance lies outside the critical bounds, a final decision regarding cointegration can be reached, without one bothering to know whether the variables are integrated of order I(0) or I(1).

In other words, when the computed F-statistics is larger than the upper bound critical value, then the null hypothesis is rejected, meaning the variables are cointegrated. On the other hand, if F-statistic falls below the lower bound, then the null hypothesis of no cointegration amongst the variables cannot be rejected. However, if the F-statistic lies within the lower and upper bounds, the test is inconclusive. The cointegration property is supported by data hence an error correction model (ECM) is estimated. In this case, the short-run dynamic parameters can be obtained by estimating an error correction model from the long-run estimates. The reduced form short-run model can be specified as:

$$\Delta KF_{rt} = \alpha_0 + \sum_{i=0}^{k} \Omega_i \Delta KF_{rt-i} + \sum_{j=1}^{k} \Omega_j \Delta Z_{t-1} + \varphi_1 ECM_{t-1} + \xi_{1t} \ldots\ldots(4)$$

Where, Ω_i measures the short-run dynamics coefficients of the model's convergence to the equilibrium; φ measures the speed of adjustment needed for parameters to converge into the long-run equilibrium in the event of shocks in the system; ECM is the error correction term obtained from the estimated equilibrium relationship of equation (3) and the rest of the variables are as previously defined. The model's robustness is

further determined by checking for autocorrelation, heteroscedasticity, the CUSUM stability test and the normality of residuals.

4. Empirical Analysis and Results

Lag Length Selection Test: Before carrying out the ARDL BT to cointegration, the optimum numbers of lags length to be used under unit root test and other subsequent tests needs to be identified. Table 1 below illustrates the test results obtained by various information criterions.

Table 1: Vector Autoregressive Lag Length Selection Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	513.7638	NA	3.88e-23	-28.90079	-28.54528	-28.77807
1	1067.062	822.0434	3.07e-35	-56.86070	**-53.66113***	-55.75621
2	1167.728	**103.5421***	**7.03e-36***	**-58.95590***	-52.91226	**-56.86964***

Source: Authors' own compilation using E views
Note: * indicates lag order selected by the criterion

Where, LR stands for sequential modified Likelihood Ratio test statistic; FPE is the Final Prediction Error); AIC denotes the Akaike Information Criterion; HQ stands for Hannan-Quinn information criterion; and SC is for Schwarz Information Criterion. All tests are evaluated at 5% significance level. Table 1 indicates that the LR, FPE, AIC, and HQ have all selected a VAR system with a maximum lag number of 2. However, only the SC suggests use a maximum number of lag 1. Given that the SC always selects a more parsimonious model, and is most appropriate when handling a small sample size.

Unit Root (Non-Stationarity) Test: The ADF and KPSS stationarity tests were carried out using the equation with an intercept and the model with an intercept and a trend, the outcomes are presented in the Table 2.

Table 2: Unit Root Test- ADF & KPSS

Name of Variable	Model Specification	Unit root test ADF		KPSS		Order of Integration
		Levels	First difference	Levels	First difference	
KFr	Intercept	-2.1339	-3.9395**	0.6452	0.3061**	I (1)
		(-2.8959)	(-2.8963)	(0.4630)	(0.4630)	
	Trend & Intercept	-1.7951	-4.0961**	0.3813	0.0865**	I (1)
		(-3.4635)	(-3.4620)	(0.1460)	(0.1460)	
*ln*ED	Intercept	0.4420	-5.2413**	2.8439	0.2035**	I (1)
		(-2.8959)	(-2.8963)	(0.4630)	(0.4630)	
	Trend & Intercept	-3.4189*		0.1596***	-	I (0)
		(-3.1582)		(0.2160)		
CD	Intercept	-0.1491	-5.0505**	2.6366	0.1257**	I (1)
		(-2.8959)	(-2.8963)	(0.4630)	(0.4630)	
	Trend & Intercept	-2.9998	-5.0554**	0.1542***	-	I (0)
		(-3.4635)	(-3.4642)	(0.2160)		
*ln*T	Intercept	-2.2640	-9.2703**	1.4405	0.0572**	I (1)
		(-2.8951)	(-2.8955)	(0.4630)	(0.4630)	
	Trend & Intercept	2.8174	-9.2221**	0.0859**	-	I (0)
		(-3.4623)	(-3.4622)	(0.1460)		
*ln*GX	Intercept	-2.4652	-2.9739**	0.6741***	-	I (0)
		(-2.8959)	(-2.5869)	(0.7390)		
	Trend & Intercept	-2.3396	-3.0336	0.4120	0.1187**	I (1)
		(-3.4635)	(-3.4642)	(0.1460)	(0.1460)	
*ln*GD	Intercept	-0.6155	-3.2735**	1.1021	0.0557**	I (1)
		(-2.8972)	(-2.8972)	(0.4630)	(0.4630)	

	Trend & Intercept	-2.6735	-3.2357*	0.1503***	-	I (0)
		(-3.4655)	(-3.1594)	(0.2160)		
*ln*INF	Intercept	-3.1672**	-	0.8314	0.0281**	I (1)
		(-2.8959)		(0.4630)	(0.4630)	
	Trend & Intercept	-3.9567**	-	0.0806**	-	I (0)
		(-3.4635)		(0.1460)		
*ln*FD	Intercept	-1.4326	-4.0656**	2.0378	0.1202**	I (1)
		(-2.8959)	(-2.8963)	(0.4630)	(0.4630)	
	Trend & Intercept	-2.4031	-4.0397**	0.3955	0.1261**	I (1)
		(-3.4635)	(-3.4642)	(0.1460)	(0.1460)	

Sources: Authors' own compilation using E views.
Note: *, **, and ***, denotes the rejection of a unit root null hypothesis at the critical values of 10%, 5%, and 1% respectively in instances whereby a variable is stationary in all levels, ** is chosen.

Following the ADF test results from Table 2, it is evident that most of the macroeconomic variables used in this study were non-stationary in level, but stationary after first difference. Confirming these outcomes with a more powerful test, the KPSS unit root test, it can be seen that most variables are still non-stationary in level form however after first difference they all become stationary. This means, other supportive tests should be carried out in order to reach a conclusion. The final conclusion of the order of integration is based on the KPSS unit root test. The mixture in the order of integrations makes the application of the ARDL BT to cointegration approach an appropriate methodology to be applied in this study.

ARDL Cointegration Test Results: Using the automatic selection of lags found in E views, the appropriate number of lags for the ARDL Model was found to be: (1, 1, 1, 1, 1, 1, 1, 1). The model's lag selection is based upon the AIC lag selection criteria. Table 3 presents the results as follows:

Table 3: **ARDL BT for Cointegration**

Variables	**F-Statistics**		**Result**	
f (ED, CD, T, GX, GD, INF, FD)	102.7930 *' **' ***		Cointegration	
	Pesaran		**Narayan**	
Critical Value	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1%	2.73	3.9	3.40	5.03
5%	2.17	3.21	2.52	3.83
10%	1.92	2.89	2.15	3.30

Source: Authors' own compilation using E views
Note: ****** denotes rejection of null hypothesis of no cointegration at 1%, 5% and 10% levels of significance respectively.

The, critical values obtained from Narayan (2005) is for 36 observations; Case IV is for restricted constant and no trend (k=7). Comparing the calculated F-Statistics results from Table 3, with critical values obtained from both Pesaran and Narayan, F-Statistics value is beyond the upper bounds at all levels of significance in both instances. Thus, there is adequate evidence to reject the null hypothesis of no cointegration and conclude that the variable exhibits a long-run equilibrium relationship.

Long-Run Coefficient using ARDL Approach: After establishing the presence of a long-run relationship among the variables, next step was to estimate the marginal effects of each explanatory variable on the explained variable using equation 3. Table 4 presents the long-run coefficients.

Table 4: **ARDL Estimated Long-Run Coefficients (1, 1, 1, 1, 1, 1, 1, 1)**

Variables	**Coefficient**	**t-Statistic**	**Prob.**
*ln*ED	0.116192	0.720824	0.4794
CD	-1.597724	-2.437320	0.0243
*ln*T	-1.052131	-1.132400	0.2709
*ln*GX	4.125574	5.269625	0.0000

*ln*GD	0.620453	4.010219	0.0007
*ln*INF	-0.340596	-3.209009	0.0044
*ln*FD	-1.797308	-7.260408	0.0000
C	5.079689	2.571684	0.0182

Source: Authors' own compilation using E views
Note: * denotes that the variable is significant.

Table 4 reveals that in the long-run, GD (which is the interaction term between government expenditure (GX) and the level of debt stock (CD)) and government expenditure (GX) affect capital flight (KF) positively. The positive effect between GD and capital flight implies that Namibia's capital flight is partially debt-fuelled. This is not surprising given the drastic increases ratio of debt to GDP over the past few years. Currently the debt to GDP ratio stands at 46.3% which is beyond the established thresh hold of 35%. Accordance to the debt driven capital flight theory, individuals as well as companies tend to transferring their financial resource abroad when they perceive that the debt being incurred by their government is too huge and it is likely to burden their hard earned capital gains in the nearest future. The positive impact between government expenditure and capital flight support the debt-fuelled hypothesis such that an increase in government expenditure is associated with more debt that subsequently enhances capital flight. On the other hand, an inverse relationship is reported for debt stock (CD), financial deepening (FD) and inflation (INF). The negative effect between the two control variables (Inflation (INF) and Financial Deepening (FD)) and capital flight is in line with the a priori expectations. The negative relationship between financial deepening and capital flight seems to suggest that in the long-run as the Namibian financial sector service provision continues to evolve, individual have little incentives to transfer their financial assets abroad. In addition to that, the fact that the Namibian economy is politically stable, which is an indispensable requirement need to instil the investors' confident in the long-run could serve as an added advantage to reverse capital flight in the country. This means, other supportive tests should be carried out in order to reach a conclusion.

Short-Run Dynamics of Capital Flight in Namibia: The study further analysed the nature and direction of the short-run dynamics of the selected macroeconomic variables by estimating the error correction model (ECM). Under the ECM method, a long-run relationship amongst the variables within the model is ascertained by a negative sign and a significant probability value of the ECM. Equation (4) was used to estimate the general short-run dynamics and the results are provided in Table 5.

Table 5: **ARDL Error Correction Model (1, 1, 1, 1, 1, 1, 1, 1)**

Variables	Coefficient	t-Statistic	Prob.
D(KF(-1))	0.849732	31.17363	0.0000
D(*ln*ED)	-0.098797	-5.280667	0.0001
D(*ln*ED(-1))	0.071405	3.488864	0.0030
D(CD)	0.504573	4.370885	0.0005
D(CD(-1))	-0.820777	-9.321068	0.0000
D(*ln*T)	-9.740098	-24.32920	0.0000
D(*ln*T(-1))	8.976363	31.30012	0.0000
D(*ln*GX)	-3.078948	-11.74497	0.0000
D(*ln*GX(-1))	3.914416	14.06527	0.0000
D(*ln*GD)	0.588054	14.27231	0.0000
D(*ln*GD(-1))	-0.419151	-12.80107	0.0000
D(*ln*INF)	-0.162714	-10.36557	0.0000
D(*ln*INF(-1))	0.106315	8.744519	0.0000
D(*ln*FD)	-1.105198	-10.42583	0.0000
D(*ln*FD(-1))	1.015238	12.90144	0.0000
ECT(-1)	-0.668358	-2.795108	0.0130
C	-0.005733	-1.669120	0.1145

Source: Authors' own compilation using E views
Note: * denotes that the variable is significant.

The results from Table 5 show a negative error correction term of -0.6684 which is statistically significant. This finding simply reaffirms the results of cointegration between the variables used in this study. More precisely, the coefficient of the error correction term indicates that approximately 67% of the disequilibrium from previous quarter's period of shocks will converge itself back to the long-run equilibrium levels in the current quarter. The short-run result from Table 5 reveal that previous capital flight, previous external debt, previous corporate tax rate, previous government expenditure, current interaction of government expenditure and debt stock, previous inflation and previous financial deepening are jointly associated with an increase in capital flight. The evidence that previous capital flight is positively related to current capital flight is an evidence of habit formation. The fact that previous external debt and current debt stock are associated to capital flight is a sign that capital flight is debt driven, which is in line with the debt-fuelled capital flight theory. In the same vein, the finding that previous corporate tax rate is found to exacerbate capital flight in the shorter horizons. This is because a higher corporate tax rate is an indication that most investment returns accrued to corporate shareholders ends up being eroded off.

This indicates that corporate companies operating in Namibia tend to repatriate their investment funds elsewhere where they have better incentives (such a lower corporate tax rates). On the other hands, the reason why corporate tax rate is negatively related to capital flight in the current period, it is because whenever a policy announcement is passed, its effects are not always felt immediately. Some take a while before their effects are felt in the economy. The finding implies that a contractionary fiscal policy in terms of increased tax rate will be associates with an increase in capital flight of not less than 9 percent. Conversely, present values of external debt, current inflation rates, and the interaction term of past government expenditure and debt stock were found to negatively affect capital flight in the short-run. Likewise, the findings that current financial deepening negatively relates to capital flight is in line with the a priori expectations because of the reasons aforementioned. It is evident that some results obtained the short-run are not consistent with the ones obtained in long-run. Nonetheless, the results obtained with respect to past capital flight are in line with those obtained by other researchers; such as, Al-Fayoumi, AlZoubi and Abuzayed (2012), Ndikumana and Boyce (2003) and Cuddington (1986), but inconsistent with the findings.

Likewise, the finding with regards to current external debt are in harmony with: Muchai and Muchai (2016); Al-Fayoumi, AlZoubi, and Abuzayed (2012). In the light of the above empirical results, there exists sufficient evidence that fiscal policy has largely contributed to capital flight in Namibia. However, the effect of corporate tax rate may be temporary and could be reversed in the long-run given the insignificant inverse relationship. These findings provide useful insight to policy makers on how fiscal policy instruments ought to be handled and managed in order to curb the problem of capital flight in Namibia.

Wald Coefficient Test: The Wald coefficient test is employed to examine and validate the significance of whether or not fiscal policy variables are jointly significant in explaining variations of capital flight in Namibia. The results of these tests are presented in Table 6.

Table 6: Wald Test for Joint Significance of the Fiscal Policy Variables

Estimated Equation: $\boldsymbol{KF_t = \beta_0 + \beta_1 lnED_t + \beta_2 CD_t + \beta_3 lnT_t + \beta_4 lnGX_t + \beta_5 lnGD_t + \beta_6 lnINF_t + \beta_7 \mathrm{lnFD}_t + \xi_t}$

Null Hypothesis: $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$

Test statistics	Value	DF	Probability
F-statistics	206.0350	(6,20)	(0.0000)
x^2-statistics	4138.210	(6)	(0.0000)

Source: Authors' own compilation using E views

From Table 6, there is strong evidence that fiscal policy variables are jointly significant in determining capital flight in Namibia.

Diagnostic Tests

Table 7: **Diagnostic Test**

White Heteroscedasticity	**Chi-square:**	**13.47407 (0.7039)**
Breusch-Godfrey LM Test	Chi-square:	1.9599 (0.1029)
Ramsey RESET Test	F-statistics	0.0978 (0.7588)

Source: Authors' own compilation using E views

Results from Table 7 illustrates that the model has passed all essential diagnostic tests. In particular, the Ramsey RESET test indicates that the overall model is correctly specified. The White heteroscedasticity test result refutes the presence of heteroscedasticity. The Breusch-Godfrey LM test further affirms the absence of serial correlation.

Stability Tests: Lastly, the stability test of the long-run parameters combined with the short-run dynamics for the equations is assessed in order to decide whether or not the parameters in the model are stable. This study employed the cumulative sum of recursive residuals (CUSUM) as well as the cumulative sum of recursive residuals of squares (CUSUMSQ) to check for the model's stability. Figure1 and 2 illustrate the findings as follows:

Figure 1: CUSUM

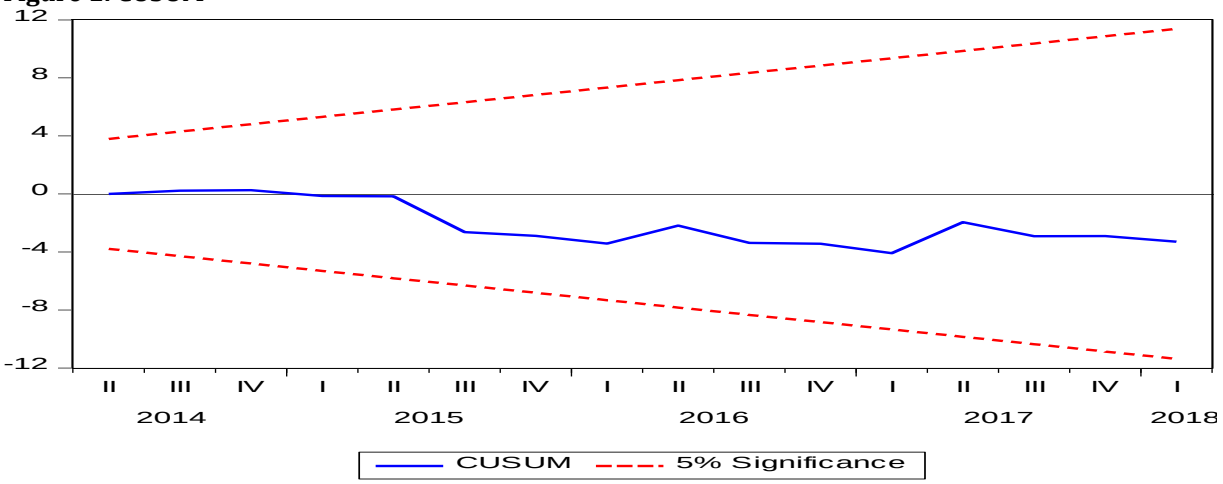
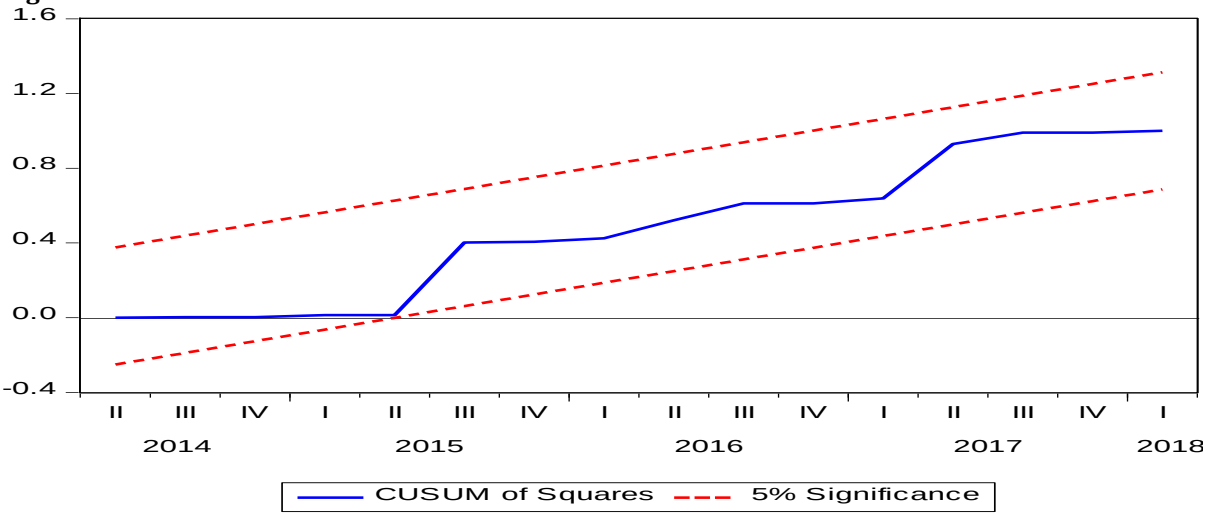


Figure 2: CUSUM



The results from both Figure 1 and Figure 2 suggest that the model used in this study is correctly specified and stable in both plots. This is so because plot of the critical bounds is well within the 5% levels of significance.

Table 8: Magnitude of Capital Flight in Namibia between Periods 1993-2014 (in N$ Millions)

Year	(Change in External Debt) ΔED	(Net Foreign Direct Investment) FDI	(Current Account Balance) CAB	(Change in Foreign Reserves) ΔFR	(Capital Flight) KF	KF as a % of Real GDP
2009	-895.29	-6,513.00	-2,423.60	1,115.49	-6,100.18	-0.08
2010	59.18	-2,072.00	-3,889.90	-3,620.29	5,497.37	0.07
2011	4,231.40	-5,667.00	-5,962.30	4,198.29	328.41	0.00
2012	2,291.13	-8,672.00	-7,264.70	323.19	560.63	0.01
2013	1,718.07	-7,264.00	-9,627.30	980.24	3,101.14	0.03
2014	396.76	-4,621.00	-13,191.30	-2,182.59	11,149.65	0.11
2015	16,901.20	-10,884.00	-21,065.90	10,050.31	17,032.79	0.16
2016	-3,069.00	-5,138.00	-23,006.10	1,142.89	13,656.21	0.12
2017	1,164.00	-6,927.00	-3,943.90	5,457.00	-7,276.10	-0.07
2018	5,730.00	-1,583.00	-757.00	846.61	4,057.39	0.04
Total	**28,527.45**	**-59,341.00**	**-91,132.00**	**18,311.13**	**42,007.32**	**0.04**

Source: Authors' own compilation

Estimates from table 10 reveal that Namibia lost approximately N$42 billion in 9 years (2009-2018) in the form of capital flight. During the same period, capital flight to GDP ratio was approximately 4%. Implying that, for every N$ 1.00 of annual GDP accumulated by the Namibian economy, private Namibian residents amassed about N$ 0.04 in the form of external assets. With regards to the interpretations of capital flight, a positive amount of KF implies an unrecorded capital flight since it is a resemblance of private assets accumulated abroad. On the other hand, a negative amount of KF implies unrecorded reversed capital flight, which is tantamount to a decrease in foreign private assets.

5. Conclusion and Policy Recommendations

The main objective of this study was to examine the effects of fiscal policy on capital flight in Namibia using quarterly data from period –2009 - 2018. An econometric analysis using the ADRL BT approach to cointegration was carried out in order to ascertain the role played by fiscal policy in influencing capital flight. The study found that in the long-run capital flight is exacerbated by government expenditure and its interaction with debt stock, whilst financial deepening and inflation are inversely related to capital flight. On the contrary, the short-run results divulge that, past capital flight, previous period tax rates, previous external debt, current debt stock, previous inflation rate, and previous financial deepening plays a significant role in worsening the problem of capital flight. The study also attempted to uncover magnitude of capital flight, and the estimations shows that Namibia lost an enormously an amount to the tune of approximately N$42 billion over a period of 9 years. Had these funds stayed in the country, part of it could have been used to steer up more investments and economic development need to uplift the ailing economy, thereby improving the living standard of citizens in the country.

The empirical results from this study seems to insinuate that the magnitude of the capital flight is to a large extent attributed to excessive increase in government expenditure coupled with its debt stock accumulation. The outcomes from this study yields several policy implications deemed for Namibia and other developing economies with similar characteristics to Namibia. Firstly, the fact that the previous external debt and current debt stock in the short-run and the interaction term between government expenditure and debt stock (GD) in the long-run are found to positively affect capital flight validates the idea that capital flight in Namibia is debt-

fuelled.. Hence, government should pay close attention on how much they borrow and how the borrowed money is utilised. Secondly, the fact that previous tax rates have got a positive effect on capital flight should be taken seriously. The government through the ministry of finance should reconsidering exploring other alternative means of generating revenue instead of overburdening corporation (and the working class) with hefty tax rates which discourages their participation in the economy. The government should continue pursuing policies that helps accelerate the creation of a conducive, economic environment.

This will promote inward investment opportunities, thereby offsetting capital flight. Thirdly, the inverse relationship of previous financial deepening and capita flight entails that there is still room for improvement of the financial sector service provision. Such relaxation will cause the country's financial system to open up, thereby causing it to develop at a faster pace as a result of the benefits that comes with the spirit of competition. This is necessary because many a times the flow of capital is always from the least developed financial markets (Namibia) to a highly developed financial market (say, South Africa). Lastly, there is a need for concerted effort by the government to engage countries believed to have been benefiting from Namibia's capital flight to help combat the issue of capital flight. This is for instance possible if countries agree to establish international tax treaties that could see governments across the world liaising information (especially those linked to financial crimes, i.e., money laundering) which is crucial to curbing capital flight. These actions will no doubt broaden government's revenue base since it will cause it to be in a positions of taxing its local residents as well as those residents who are residing abroad, and holding their financial assets abroad.

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Feeding Management and Extent of Commercialisation among the Smallholder Dairy Farmers in Zimbabwe

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Abstract: This study assessed the effects of grazing and feeding management on the extent of commercialization among the smallholder dairy farmers in Zimbabwe. Using a sample of 225 smallholder dairy farming households selected randomly across 11 smallholder dairy cooperatives in Zimbabwe, data were analysed using descriptive statistics and the ordinary least squares regression method. The study used milk yield as a proxy for commercialization. Farmers whose cows produced higher yield were considered more commercialized than farmers whose cows produced a lower yield. The results indicated that access to better pastures, better feed types, more area under fodder and more feeding frequency positively impact on milk yield. This result indicates that smallholder farmers with better access to enough, appropriate and consistent feed obtain better milk yield from the dairy cows while the poor quality and quantity of feeds are the primary reasons why most smallholder dairy farmers in developing countries like Zimbabwe continue to produce low/uneconomic milk yields. Since purchased dairy feed concentrates are essential in enhancing milk yield, the study recommends that farmers who can afford these should continue using them and where applicable agro-dealers selling these inputs should be supported to establish selling outlets within the farmers reach. However, given the cost of the commercial dairy feeds visa the economic capacity of smallholder milk producers, the study recommends farmer to consider producing their feed by putting more area under fodder than buying commercial feed.

Keywords: *Fodder, pasture, Ordinary Least Squares regression, smallholder farmer, grazing.*

1. Introduction

Livestock including dairy cows performs multiple functions within the smallholder farming systems. They provide milk which is a crucial and affordable food source, manure which acts as input required for crop and vegetable production through enhancing soil productivity and fertility, cash income provision as well as in enhancing savings, investments and employment (Ngongoni et al., 2007; Afzal, 2010; Aweke, 2017). Unlike other agricultural enterprises like crop production which are often seasonal, milk provides farming households with regular income throughout the year (Moran, 2009; Pandey & Voskuil, 2011). Moreover, dairy farming provides alternative employment opportunities for the rural farm and non-farm economy. A study on enhancing and re-designing smallholder dairy farming in Pakistan conducted by Afzal (2009) found that for each 20 litres of raw milk produced within the smallholder farming sector per day, one full-time wage employment is created. Similarly, a study conducted by Rodriguez (1987) in Zimbabwe found milk to be a source of livelihoods and employment not only for the producing farming households but also for many value chain actors along the milk cold chain. With these several functions, enhancing the productivity and commercialisation of smallholder.

Dairy farming can serve as a vehicle for improving smallholder farmers' livelihoods, providing income and food security. Research shows that milk yields in the smallholder dairy sector in many developing countries are usually low, ranging from as low as 2 to 5 litres per cow per day (Marius et al., 2011). One of the most significant critical challenges affecting the smallholder dairy farming sector in the developing countries is both the quality and quantity of the feeding used (Moran, 2009; Afzal, 2010; FAO, 2010; Pandey & Voskuil, 2011; Kipkirui & Otieno, 2017). While milk productivity and the delivery by large scale commercial dairy farmers is usually constant all year round, the quantity of milk produced within the smallholder dairy farming sector in developing countries significantly decreases by up to 35% during the dry season because of limited access to appropriate feeds (Pandey & Voskuil, 2011). This shows that the poor quality and quantity of feeds are the main reason why smallholder milk producers in developing countries continue to produce low milk yields (Kipkirui & Otieno, 2017). Majority of the smallholder milk producers in Africa lack the knowledge and experience of efficient and appropriate utilisation of animal feed resources (NABC, 2014). In addition, a review of related literature on smallholder milk productivity in Zimbabwe revealed a few gaps.

Most of the studies on small scale dairy farming conducted in Zimbabwe (e.g. Mupunga & Dube, 1993; Hanyani-Mlambo et al., 1998; Gran et al., 2002; Ngongoni et al., 2006; Marius et al., 2011; SNV, 2012; Shangurai, 2013) have researched on the general issues affecting the sector without explicitly addressing the grazing, feeding and nutrition issues in detail. A review of literature on this subject further reveals that the majority of studies which adequately addressed effects of feeding and nutrition on milk productivity among the smallholder dairy farmers have been conducted outside Zimbabwe (Omiti et al., 2009; Land O'Lakes, 2010; Gachuiri et al., 2012; Kipkirui & Otieno, 2017; Meja et al., 2017; Aweke, 2017). These studies were done in East Africa mainly in Kenya and Ethiopia. It is for these reasons that this study seeks to explore the relationships between grazing, feeding management, nutrition and commercialisation of smallholder dairy farmers in Zimbabwe using descriptive statistics and the Ordinary Least Squares (OLS) regression model. Milk yield was chosen as the determinant of productivity because it is the most universally accepted measure of this component. This study examines the milk yield levels of cows getting different feed types and different feeding intervals. As such, the remainder of this study is structured into three sections. The next phase presents the research methodology, where the conceptual framework and the econometric models are outlined.

2. Literature Review

An Overview of Smallholder Dairy Farming in Developing Countries: This section presents a brief overview of smallholder dairy farming in general followed by a discussion of smallholder dairy farming in Zimbabwe. Research shows that smallholder farmers in developing countries have a long history of producing milk. Apart from producing milk for household consumption, hence improving the nutritional status of the rural population, the dairy enterprises provide income as well as employment to many people (FAO, 2010; USAID, 2018). However, most milk in developing countries is still produced in traditional small-scale systems with little or no mechanisation or technological advancement and innovations (Gerosa & Skoet, 2012). While the milk and the dairy sector in most developed countries have shifted towards larger herds and greater milk productivity per cow, the situation in Africa has remained poor. Larger herd sizes allow for the adoption of technologies and systems that require more substantial capital investments (Muehlhoff et al., 2013). As a result, despite the growing demand in milk and other dairy products, a study by Kandjou (2011) revealed that small-scale milk producers in the developing countries of Africa face several problems in realising the opportunities offered by growing demand for dairy products.

An Overview of Dairy Farming in Zimbabwe: The dairy sector in Zimbabwe is made of predominantly two groups; the large-scale commercial and smallscale sectors. The most significant difference between these categories is the scale of production (Rodriguez 1987; Mpofu 2007; Mugweni and Muponda 2015). The large-scale sector has large farms with high producing (> 5000 kg/lactation) pure exotic dairy breeds and their crosses and accounts for more than 98% of formally marketed milk while the smallholder sector contributes only 1-2% of the formally marketed national milk production (Ngongoni et al., 2006). The large-scale sector consists predominantly of white farmers, with herd sizes of up to 90 purebred animals working in commercially conducive environments while the smallholder sector consists of the indigenous black people operating under predominantly subsistence conditions (Hanyani-Mlambo, 2000). Unlike the large-scale commercial dairy sector which has substantial commercial linkages with the dairy processing firms, the smallholder dairy sector is mainly characterised by weak institutional linkages to dairy processors (Mugweni & Muponda, 2015).

Smallholder Dairy Production Constraints in Zimbabwe: Unlike the large scale commercial dairy farmers who run viable and profitable dairy enterprises, the smallholder dairy farmers in Zimbabwe face several limitations. However, the bulk of the milk produced in the small-scale dairy sector is mainly for local consumption within the producing localities with the surplus sold through the Milk Collection Centres (Mugweni & Muponda, 2015). First, the smallholder dairy sector in Zimbabwe is characterised by a firm reliance on family labour, a weak resource base, use of primitive technologies, poorly developed infrastructures, weak institutional connections, and uneconomic production levels and very few smallholder farmers have access to cash to hire extra labour (Hanyani-Mlambo, 2000). Moreover, small-scale dairy farmers in Zimbabwe predominantly use local indigenous breeds for dairy which though well adapted to the marginal production conditions, have poor dairy characteristics (Mpofu, 2007).

Furthermore, smallholder dairy farmers in Zimbabwe own 1-3 cows, which are overall too low to justify commercial viability (Ngongoni et al., 2007). Key among the factors hindering milk production within the smallholder dairy sector in Zimbabwe are shortages of feeds, limited access to liquid cash and poor farm records (Hanyani-Mlambo, 2000). The large-scale commercial dairy farmers use some organised cooperative transport system to send their milk directly to the processors (Matekenya, 2016). According to Topps & Oliver (1993), the poor levels of feeding and nutrition management are among the fundamental causes of the uneconomic yields, poor calving rates, late calving and prolonged calving intervals among the small scale milk producers in Zimbabwe. A study by Ngongoni et al. (2007) on the factors influencing dairy milk production in the smallscale dairy sector of Zimbabwe revealed that inadequate nutrition caused acute reproductive challenges such as retained placenta and long post partum anoestrus periods. In the absence of supplemented protein concentrate, the dairy cattle grazing natural pasture have high chances of losing body weight with cyclic ovarian activity ceasing when cows lost 20-30% of their mature weight due to undernutrition (Topps & Oliver, 1993). Further, a study by Marius et al. (2011) showed that the dairy farming households that supplemented their feeding produced significantly more milk than those that did not supplement.

The same study revealed that during the rainy season, the dairy animals even for the smallholder sector gained weight and milk production was high, while during the dry season the yield and body condition of the cows significantly declined (Marius et al., 2011). Majority of smallholder dairy farmers in Zimbabwe rely on natural pastures for feeding the dairy animals. A study by Ngongoni et al. (2007) on the factors affecting milk production in the smallholder dairy sector of Zimbabwe show that natural pasture accounts for 90% of the feed that given to the dairy cows during the wet season. The same study by Ngongoni et al. (2007) also shows that other feeds such as maize stover and fodder mainly Napier and Bana grass contributes the remaining 10% of the overall feed available in the smallholder dairy sector. Sadly, the natural grazing systems provide limited capacity for intensification of dairy production. Research shows that under-nutrition because of low energy consumption negatively affects oestrus cycles, ovulation and fertilisation in dairy cows (Topps & Oliver, 1993). An evaluation of small-scale dairy farming in Zimbabwe conducted by the SNV Netherlands Development Services in 2012 revealed that the use of own silage among the smallholder milk producers was still deficient most likely because of reliance on grazing. The same study by the SNV also revealed a high usage of natural communal grazing across all projects with the average area allocated to fodder production averaging 0.9ha/farmer (SNV, 2012).

3. Methodology

Data: The study applied cross-sectional research design. Before data collection, a comprehensive list of 21 active small-scale dairy cooperatives with a combined active membership of 517 smallholder farmers was obtained from the Zimbabwe Association of Dairy Farmers (ZADF). The Yamane's formula for calculating sample size was used to determine the sample size. A renowned mathematical statistician Taro Yamane developed this formula in 1967, and different researchers across disciplines have used it over the years (Israel, 2003). The rationale for adequate calculation of the sample size was to enable the researcher to generalize the conclusions reached after analysing the data to the entire population under study. Below is the mathematical equation for the Yamane's formula that was used to decide the sample size at a 95% confidence interval.

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

Where n is the sample size, N is the population size, and e is the level of precision. When this formula was applied to this study, a sample of 221 farmers was determined as the minimum target for this study. The data was gathered from 225 small scale milk producers (176 male, 49 female) randomly selected from 11 small scale dairy cooperatives in Zimbabwe. A three-level multistage sampling method was applied. First, 11 smallholder dairy cooperatives were selected using simple random sampling. The simple random sampling method gives every element of the population (in this case a smallholder dairy cooperative) an equal chance of being included in the sample. With this method, each component of the population is selected independent of one another, and without replacement thus no item can be selected twice (Personal, Archive, Kundurjiev, & Salchev, 2011). Second, the probability proportional to size was applied to determine the number of units to be reached in each cluster.

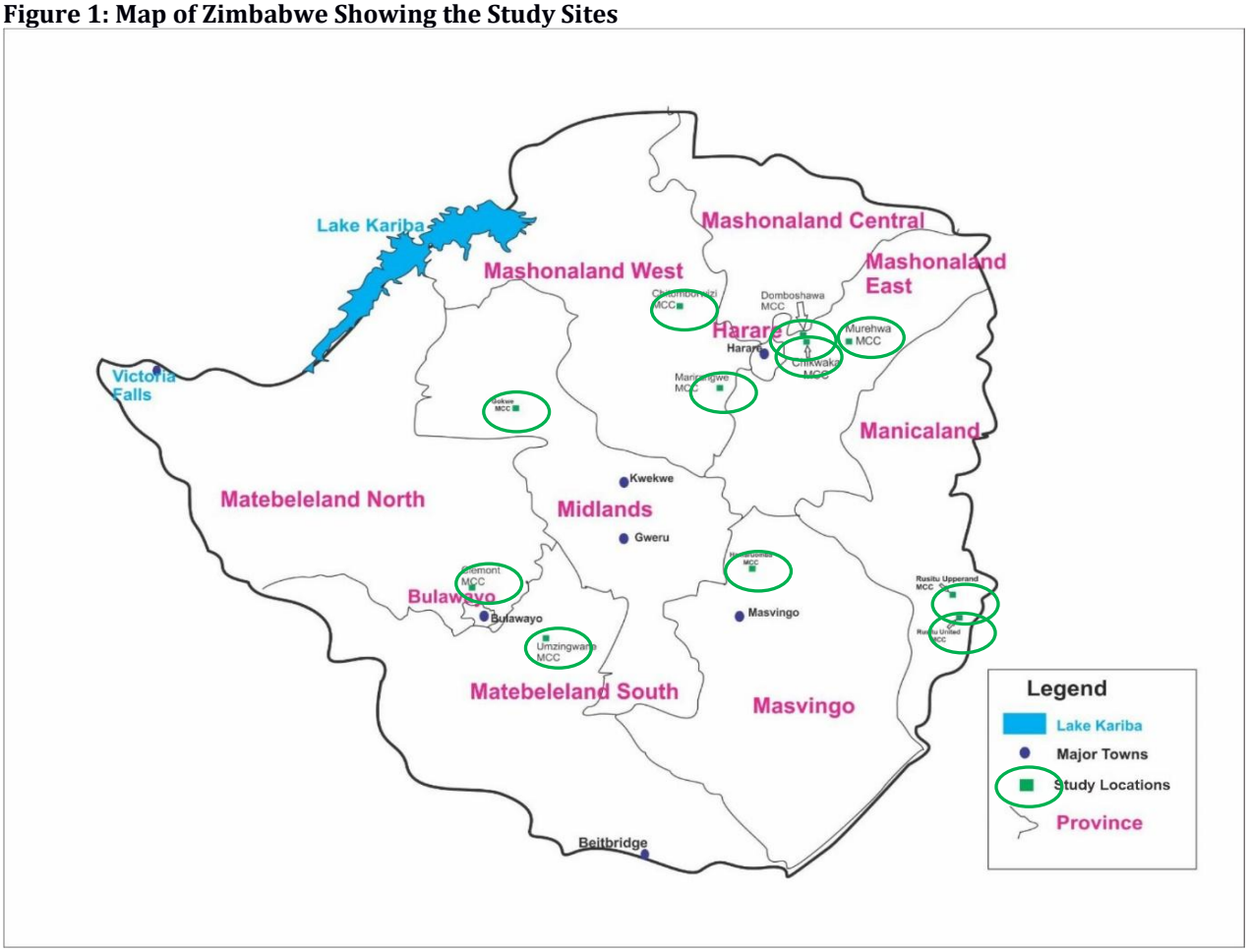
Finally, simple random sampling was again used to select the survey respondents in each cluster. Figure 1 below shows the map of Zimbabwe indicating study area while Table 1 summarizes the final sample for the locations and number of farmers interviewed in each area.

Table 1: Summary of Farmers Reached for the Survey per Each Location

Province	Dairy Project	District	Location	Respondents Female	Male	Total
	Chikwaka	Goromonzi	Juru GP	5	12	17
	Domboshava	Goromonzi	Damboshawa	4	13	17
	Chitomborwizi	Chinhoyi	Crawford Farm	-	13	13
	Marirangwe	Beatrice	Marirangwe BC	5	33	38
Mash East	Murehwa	Murewa	Murewa 44 BC	8	4	12
	Rusitu Dairy	Chipinge	Rusitu Valley	8	34	42
Manicaland	Upperand	Chipinge	Rusitu Valley	3	12	15
Masvingo	Hamaruomba	Masvingo	Mushagashe BC	7	20	27
Midlands	Gokwe	Gokwe	Gokwe GP	1	19	20
	Mzingwane	Umzingwane	Mawabeni BC	6	12	18
Mat South	Claremont	Umzingwane	Bulawayo	2	4	6
Total	**11**	**8**	**11**	**49**	**176**	**225**

Source: 2018 household survey

Figure 1: Map of Zimbabwe Showing the Study Sites



Source: Developed by the author.

Data Collection: Primary quantitative data used for this study was gathered from the farmers using a structured questionnaire. Gray (2014) defined a questionnaire as a research tool which enables the researcher asks the targeted respondents to respond to similar questions in a predetermined order. According to Somekh & Lewin (2005), questionnaires allows the collection of data in a standardised way. The questionnaire designed had clear objectives and was structured into sections to ensure that all relevant issues are addressed. The nature of the data that was collected from the farmers required the use of questionnaire consisting of both open-ended and close-ended questions. The questionnaire content validity was reviewed by a panel of experts associated with dairy farming and agricultural economics, and their suggestions were used to modify the items of the instrument. This was to ensure that the tool measured what it intended to measure; questions were worded, and statements in the questionnaire were not ambiguously stated. A pre-test was conducted with 20 small scale dairy farmers, to establish the usability of the instrument. The data for the study was collected over a three months period which ran from May to July 2018.

Four highly experienced and qualified enumerators were recruited, trained, coached, mentored and guided to assist with the administration of questionnaires. All the four enumerators had good knowledge of the smallholder dairy farming systems and could speak the local languages (Shona and Ndebele). Before the actual interviews, the researcher trained the enumerators on how to interpret and ask each question. The enumerator training included two-day piloting of the tool on an accessible location. During piloting, the enumerators took detailed notes of the data collection process including detailed notes on how participants reacted to both the general format of the questionnaire and the specific details of the questions. The piloting also helped the research team to estimate the actual time required to complete each interview. Face-to-face interviews were conducted at each farmer home and targeting the household head. This method of interviewing minimises nonresponse while maximising the quality, reliability and usability of the data. Also, the face-to-face interview strategy in the presence of the interviewer makes allows the respondent to either clarify answers or ask for clarification for some of the potentially confusing portions of the questionnaire. This study involved collecting some potentially sensitive data such as income and costs.

Data Analysis: The data used for this study was analysed using the causal modelling technique. The actual analysis for this study was carried out using R software. The graphs were generated using the ggplot2 library that provides a lot of functions to generate bar graphs, histograms, scatter plots, and other charts. Further, the VGAM library was used to perform the OLS regression analysis. This library provides the LM function (which is part of the stats library) was used to perform OLS regression for hypothesis. The selection of appropriate statistical technique largely depended on the distribution of the study variables. The data analysis was divided into two parts, a descriptive analysis, and hypothesis testing using the OLS regression analysis. The OLS regression coefficients show the marginal effects and direction of change of the independent variables on the dependent variable.

Yield As a Proxy for Commercialization in Smallholder Dairy Farming: The low level of agricultural productivity, competitiveness and profitability among the smallholder farmers in developing countries has been widely researched (Shumba & Whingwiri, 2006; World Bank, 2008; FAO et al., 2012; Dube & Guveya, 2016; FAO., 2017). It is apparent that efforts to enhance the commercialisation of smallholder agriculture in developing countries will ultimately have minimum benefit if the challenges of low productivity among the smallholder producers is not adequately addressed (Arias et al., 2013). This study used milk yield for each household which is defined as the average milk produced per cow as the determinant of agricultural productivity among the small-scale milk producers in target locations. The minimum milk yield values range from zero upwards and theoretically, there is no upper limit, but values above 30 are rare. Though other factors may cause variations, under normal conditions, higher yields are associated with higher commercialisations and vice versa. Mathematically, it can be calculated as:

$$MilkYield = \frac{TotalMilkProduced}{TotalNumberofCows}$$

The Ordinary Least Squares (OLS) Regression Model: To estimate the econometric relationship between milk yields and the various determents of feeding and grazing management, the Ordinary least squares (OLS)

regression model was used. The data used for this study consisted of observations that were drawn randomly from the population. The OLS regression model was estimated as:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

Where Y*= Milk Yield; Xi is a vector of explanatory variables relating to the grazing and feed management factors that include feed type, feed season, pasture access, fodder area, and feeding frequency. The details of the variables are presented in Table 2 below.

Table 2: Variables Used in the OLS Model for Assessing the Effects of Feeding and Grazing on Milk Yield

Study Variable	Variable Description	Variable Type
Y*	Milk Yield (litres/cow)	Dependent Variable
X_1	Type of feed used to feed the cows (1=Zero grazing, 2=Natural pastures, 3=Purchased feed (concentrates)	Independent Variable
X_2	Supplementary feeding during the dry season. (1=Depends on the situation, 2=Same for the dry and rainy season, 3=Supplement during the dry season).	
X_3	Access to grazing pasture (1=Easily accessible, 2=Difficult to access)	
X_4	The area under fodder production (ha)	
X_5	Feeding Frequency (1=None, 2=Once, 3=Twice, 4=Thrice)	

4. Results and Discussion

Descriptive Statistics: Table 3 below shows the summary information of cattle feeding by smallholder dairy farmers reached by this study. The table shows that close to half (47.11%) of the respondents use open range grazing to feed their dairy cattle while 39.11% use the paddock grazing system and only 13.78% use zero grazing. All the farmers using both the open range and paddock grazing systems practically rely on natural pastures; therefore cumulatively 86.22% of the farmers use natural pastures. These results support the findings of a recent evaluation of small scale dairy farming in Zimbabwe conducted by the SNV Netherlands Development Services in 2012 which revealed that the use of natural communal grazing was very high across all projects (SNV, 2012). Similarly, a study by Ngongoni et al. (2007) on the factors affecting productivity in the small scale dairy sector of Zimbabwe shows that natural pastures account for 90% of the feed that is given to the dairy cows. The same study by Ngongoni et al. (2007) also shows that other feeds such as maize stover and fodder mainly Napier and Bana grass contributes the remaining 10% of the overall feed available in the smallholder dairy sector.

This makes it easier for them to sign commercial contracts with buyers and enhance their business. A study by Pandey & Voskuil (2011) noted that milk productivity and the quantity of milk delivered to the market by commercial dairy farmers is usually constant throughout the year, but the quantity of milk produced by smallholder dairy farmers in developing countries significantly decreases by up to 35% during the dry season due to the shortage of appropriate feeds. The results in Table 3 shows that over half (57.33%) of the surveyed farmers do not grow fodder at all. The practice by smallholder dairy farmers of using natural pastures as opposed to purchased feed or planted fodder is common not only in Zimbabwe but other developing countries as well. A report on enhancing productivity, profitability and investment attractiveness in Kenya's small scale dairy sector produced by the United States Agency for International Development (USAID) in (2018) reveals that majority of smallholder dairy farmers in Kenya predominantly rely on natural forage and where applicable small quantities of purchased concentrate on feeding their herds (USAID, 2018).

Table 3: Summary Information on Cattle Feeding by Smallholder Dairy Farmers in Zimbabwe

Study Variable	Details	Count	Percentage (N=225)
Grazing Method	Open range grazing	106	47.11
	Paddock grazing	88	39.11
	Zero grazing	31	13.78
Feed Type	Natural pastures	194	86.22
	Purchased feed (concentrates)	31	13.78
Feed Season	Depends on the situation	6	2.67
	Same for dry and rainy season	134	59.56
	Supplement during the dry season and crop residue	85	37.78
Pasture Access	Easily accessible	102	45.33
	Difficult to access	123	54.67
Fodder Area	None	129	57.33
	1-2 Acres	65	28.89
	3-5 Acres	27	12.00
	6 or more acres	4	1.78
How many times feed your cattle	None	3	1.33
	Once	46	20.44
	Twice	124	55.11
	Thrice	52	23.11

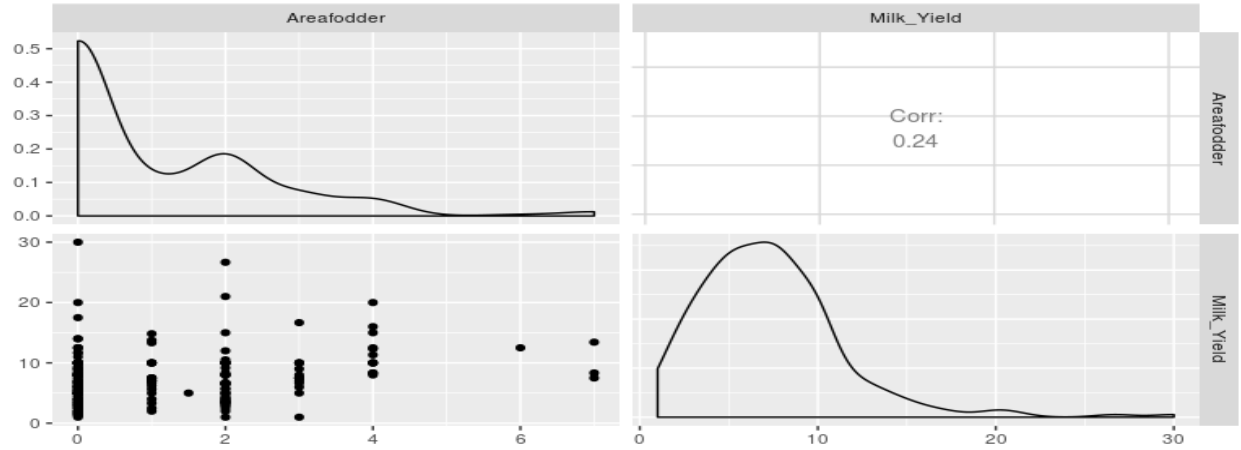
Although very popular among the smallholder sector, the natural grazing systems provide an only limited capacity for intensification of dairy production. Research shows that under-nutrition through limited energy intake has negative effects on oestrus cycles, ovulation and fertilisation in dairy cows (Topps & Oliver, 1993). Although some of the respondents (37.78%) reported supplementing their feeding during the dry seasons, a significant proportion of the farmers (59.56%) use the same feeding approach in both the rainy and the dry season. Given that natural pastures are usually scarce during the dry season that shows that the majority of dairy animals are nutritionally starved during the dry season. A study conducted by Marius et al. (2011) in Manicaland, Zimbabwe showed that the smallholder farming households that supplemented their feeding produced significantly more milk than those that did not supplement. Unlike the smallholder dairy farmers who struggle with feed during the dry seasons, the large scale commercial dairy farmers who consistently supplement their feeding and, in many cases, use zero grazing often get consistent milk volumes throughout the year.

A related study conducted in Zimbabwe by Marius et al. (2011) found that during the rainy season, the dairy animals even for the smallholder sector gained weight and milk production was high, while during the dry season the milk yield and body condition of the cows significantly declined. However given that majority of smallholder farmers do not manage their forages maximally to produce the highest yields of forage possible, a more realistic recommendation for smallholder farmers would be 6 to 8 milking cows per ha od forage (Moran, 2005). At 95% confidence interval, the results show that household that reported using purchased feed have 4.328-unit higher milk yield compared to the households that reported using natural pastures for feeding the cows (z-val = 6.271, p-val = 0.000). The findings of this study agree with the results from a study by Kipkirui & Otieno (2017) which showed that the poor quality and quantity of feeds are the main reason why smallholder dairy farmers in developing countries continue to produce low milk yields. In the absence of supplemented protein concentrate, the dairy cattle grazing natural pasture have high chances of losing body weight with cyclic ovarian activity ceasing.

When cows lose 20-30% of their mature weight due to undernutrition (Topps & Oliver, 1993). To make dairy farming successful, it is crucial to have a reliable source of good quality feeds, fodder and grazing all year round (Pandey & Voskuil, 2011). However, one of the major challnges affecting small scale dairy farming in Zimbabwe is accessing good, reliable and consistent pastures for their cows. Table 3 shows that over half of the respondents in this study (54.67%) reported experiencing challenges accessing pastures. Given the limitations in natural pasture access which are apparent in many smallholder dairy farming areas, planting fodder is a feasible way of managing the dairy cattle feeds costs and access. According to Moran (2005)

forages provide an alternative and cheaper source of the crucial feed nutrients when compared to concentrates. No matter the farmer circumstances, it is often cheaper for the farmer to grow the forages on the farm rather than purchase them from elsewhere. Farmers producing their forage on the farmer find it easier to control the quality than with purchased forages.

Figure 2: Pairwise Correlation between Milk Yield and Area Under Fodder



The histogram plot showing the distribution of area planted under fodder, and milk yield are summarised in a pair-wise correlation diagram in Figure 2. It can be observed that the distribution of respondents based on area under fodder is skewed towards left, indicating that most of the households have small fodder area to feed their cattle. On the contrary, the distribution of the milk yield is approximately normal with a heavy tail towards the right, indicate that some household has high milk yielding cows.

Effects of Grazing and Feed Management on Milk Yield: The Ordinary Least Squares (OLS) regression model was applied to examine the effects of grazing and feed management on the commercialisation of smallholder dairy farming using milk yield as the dependent variable. Table 4 below shows the results of the OLS model. In order to get a sense of the fitness of the OLS model two statistical tests were conducted, multiple squared correlations and the standard error of variance. The correlation between the predicted and observed values of Milk Yield is 0.7068. If we square this value, we get the multiple squared correlations; this indicates predicted values share 49.95% of their variance with milk yield. The standard error of variance indicates the distance between the data points and the regression line. The calculation indicates that the standard errors of the regression for all the variables fell below 5%. This means that the standard variance between the observations and the regression line is below 5%. Consequently, we can use the standard error to obtain a rough estimate of the approximately 95% prediction interval. Lower magnitudes of the standard error imply that the variances between the data points and the fitted values are smaller thereby making the model applicable.

Table 4: Ordinary Least Squares Regression Analysis Results

Variable Name	Variable Description	Estimate/ Coef.	Std. Error	Z-value	P -value
(Intercept)		7.678	2.133	3.599	0
Fodder Area	Area planted by household under fodder (ha)	0.342	0.143	2.392	0.018**
Feed Type	Use of purchased Feed Concentrates	4.328	0.69	6.271	0.000***
	Use of Natural Feed Pastures	.	.	.	.
Feed Season	Same for day and rainy Season	-1.647	1.275	-1.292	0.198
	Supplement During Dry Season and Crop Residues	-0.536	1.282	-0.418	0.676
	Depends on the Situation	.	.	.	.

Pasture Access	Easily Accessible	0.783	0.491	1.593	0.113
	Difficult to Access during Dry Season		.	.	.
Feed Frequency	Once	-3.132	1.816	-1.724	0.086*
	Thrice	2.117	1.809	1.17	0.243
	Twice	-0.617	1.767	-0.349	0.727
	None	.	.	.	.

* p-val <0.10, ** p-val < 0.05, *** p-va <0.01, r-Square = 0.50, (correlation coefficient) = 0.71, F (8,216) = 26.95, p-val < 0.01

As shown in Table 3 above, a significant number of farmers (57.33%) do not grow fodder at all while only 12% grow more than 2 ha of fodder. These results suggest that in the absence of purchased feed concentrates which are often too costly for the resource-constrained smallholder producers, the majority of farmers rely on natural pastures. Interestingly, the OLS regression results show that there is a positive impact of area planted under fodder on the milk yield. It is observed that for every unit increase in the area planted under fodder, the household milk yield increases by 0.342 units (z-val = 2.392, p-val =0.018). The low cultivation of fodder by small scale milk producers in Zimbabwe was also confirmed by a study by the SNV Netherlands Development Organization which reported that the average area which farmers in Zimbabwe allocated to fodder production was 0.9ha (SNV, 2012). This study shows that almost 60% of the farmers are not growing fodder at all. Similarly, an assessment of small scale dairy farming in Zimbabwe conducted by the SNV Netherlands Development Services in 2012 revealed that the use of own silage.

Among the smallholder dairy farmers in Zimbabwe was still deficient most likely because of reliance on grazing. Despite this low cultivation of fodder, research shows that farmers cultivating their fodder save much money thereby growing their businesses substantially. According to Moran (2005), a farmer cultivating the maximum possible volumes of quality forages requires at least one hectare to adequately feed 8 to 10 milking cows. Similarly, a study by Aweke (2017) on major production challenges of dairy cows in Ethiopia identified poor grazing and management as one of the key production challenges. The regression results show that, at 90% confidence interval, we observe that households who reported feed frequency of one have 3.132 units lower milk yield compared to the households who reported no feed frequency (z-val = -1.724, p-val = 0.086). Research shows that limited knowledge and experience on the use of locally available feedstuffs, lack of pasture seed limited access to land for pasture improvement, poor pasture management especially during the dry season collectively worsens the feed shortage especially during the dry seasons (Tebug, 2012).

5. Conclusions and Policy Implications

This study assessed how the different components of grazing and feeding management such as feed types, access to grazing pastures, grazing methods, feeding frequency, feed supplementation during the dry season, and area under fodder production are related to milk yield at farmer level. More than half of the respondents (57.33%) had utterly no area under fodder production. Of those who planted fodder, only 12 % planted more than 2 ha of fodder. Majority of the farmers, almost 90% rely on natural pastures to feed the cows. The results show that farmers putting more area under fodder production produce significantly more milk yield than farmers with less or no land under fodder production. Results also show that farmers relying on natural pastures to feed their cattle are getting significantly lower milk yield levels than farmers using dairy feed concentrates. Farmers with better access to pastures have significantly higher milk yield levels than farmers with poor access to grazing pastures. Likewise, dairy cattle that get supplementary feeding get significantly more yield levels than those that are not getting supplementary feeding during the dry season. Overall the results show that feeding is a crucial element of any dairy activity.

The conclusion is that the smallholder dairy farmers who have access to, enough, nutritious and consistent feed types are more likely to get better milk yields and to be market-oriented. Farmers should be advised to plan and secure feed ahead of time. Planning helps to ensure that the herd's feed requirements are met. This enhances good heard health and better productivity. Where applicable, farmers should aim to implement sustainable and economically viable ways of securing dairy feed such as growing their feed. In situations where producing their own feed is not possible for any reason such as limited access to land or lack of

technical expertise, farmers can resort to purchasing feed from the suppliers. However, it is crucial to ensure the traceability and reliability of feedstuffs brought to the farm. It is recommended for the farmers to source animal feed from those suppliers having an approved quality assurance system in place and at all costs prevent the use of feeds that are not suitable for dairy animals. Moreover, farmers should also keep accurate records of all feed and feed ingredients used on the farm.

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An Analysis of Macroeconomic Determinants of Remittances in Southern Africa

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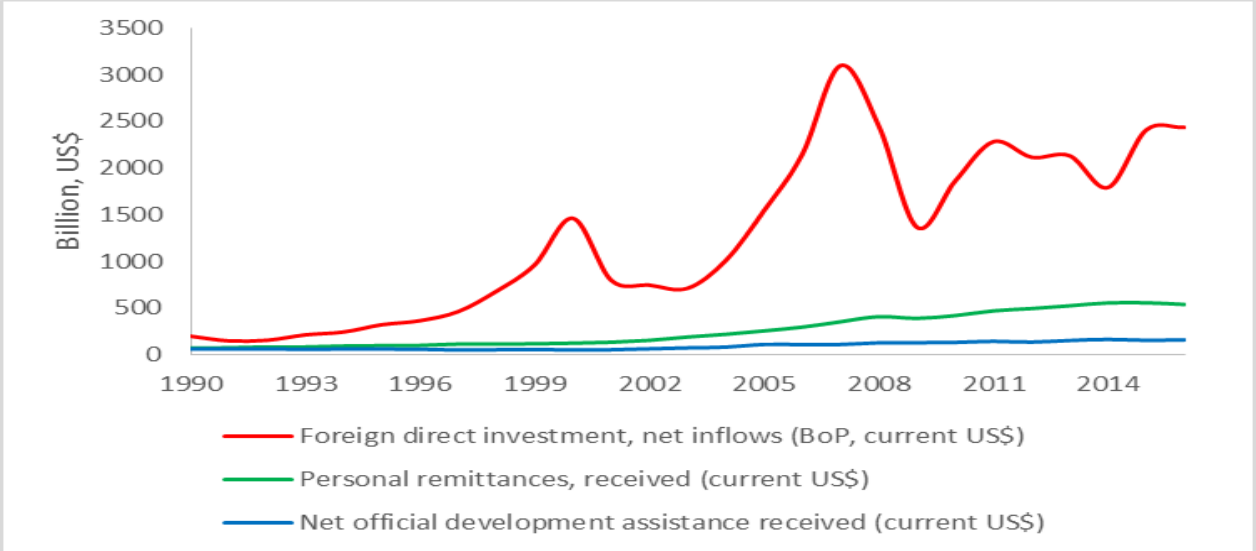
Abstract: The study analyzed macroeconomic determinants of remittances in Southern Africa and used annual data for the period ranging from 2003-2016. The macroeconomic determinants used include: remittances themselves, inflation rate, GDP growth rate, nominal exchange rate, broad money and age dependency ratio. A panel study was carried out using both the fixed and random methods of which the random method was found to be most appropriate. The countries included in the study were Botswana, Lesotho, Malawi, Mozambique, South Africa, Swaziland and Zambia. It was found that of the variables used, only changes/improvements in the home countries' economic environment and the exchange rate were statistically significant.

Keywords: *Remittances, Macroeconomic Determinants, Southern Africa.*

1. Introduction and Background

Remittances otherwise coined as "Personal remittances" by the World Bank are defined as the sum of personal transfers and compensation of employees to their respective home countries. As such, the discussion around remittances is centered more on migrants who find themselves in "favourable situations". Remittances as is illustrated in Figure 1 have been on the rise globally. According to the World Bank (2016), they were estimated to be approximately U.S. $ 601 billion with U.S. $ 441 billion expected to be received by developing countries.

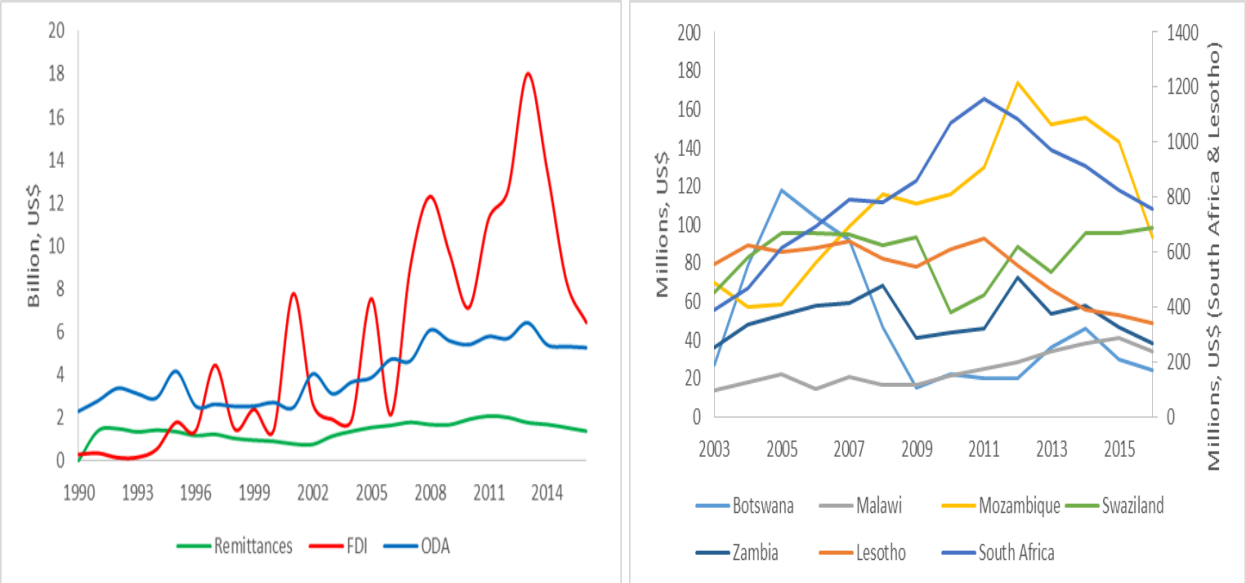
Figure 1: Global Remittances and Other Inflows (1990-2016)



Source: Authors compilation of WDI

As illustrated in Figure 1, global remittances surpass global Official Development Assistance/Aid, as literature purports (Tabit & Moussir, 2016) and are generally more stable in comparison to FDIs (Ratha & Plaza, 2011; Boly, Coniglio, Prota, & Seric, 2014). However, in the Southern African region, remittance inflows fall below ODA as illustrated in Figure 2a below. This trend should however, not be looked at on face value but rather the informality of remittance transfer and poor data collection (which also led to the omission of several countries that would have been part of the study but were not due to a lack of data) on the continent should be considered (Mohapatra & Ratha, 2011).

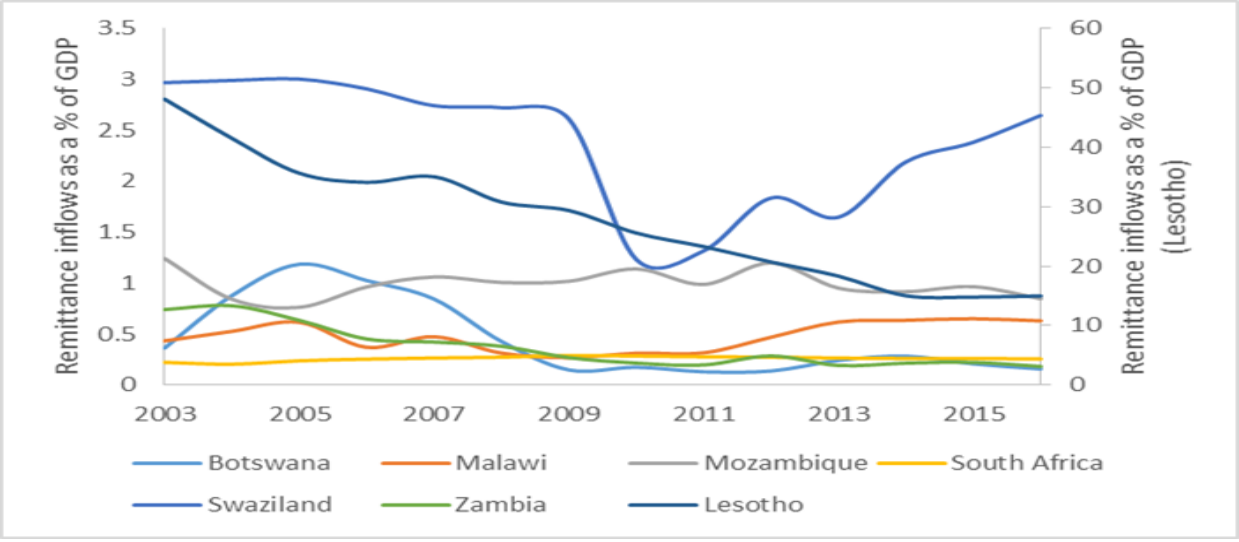
Figure 2: (a, b) (a) Remittances and Other Inflows for - Select Southern African Countries (1990-2016). (b) Personal Remittances, Received (current US$) - for Select Southern African Countries (2003-2016)



Source: Authors compilation of WDI

The stability of remittance inflows further substantiates calls for countries in the region to consider it as a development source of revenue, more so given the less straining conditions associated with them in comparison to the other sources (FDI and ODA). However, as can be observed in figure 2b, individual countries do not depict the same stability. Overtime however, the trend has generally been constant in southern African. A point of interest is the disparity of remittance inflows by each nation, particularly in South Africa and Lesotho. Both countries have considerably higher remittance inflows recorded (probably highlighting their better records of data in comparison to the other nations). Another point of interest is the post-recession behavior of the remittance inflows. It is noticed that in both the Figure 2b and 3, that there were slight increases in remittance inflows before declines. The behavior of remittance inflows noticed around the recession period adds to their novelty as an alternative source of funds to spur development and growth in Southern Africa.

Figure 3: Remittance Inflows (% of GDP) - for Select Southern African Countries (2003-2016)



Source: Authors compilation of WDI

As is illustrated in Figure 3, remittance inflows for some of the select countries make up a considerable amount of GDP - more so as illustrated by Lesotho especially as it has been rising, post 2010. However, this is not the case for the majority of the countries. Even so, the magnitude cannot be ignored. The constant percentage, though in some cases as is the case with Swaziland where remittances are in decline, should be taken with caution as official estimates are prone to be understated more so given the informal transfer of remittances in the region (Mohapatra & Ratha, 2011). According to Boly, Coniglio, Prota and Seric (2014), about 50% of the African diaspora is located within the continent; and particularly, intra-regional migration accounts for almost 65% of total emigrants in Sub-Saharan Africa. Southern Africa the focus area of this study is a relatively integrated trade block. Migration in Southern Africa occurs for various reasons these being conflict, political instability and economic instability to mention but a few. In the region, migration is driven more by economic instability now than that of political or conflict reasons (Eyden, Sekyere, & Kemegue, 2011), with countries like Zimbabwe, Mozambique and Angola being examples. Southern Africa is further characterized by high unemployment levels, poverty, low financial inclusion and generally low standards of living. According to Porter (2017), it was estimated that nearly 88 million people live in extreme poverty in the region.

With the region accounting for 9% of extreme poverty globally, although it only makes up 2.5% of the world's population furthermore, the region has some of the highest costs of sending remittances, for example in the third quarter of 2015, it cost about 19% of U.S. $200 to send remittances from South Africa to Zambia and 17.4% from South Africa to Botswana. Whereas, in comparison to other developing countries out of Africa, it cost 6.70% from Brazil to Bolivia and 4.4% from Chile to Peru (Watkins & Quattri, 2014; World Bank, 2016). Recently there has been a shift of thought from the perception of emigration being a loss to that of gains (Ratha & Plaza, 2011), particularly of remittances and knowledge through exposure. Considering their magnitude and uniqueness (it is a source of income rivaling and with close to no conditions in comparison to other sources for example FDI and ODA), it is believed that even without targeted (macro) programs they have been able to alleviate at least household issues (Crush & Frayne, 2007; Dorantes, 2014; Tabit & Moussir, 2016). Therefore, their absence could be detrimental to the region, which is not helped by the hostile environment surrounding migration and foreigners in the region. Therefore, remittances are an interesting avenue of focus that if channeled appropriately has the potential to alleviate a majority of the aforementioned issues regardless of its size in comparison to other regions.

2. Literature Review

As mentioned earlier, the paper focuses on macroeconomic determinants. The macroeconomic approach considers macroeconomic variables of the sending, as well as receiving countries. In this case, researchers have used aggregate data that affects the behavior of remitting such as the economic situation, interest rates, exchange rates, wage rates, inflation, etc. While the remitting decision is made at the micro level: it is at the macro level where how much is remitted, is further determined. There are a number of studies that have examined not only macroeconomic determinants of remittances but economic determinants in general. These studies focus on issues like what social-economic factors might cause migrants to remit and once they do remit, what factors affect the amount is remitted home. However, empirical studies on the phenomenon of interest in Southern Africa particularly are minimal with most studies in Africa either being on Sub-Saharan Africa, or SADC – which encompasses various countries that may not be a true reflection of what happens in Southern Africa, and other sub regions on the continent.

The findings have been found to vary as has the impact of factors that affect the amounts remitted. Among the various determinants (income, education, exchange rates and dependency just to mention a few), education has been found to be one of the important determinants of remittances not only because of the perceived amounts the educated verses the uneducated remit (which has been debated) but that remittances are sent to foster education. Two studies (Faini, 2007; Adams, 2008) used cross-country data from a variety of developing countries and found that skilled migrants (otherwise known as educated migrants) remit less than unskilled migrants. This they perceived to be down to a number of skilled migrants spending a lot of their time abroad and therefore moving with their families and having no reason to remit as much as unskilled migrants. These findings were however contested by Bollard, McKenzie, Morten, and Rapoport (2009), who used micro data from immigrant surveys in 11 OECD countries and found.

While education has a mixed effect on the disposition to remit as aforementioned, there are several determinants. Most linked to one another as is the case with education and dependency. Just as the determinants vary, so too do the methods of measurement Huang and Vargas-Silva (2006), using a VECM; Baldé (2009), using a Two Stage Least Square (TSLS); whereas, Coulibaly (2009) used a panel VAR) among other issues. Baldé (2009) found that remittances do not have a direct positive impact on growth. Whereas, Huang and Vargas-Silva (2006) and Coulibaly (2009) found supporting results: in which both studies concluded that economic conditions in the host country are more significant and that remittances respond more to them than to the economic conditions in the home countries. This was irrespective of different time periods of study and countries included, although both studies looked at a similar region (Latin American countries). In another study, related to macroeconomic determinants of remittances, Yuni, Omeje and Asogwa (2013) also investigated the phenomenon in 21 selected African countries for the period 1980 to 2011. The variables used included remittances received, real exchange rate, broad money base, tax revenue and the inflation rate. Applying a dynamic generalized method of moments (GMM), they found that the broad money base (M2) and tax revenue had a statistically significant but negative relationship with remittances, whereas, the inflation rate as well as age dependency ratio were statistically significant with respective positive relationships.

Lim and Mahbub-Morshed (2015), in keeping with macroeconomic determinants of remittances, investigated the aforementioned for 122 developing countries for the period ranging from 1990 to 2010. Their study applied ordinary least square (OLS) – fixed effects (FE), and random effects (RE) – on the variables: Migrant stock, GDP per capita and private credit to GDP. The analysis showed that home income stock had a negative impact on remittances, suggesting an increase in remittances could have been due to a decrease in home income. Their results showed a significant impact of financial development in easing the flow of remittances to developing countries. In a study examining macroeconomic determinants of remittances for the period ranging from 1990 to 2014, Zakari and Nasiru (2016), looked at 14 West African countries. Their variables of interest included: Remittances measured as total personal remittances received in US dollars; Home income was proxied by gross domestic product measured as constant 2005 US dollars; the labour market situation proxied by the unemployment rate; and the real exchange rate as a proxy for the exchange rate. The study applied several panel unit root tests, then the Pedroni cointegration test before a fully modified ordinary least square (FMOLS) estimation. It was found that there existed a long run relationship among the variables. The FMOLS revealed that home income and the exchange rate had a positive and significant impact on remittance inflows. It was however found that the labor market situation exhibited the opposite. Their findings led them to the conclusion that, remittance inflows increased in response to the increases in home income.

3. Methodology

This study employed a quantitative method and uses data that covers a panel of 7 countries to analyze macroeconomic determinants of remittances in select Southern African countries. The study used secondary, annual data ranging from 2003 to 2016. The data used was extracted from the World Bank Development Indicators (WDI) and the International Financial Statistics (International Monetary Fund – IMF). The Southern African countries selected were: Botswana, Lesotho, Malawi, Mozambique, South Africa, Swaziland and Zambia. As discussed in the literature, remittance determinants fall into two categories. These being micro and macroeconomic determinants in keeping with the focus of this study, macroeconomic analysis were undertaken and the modeling approach used by Yuni, Omeje, and Asogwa (2013) is adopted. The initial model specification is given as:

$$REM_{it} = \beta_0 + REM_{it-1} + INF_{it} + GDPG_{it} + EXC_{it} + BM_{it} + AGED_{it} + u_{it} + \varepsilon_{it}$$

The model uses remittances of the previous year (REM_{it-1}), the inflation rate (INF_{it}), the GDP growth rate ($GDPG_{it}$), the nominal exchange rate (EXC_{it}), and broad money variable (BM_{it}), and age dependency ratio ($AGED_{it}$) as the macroeconomic determinants. Whereas; $u_{it} \sim iid\ (0, \sigma_u^2)$ is the unobserved random effect that varies across countries but not over time, and $\varepsilon_{it} \sim iid\ (0, \sigma_\varepsilon^2)$ is an idiosyncratic error term, i =1, N; t = 1, T. Remittances are the dependent variable represented by Personal remittances, received (% of GDP). As per theoretic and literature consideration Lagged Remittances are used as one of the dependent variables to explain current remittances (Coulibaly, 2009; Yuni, Omeje & Asogwa, 2013). For the inflation variable, inflation as the GDP deflator (annual %) is used. This was done to capture the economic environmental conditions of the home countries as opposed.

Coulibaly (2009) who used GDP per capita as the study felt inflation is more reflective of the aforementioned whereas, to show changes in the economic environment in the home countries, the study used the GDP growth (annual %) variable as opposed to Coulibaly's study that used Real GDP. Other control variables of importance that were used include: the Nominal exchange rate (National Currency per US Dollar, End of Period), Broad money as % of GDP and the Age dependency ratio which was reflected by Age dependency ratio (% of working-age population). The exchange rate is representative of the cost of send remittances from one country to another. Whereas, broad money was used to represent market sophistication (as done by Yuni, Omeje & Asogwa, 2013; whereas Eyden, Sekyere & Kemegue, 2011 used money and quasi money as a percentage of GDP to represent market sophistication). This was done so that a single regression analysis would be enough to see the effect of market sophistication in the region which is apparent as is illustrated by the differences between economies as those in Botswana. Even more so by South Africa in comparison with countries like Malawi, Mozambique, Lesotho, Swaziland and Zambia last but not least, the Age dependency ratio was used to analyze how dependency on remittances affect remittance flows in the region. Aside from the analysis from the above econometric model, this paper made use of impulse response functions and variance decompositions. The impulse response functions were used to determine the effects of one standard deviation in one variable on the other variables in a system. Whereas, the variance decompositions show how shocks reverberate through a system and measure the relative importance of each innovation that affect the respective variables.

4. Empirical Results and Discussion

The data was first converted to log form to eliminate extreme variability in the variables. This was done for all the variables except for GDP growth which was already converted. In keeping with the outlined methodology, the unit root tests were the first to be estimated. This was done in order to avoid spurious results down the line. As aforementioned, the study checked the stationarity properties using the Im, Pesaran and Shin Test, the ADF-Fisher Chi-square test, the PP-Fisher Chi-square and last but not least the Levin, Lin and Chu test. It was found from the unit root tests that all the variables apart from age dependency (LNAGED) become stationary at first difference at 5% level of significance and are therefore of order of integration one. As aforementioned, LNAGED was the only variable that did not become stationary at first difference but rather at second difference and is therefore of order of integration two.

Diagnostic Tests: Having applied the unit root tests, stability tests were applied to check the stability of the variables to be used in the model. The AR roots check was one test derived for this. It was found that all the dots (roots) fell within the circle and it was therefore safe to conclude that the variables to be used in the model were stable or satisfy the stability condition. After which the Residual Serial Correlation LM test was estimated as one of the diagnostic tests to ensure the validity of the overall model to be estimated. Of which it was found that all the p values were greater than α at all levels of significance (1%, 5% and 10%). This leads to the conclusion of no serial correlation and that suitable estimates could be made as the null hypothesis cannot be rejected.

Panel Cointegration Test: Having applied the unit root tests and diagnostic tests, the study then applied the Pedroni panel cointegration test to see if there existed a long run relationship or otherwise. The results are presented in the table below.

Table 1: Panel Cointegration Tests Within-Dimension

			Weighted	
	Statistic	**p-value**	**Statistic**	**p-value**
Panel v test	-0.403	0.656	-1.462	0.928
Panel rho test	1.424	0.923	0.970	0.834
Panel PP test	-2.603	0.005	-5.295	0.000
Panel ADF test	3.066	0.999	0.019	0.508
Between-dimension				
	Statistic		**p-value**	
Group rho test	2.165		0.985	

Group PP test	-6.135	0.000
Group ADF test	0.091	0.536

Source: Authors' computations

As presented above, of the eleven tests done, eight could not reject the null hypothesis of no cointegration as the p values were greater than α (1%, 5% and 10% level of significance*)*. This was the case for six of the tests from the within dimension and two of the tests from the between dimension tests. As a majority of the tests could not reject the null hypothesis, the study concluded that there was no cointegration and therefore, there was no long run relationship or association between the variables. After the cointegration test was applied, both the fixed and random effects model was estimated. After which, the Hausman test was applied to pick which of the two aforementioned tests would be appropriate to use. The result of the Hausman test is depicted in the table below.

Table 2: The Hauman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.357	6	0.155

Source: Authors' computations

The Hausman test has the null hypothesis that the random effect estimator is correct. As the p value is greater than α (1%, 5% and 10% level of significance), the study could not reject the null hypothesis of no statistical significance. The Random effect estimators were therefore chosen and are the ones from which inferences were made.

Estimation Results: As the random effect estimators were the ones chosen over the fixed effect as per the Hausman test, the model generated was that of the random effect estimators and provided the following:

Table 3: Estimation Results

Variable	Std. error	T stat	Prob.
C	0.029	-2.763	0.007
D(LNREM(-1))	0.094	1.620	0.109
D(LNINF)	0.022	-0.375	0.709
D(GDPG)	0.008	3.300	0.002
D(LNEXC)	0.160	2.517	0.014
D(LNBM)	0.273	0.273	0.786
D(LNAGED, 2)	11.265	-0.756	0.452
R^2	0.185	**Prob (f statistic)**	0.015
Adjusted R^2	0.120	**F statistic**	2.833
		D Watson	2.312

Source: Authors' computations

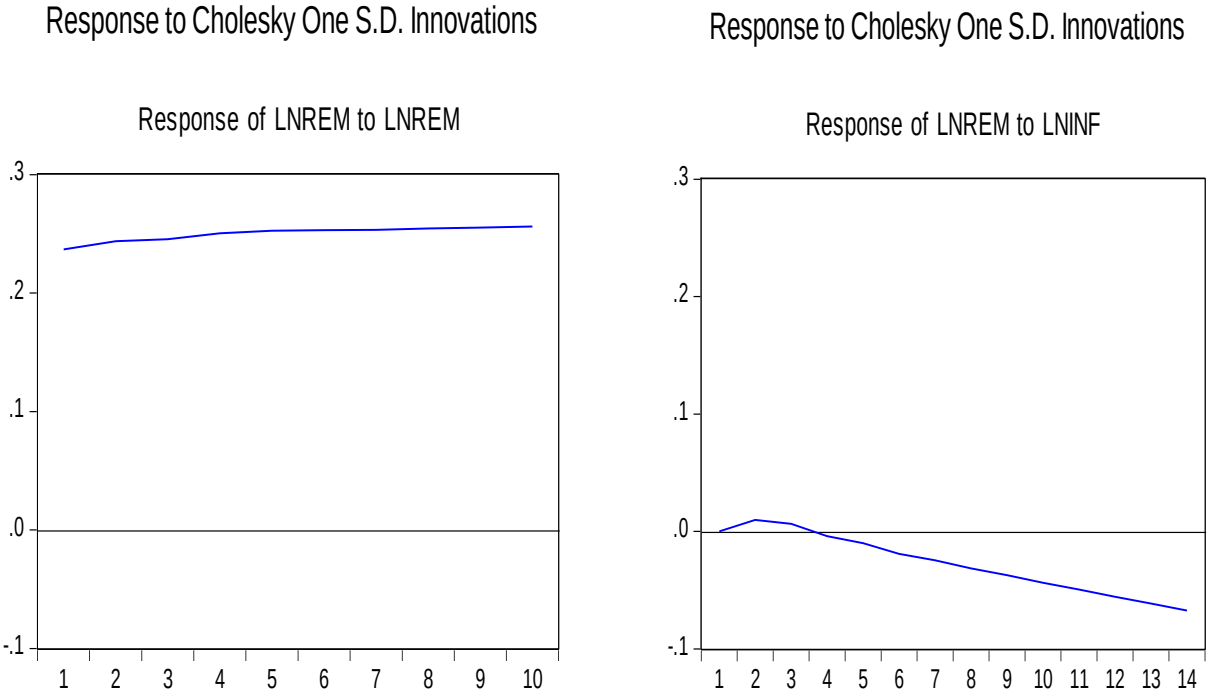
From the estimation results, the only significant variables were GDP growth and the exchange rate which represented changes/improvements in the home countries economic environment and costs of remitting respectively as their p values were less than α (1%, 5% and 10% level of significance and 5% and 10% level of significance respectively). This is in contradiction with the finding of Yuni, Omeje and Asogwa (2013), who found the exchange rate to be insignificant. The finding of the economic environmental conditions being insignificant is similar to that of Coulibaly (2009). However, the finding of market sophistication being insignificant is different from that of Yuni, Omeje and Asogwa. It should however, be mentioned that Eyden, Sekyere and Kemegue, (2011) found different results in regards to market sophistication in their one study. While certain methodology said it was significant, another said otherwise. Furthermore, while Coulibaly; Yuni, Omeje and Asogwa; and Eyden, Sekyere and Kemegue found that remittances from the previous period are significant in affecting current remittance flows, the results of the study show otherwise.

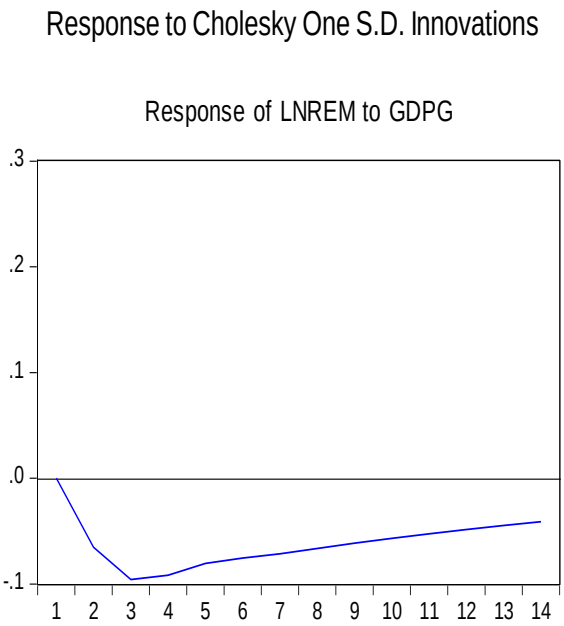
The results of the study imply that the economic environmental conditions and market sophistication do not influence the receiving of remittances in the select Southern African countries. These findings were not expected as it would be expected that a poor economic environment (which one would argue has been prevalent in the region) would see remittances flow into the economy as migrants try to support those left behind (of course this is also dependent on the fact that migrants left family behind) and otherwise. However, as changes/improvements in the economic environment is significant, the economic environment of the home country relative to the host country could play a vital role in the home countries as the changes reflect to an extent the economic environment. Autocorrelation was not found to be an issue in the residual given the d Watson at 2.312 (approximately equal to 2). The model was found to be jointly statistically significant as the probability (statistic test) is at 0.015 and the F statistic is at 2.833. However, as the probability (statistic test) is at 0.015 it is worth noting that there may be issues with the fitting of data (i.e., the independent variables are not purely random with respect to the dependent variable). Generally, the R^2 is low in cross sectional data as compared to time series data. In panel data due to heterogeneity of cross sections, it is not too high.

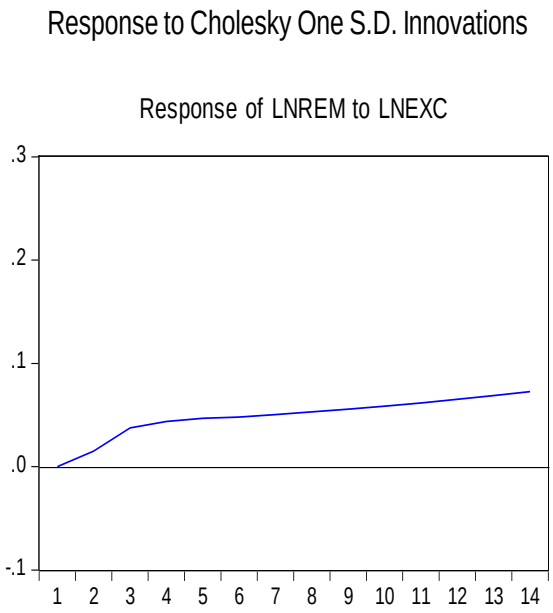
Which is to an extent expected given the set objectives the R^2 at 0.185 and the adjusted R^2 = 0.120 are relatively low, indicating that the model does very little in explaining of the variability of the response of the data around its mean. Regardless of the low R^2, the results can be interpreted and relied upon as in panel data analysis; the individual significance and overall significance of the model instead of the R square or adjusted R square are relied on. All the significant variables were found to have a positive relationship with the dependent variable implying remittances would increase by respective percentage changes given a percentage change from the respective dependent variables. After the model estimation, one more diagnostic test was applied to see if the aforementioned issues from the estimation results would be problematic (multicollinearity and the positive autocorrelation). This being the Residual cross-section dependency test of which the null hypothesis of the test is that there is no cross-section dependence (correlation) in residuals and the decision rule being that that if the p value is greater than α (1%, 5% and 10% level of significance), the null hypothesis cannot be rejected which was the case. Therefore, the study concluded that the estimates found were valid and suitable to make inferences from.

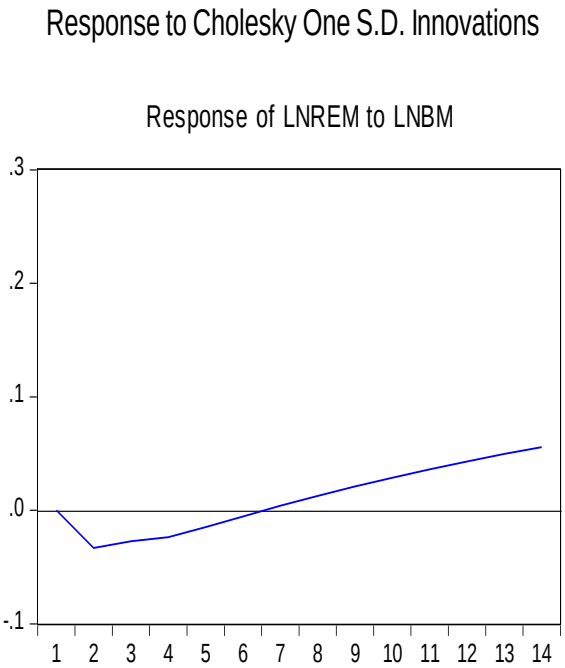
Impulse Response Functions: In keeping with the outlined procedure, after the model estimation the impulse responses of remittances were derived. The figures below illustrate the responses of remittances from the respective independent variables.

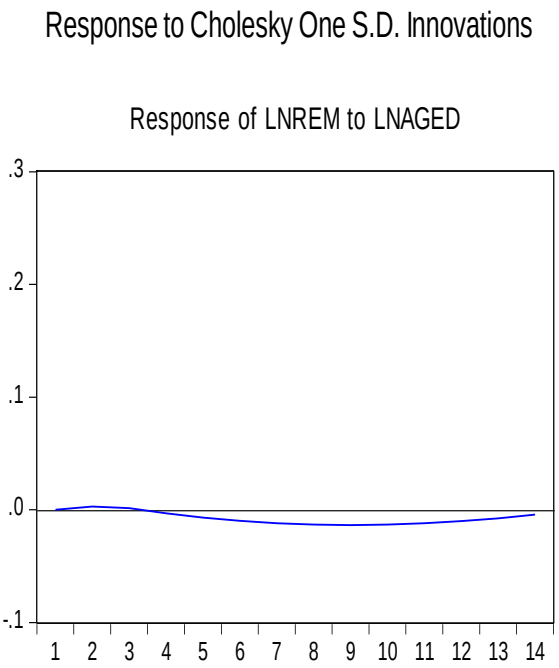
Figure 4: Impulse Responses











Source: Authors' computations

As illustrated, a one standard deviation or shock from remittances themselves sees a slight positive response in remittance inflows. However, over time this response does not vary but remains relatively constant. On the other hand, a one standard deviation or shock from inflation (economic environmental environment) to remittance inflows would initially see a positive response in remittance inflows. However, over time (over three years) remittance inflows would see a fall as a response to a shock in the economic environmental conditions. In regards to remittance inflows response to changes/improvements in the economic environment (GDPG), a standard deviation or shock in the economic environment would see a fall (negative response) in remittance in flows. Over time, remittance in flows would increase but not be 'substantial'. Remittance inflows respond favorably to shocks in the exchange rate as is expected. Given that the exchange rate is in U.S. dollar (for consistency among the countries), a shock in terms of a depreciation of the local currencies would indeed result in perceived and actual increases in remittance inflows.

In regard to remittance inflows response to the market sophistication, it is noticed that a shock initially results in a negative response before a positive response six years later. From the above, it can be inferred that the more market sophistication, the more remittance inflows are initially likely to be hampered before migrants or individuals get used to the systems in place. Last but not least, remittance inflows respond slightly positively to shocks in dependency. However, as time goes by the response is negative though it does improve slightly over time. This could be attributed to the motives of which migrants are remitting. It could be assumed that initially migrants do remit funds home but as to whether their families join them or they get burdened by dependents back home verses their needs in foreign lands that see a fall and negative response to remittance inflows is not clear.

Variance Decomposition Test: The variance decompositions were then applied and showed how shocks reverberated through a system and measure the relative importance of innovation effects on respective variables.

Table 4: Variance Decompositions of Remittance Percentage of the Variation in Remittances Explained by:

Period	S.E.	LNREM	LNINF	GDPG	LNEXC	LNBM	LNAGED
1	0.237	100.000	0.000	0.000	0.000	0.000	0.000
2	0.348	95.316	0.078	3.503	0.188	0.909	0.007
3	0.439	91.155	0.071	6.969	0.847	0.954	0.005
4	0.516	89.497	0.057	8.207	1.329	0.902	0.007
5	0.583	89.077	0.075	8.362	1.695	0.773	0.020
6	0.642	88.942	0.150	8.271	1.953	0.644	0.040
7	0.696	88.860	0.252	8.088	2.186	0.551	0.063
8	0.747	88.789	0.397	7.818	2.403	0.507	0.086
9	0.795	88.697	0.571	7.498	2.613	0.517	0.104
10	0.841	88.545	0.780	7.158	2.821	0.579	0.118

Source: Authors' computations. Note: the Cholesky decomposition ordering is: LNREM, LNINF, GDPG, LNEXC, LNBM, and LNAGED.

In the short run (period 3), a shock or innovation to LNREM accounts for 91.16% variation of the fluctuation in LNREM (own shock). While the shock to LNINF causes 0.071% fluctuation in LNREM. The shock to GDPG on the other hand, causes 6.97% fluctuation in LNREM. Whereas, the shock to LNEXC causes a 0.85% fluctuation in LNREM a shock to LNBM accounts for 0.95% fluctuation in LNREM. Last but not least, a shock to LNAGED accounts for a 0.005% fluctuation in LNREM. In the long run, that is period 10, the shock to LNREM accounts for 88.55% variation of the fluctuation in LNREM (own shock). While the shock to LNINF causes 0.78% fluctuation in LNREM. The shock to GDPG on the other hand causes 7.716% fluctuation in LNREM. Whereas, the shock to LNEXC causes a 2.82% fluctuation in LNREM a shock to LNBM accounts for 0.58% fluctuation in LNREM. Last but not least, a shock to LNAGED accounts for a 0.12% fluctuation in LNREM.

5. Conclusion and Recommendations

The study sought to analyze select macroeconomic determinants of Remittances in Southern Africa. It was found that the only significant variables were GDP growth (changes/improvements in the home countries economic environment) and the exchange rate (costs of remitting). The results imply that, mere economic environmental conditions, previous remitting behavior, dependency and market sophistication do not influence the receiving of remittances in the selected Southern African countries. These results were not expected as it would be expected that a poor economic environment (which one would argue has been prevalent in the region) will see remittances flow into the economy as migrants try to support those left behind (of course this is also dependent on the fact that migrants left family behind). However, as changes/improvements in the economic environment are significant, the economic environment of the home country relative to the host country could play a vital role in the home countries as the changes reflect to an extent the economic environment. The potential for using remittances to encourage development in countries is tremendous, more so in the region since a lot of migration is within the region coupled with the relative substantial amount that remittances make up in comparison.

To the gross domestic product (GDP) in some countries like Lesotho (approximately 30%) there are various policy implications from the results. However, of importance is that as remittances have potential to aid economic growth and changes/improvements in the home countries economic environments do impact remittances, policy makers should figure out how remittances can be channeled for growth when the changes in their countries are not favourable more so as remittances do not respond to general home economic conditions. This further warranting the investigation of individual and demographic variables as opposed to merely macroeconomic variables (Huang & Vargas-Silva, 2006; Coulibaly, 2009). Furthermore, it should be reiterated that reliable data on remittances is either incomplete or undervalued which leaves much to be desired to help understand the phenomenon. Informal remittances are large and unknown. A major effort will be necessary to improve data on remittances that will have to go beyond just gathering data.

It would require for instance, investigating the relationship between migration stock and remittance flows. Secondly, as aforementioned, the region has some of the highest costs of sending remittances. This reiterated by the finding of a positive and significant relationship between remittance inflows and the nominal exchange rate. These fees especially affect the poor. It is difficult to see why remittance fees should be so high, and why they should increase when the amount being transferred increases. Also, given that the average cost declines as remittances increase, there may be scope for policy measures that alleviate cash constraints and enable migrants to send larger amounts of funds (though less frequently), thereby saving on remittance costs. Last but not least, learning more about the best ways to capture and make use of remittances would require reconsidering how financial inflows are received in the respective countries. In addition, policymakers would need much more research on how to use remittances so they positively contribute to migrants' home communities and countries.

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Influence of the Consideration of Future Consequences on Financial Behavior: The Case of Japanese Individual Investors

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Abstract: We analyze the impact of the "consideration of future consequences" (CFC) on the amount of financial assets and the liabilities of individual investors by applying a Tobit model to data from a web-based survey. We find that impatient individuals with high CFC have fewer deposits and financial asset balances. We also examine the influence of the CFC-immediate (CFC-I) and CFC-future (CFC-F) sub-indicators often used in psychology as well as CFC on financial asset balances and liabilities. CFC-I show concern with immediate consequences and also an index related to ego depletion. We find that the higher the CFC-I, the lower the amount of deposits and financial asset balances. However, CFC-F is a sub-indicator designating lack of concern with future consequences; thus, the higher the CFC-F, the larger the debt.

Keywords: *Ratio of risky asset holding, individual investors, Web-based survey, Behavioral finance, Japan, Consideration of future consequences.*

1. Introduction

To investigate the relationship between the various attributes (including psychological tendencies) of Japanese individual investors and their investment behavior, we use the "Survey on Japanese Individual Investors' Financial Behavior" and analyze the data from this survey (Kozu et al., 2012, Takeda et al., 2013). Following recent studies on behavioral economics and behavioral finance, in conducting behavioral analysis of individual investors, we use data that can be clearly classified by characteristics such as age, gender, holding status of assets, individual feelings, and also psychological tendencies. In this study, we thus analyze the influence of the consideration of future consequences (CFC) on the financial assets owned by individual investors based on demographic parameters from the web-based survey. Furthermore, we divide CFCs into CFC-immediate (CFC-I), which means "concerned with immediate consequences," and CFC-future (CFC-F), which refers to "concerned with future consequences," and comparatively analyze them. A Tobit model is then applied to the results, whose parameters are related to time and money preferences.

2. Literature Review

An early empirical study by Nakagawa and Katagiri (1999) uses micro data (individual data) on Japanese household asset allocation to analyze the reason the holding ratio of risky assets is lower in Japanese households than in other countries. The study shows that Japanese investors do not consider the profitability of assets significantly important, indicating a stronger tendency to value safety and liquidity than US investors. More recently, research on behavioral economics has also been conducted using behavioral characteristics data. Kinari and Tsutsui (2009) measure the psychological tendencies of an individual being an optimist, including not only demographic parameters, such as age and sex, but also personal psychological ones such as the time discount rate of individuals. They show that psychological tendencies have influences on the holding of financial assets. Prior studies on the influence of time discount rate of individuals are roughly divided into two categories: (1) the impact on the balance of financial assets and (2) the influence on the holding ratio of risky assets. Regarding the impact of the time discount rate on the balance of financial assets, many studies show that the amount of financial assets reduces as the time discount rate increases, and "impatient" individuals tend to value "current consumption" over "future consumption." For instance, Takeuchi and Hoshino (2014) find that the time discount rate has a significantly negative influence on the holding of financial assets. They show that the higher the time discount rate is, the lower the financial assets

are. The authors conclude that the holding amount of financial assets, including risky assets, is small because individuals who are present-oriented and rational consume more.

This is based on the fact that the ratio of the time discount rate changes the evaluation of current and future consumption under the setup of the utility function in traditional economics theory. In other words, individuals with high time discount rates emphasize current consumption, meaning that savings for future consumption tend to be small. Feng et al. (2017) assert that the discount rate significantly reduces the probability of having bank deposits, postal savings, stocks, investment trusts, government bonds, and corporate pensions. However, most studies conducted in Japan on the influence of the time discount rate on personal financial asset formation compare the receipt of money between two points of time. As one of few exceptions, identify current bias by asking the qualitative question of how often the respondents did their homework as children. They find that those who are strongly focused on the present are less likely to hold financial assets. Ammerman and MacDonald (2017) summarize past research on the holding ratio of risky to financial assets. They show that whether the period is short- or long-term and the scale of profit and loss affect the impact of time discount rate on individual asset allocation. For example, if long-term investors are optimistic about future profits and the lower the time discount rate, the more likely they are to hold many risky assets aiming for future profits.

However, if investors think that the risk of a financial crisis will increase in the near future, they would be pessimistic about future profit. In this case, investors believe that loss would occur and the lower the investors' time discount rate, the more likely to reduce their risk assets. The authors also summarize that the time discount rate factor affects an individual investor's asset allocation by combining the risky asset holding ratio with expected returns, among others. Webley and Nyhus (2013) analyze the characteristics of bias related to self-control (Self-Control) using 18- to 32-year-old Dutch voter data. They show an easy feature is to increase the proportion of cash out of the assets held (for quick consumption) to value short-term consumption, as bias is stronger. Ammerman and MacDonald (2017) also use Dutch population data to show that the cash holding ratio is high for individuals with a strong current bias that values, based on current bias parameters often used in psychology, among other fields. This current bias parameter is the CFC proposed by Strathman et al. (1994) and is often used for analyzing the behavioral characteristics of individuals. However, the only example is the study conducted by Ammerman and MacDonald (2017) using Dutch data, which uses a determinant of the asset holding amount of individual investors.

3. Web-Based Survey and Framework

Web-Based Survey: In this study, we used individual data collected using the Internet survey titled "Survey on Japanese Individual Investors' Financial Behavior 2017" (hereinafter, the "2017 Survey") conducted in March 2017[1]. The subjects were male and female (Japanese) aged 20 years and over having invested in stock or other types of mutual funds (e.g., stock mutual funds, balanced mutual funds). We conducted a preliminary survey of about 20,000 people by extracting 1,233 people to investigate whether the subjects of the survey satisfy the conditions. In addition, we used an oversampling technique and calculated the time spent by each respondent to answer about 50 questions. Before beginning the statistical analysis, we excluded those observations for which the respondents took a short time to answer. After screening, the number of observations was reduced to 1,218. Of the surveyed subjects, 75.3% were men, of which 60% had less than 5 million yen as income and 60% had less than 5 million yen as deposits and other financial assets. However, around 25% of respondents owned 10 million yen or more. Regarding the amount of liabilities, about 70% of

[1] Web-based (Internet) methods inevitably have data collection weaknesses, but it is not always desirable to use Internet surveys if the purpose of the survey is to provide useful information useful to individuals and organizations It has been suggested that decision making (The Japan Institute for Labor Policy and Training, 2005). These collected data are assumed to be useful for rational analysis. Specifically, observations with a response time of 6 minutes or less were excluded. This is less than half the average response time (about 12 minutes).

respondents replied that they had zero liabilities. Regarding residential areas, the Kanto region is the largest in our sample (at around 40%).

Consideration of Future Consequences (CFC): Strathman et al. (1994) focus on future thought in relation to future prospects, conducting a study on CFC and creating a questionnaire including the 12 questions in Table 1. From the responses to the questionnaire, we can measure whether individuals tend to be affected by considering how their current behavior affects future results. Specifically, in many cases, factor analysis is applied to the answers to the 12 questions, and the score of the first factor is taken as a future result deliberation indicator showing the degree of consideration for each future result. Inoue and Arimitsu (2008) evaluate its usefulness by surveying Japanese CFCs by using the translated version of Strathman et al.'s (1994) questions into Japanese. In addition, Joireman et al. (2008) analyze the characteristics of CFC as CFC-I and CFC-F. While both indicators refer to CFC, we can divide the CFC results in relation to the present or future. Specifically, among the 12 questions in Table 1, the factor score as a result of factor analysis using only questions 1, 2, 6, 7, and 8 corresponds to CFC-F, and questions 3, 4, 5, 9, 10, 11, and 12 refer to CFC-I. Regarding these qualitative interpretations, according to Joireman et al. (2008), although both CFC-I and CFC-F are related to the time discount rate, CFC-I also strongly related to ego depletion. In this study, we investigate CFC, CFC-I, and CFC-F using the Japanese translated version of the questions in Table 1. The answers are based on a five-point Likert scale: applicable, slightly applicable, indifferent, slightly inapplicable, and inapplicable.

Table 1: Questions used to Investigate CFC Indicators

1	I consider how things might be in the future and try to influence those things with my day–to–day behavior
2	I often engage in a particular behaviors in order to achieve outcomes that may not have resulted for many years.
3	I only act to satisfy immediate concerns, figuring the future will take care of itself.
4	My behavior is only influenced by the immediate (i.e., a matter of days or weeks) outcomes of my actions.
5	My convenience is a big factor in the decisions I make or the actions I take.
6	I am willing to sacrifice my immediate happiness or wellbeing in order to achieve future outcomes.
7	I think it is important to take warnings about negative outcomes seriously even if the negative outcome will not occur for many years.
8	I think it is more important to perform a behavior with important distant consequences than a behavior with less important immediate consequences.
9	I generally ignore warnings about possible future problems because I think the problems will be resolved before they reach crisis level.
10	I think that sacrificing now is usually unnecessary since future outcomes can be dealt with at a later time.
11	I only act to satisfy immediate concerns, figuring that I will take care of future problems that may occur at a later date.
12	Since my day–to–day work has specific outcomes, it is more important to me than behavior that has distant outcomes.

Model: Because the purpose of this research is to show the influence of the bias of CFC on individual investors' asset holding, the dependent variables are "deposit amount," "stock or other types of mutual funds" (e.g., stock mutual funds, balanced mutual funds), and "liability amount" the results on "deposit ratio" and "share or other types of mutual funds ratio" for total financial assets are summarized in the Appendix. The

2017 survey includes many questions that measure not only demographic attributes and the asset holding status of individual investors, but also individual behavioral characteristics commonly used in behavioral economics. We choose independent variables likely to affect the holding status of individual financial assets, as shown in Table 2. A linear regression that ignores this data function is highly biased towards underestimating the response to the amount of individual investor assets held in relation to covariates such as age. In other words, it is important to consider whether ego depletion influences deposit amounts with respect to current time valuation.

This result shows that the concept of the time discount rate in the traditional economic utility function depend on people's view of whether they should emphasize the present. High education dummy, investment experience dummy, risk aversion, or behavioral finance factors. Since the dependent variables are based on pre-specified answers, we use a Tobit model. The Tobit analysis is designed to estimate the linear relationships between the explanatory variables and the explained variable based on censoring from below and above, respectively. Censoring from above takes place when values at or above a threshold are converted to the threshold, so that the true value might be equal to the threshold, but it might also be higher. In the case of censoring from below, values at or below the threshold are censored (Green, 2012). Specifically, we used demographic parameters and CFC as independent variables (Model 1) for each dependent variable (three types), demographic parameters, CFC-F, and CFC-I (Model 2), respectively. The Kinki and Chubu regions account for the next largest groups. These three regions collectively account for nearly 80% of respondents.

Table 2: Dependent Variables

Variables	Definition of variables	#	Mean	S.D.
Amount of deposit	0 JPY, 0.01-0.5 million JPY, 0.5-1 million JPY, 1-2 million JPY, 2-3 million JPY, 3-5 million JPY, 5-7 million JPY, 7-10 million JPY, 10-15 million JPY, 15-30 million JPY, 3000 million JPY or over ⇒ 0 JPY, 0.25 million JPY, 0.75 million JPY, 1.5 million JPY, 2.5 million JPY, 4 million JPY, 6 million JPY, 8.5 million JPY, 12.5 million JPY, 22.5 million JPY, 30 million JPY	1218	811.9	908.8
Amount of stock or other types of mutual funds (e.g., stock mutual funds, balanced mutual funds)	0 JPY, 0.01-0.5 million JPY, 0.5-1 million JPY, 1-2 million JPY, 2-3 million JPY, 3-5 million JPY, 5-7 million JPY, 7-10 million JPY, 10-15 million JPY, 15-30 million JPY, 3000 million JPY or over ⇒ 0 JPY, 0.25 million JPY, 0.75 million JPY, 1.5 million JPY, 2.5 million JPY, 4 million JPY, 6 million JPY, 8.5 million JPY, 12.5 million JPY, 22.5 million JPY, 30 million JPY	1218	647.3	829.6
Stock of other financial assets	0 JPY, 0.01-0.5 million JPY, 0.5-1 million JPY, 1-2 million JPY, 2-3 million JPY, 3-5 million JPY, 5-7 million JPY, 7-10 million JPY, 10-15 million JPY, 15-30 million JPY, 3000 million JPY or over ⇒ 0 JPY, 0.25 million JPY, 0.75 million JPY, 1.5 million JPY, 2.5 million JPY, 4 million JPY, 6 million JPY, 8.5 million JPY, 12.5 million JPY, 22.5 million JPY, 30 million JPY	1218	371.4	706.6
Amount of debt	0 JPY, 0.01-0.5 million JPY, 0.5-1 million JPY, 1-2 million JPY, 2-3 million JPY, 3-5 million JPY, 5-7 million JPY, 7-10 million JPY, 10-15 million JPY, 15-30 million JPY, 3000 million JPY or over ⇒ 0 JPY, 0.25 million JPY, 0.75 million JPY, 1.5 million JPY, 2.5 million JPY, 4 million JPY, 6 million JPY, 8.5 million JPY, 12.5 million JPY, 22.5 million JPY, 30 million JPY	1218	265.8	696.9

Table 3: Independent Variables

Variables	Definition of variables	#	Mean	S.D.
Age	1. 20s, 2. 30s, 3. 40s, 4. 50s, 5. 60s or over	1218	3.37	1.16
High education dummy	1. College graduates or over, 0. Other	1213	0.67	0.47
Investment experience dummy	1. Having investment experiences over 10 years, 0. Other	1218	0.52	0.50
Risk aversion	When do you usually go out? At what probability of rain will you take an umbrella when going out?" (0-100%)	1218	56.64	19.41
CFC	Factor score of CFC questions	1218	0.00	0.91
CFC-F	Factor score of CFC-F questions	1218	0.00	0.82
CFC-I	Factor score of CFC-I questions	1218	0.00	0.90

4. Results

Here, we discuss the results of the Tobit model described above. First, there is no difference in the amount of deposits, stocks, etc. based on gender. However, men have more liabilities than women. Regarding age, the results show that the higher the age, the more deposits and stocks an individual is likely to have and the lower the liability amount. In addition, people with education higher than the university level tend to have more deposits and stock holdings, while their amount of debt tends to be lower. People with long investment experience have large amounts of deposits and stock holdings. However, CFC, CFC-F, and CFC-I differ depending on the explained variables. With the deposit amount as a dependent variable, we find that the higher the CFC is (impatience), the lower the deposit amount. Although CFC-F is not statistically significant, CFC-I is significant. In other words, present-oriented individuals have fewer deposits. CFC, CFC-F, and CFC-I do not have a statistically significant impact on stocks as dependent variables. CFC does not have a statistically significant impact on debt amount as dependent variable. However, the effect of CFC-F is significant, and the individuals who do not value the future have higher amounts of debt.

Table 4: Estimation Results

	Amount of deposit				Amount of stocks				Amount of debt			
	model 1		model 2		model 1		model 2		model 1		model 2	
	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
Male dummy	-85.81	0.19	-87.54	0.18	14.49	0.80	15.09	0.79	1079.13	0.00	1058.42	0.00
Age	214.05	0.00	217.14	0.00	158.18	0.00	157.85	0.00	-347.57	0.00	-319.21	0.00
High education	247.16	0.00	243.94	0.00	229.87	0.00	229.54	0.00	150.79	0.43	136.01	0.48
Experience	199.93	0.00	200.42	0.00	444.79	0.00	444.92	0.00	326.88	0.08	330.80	0.08
Risk aversion	-2.21	0.12	-2.17	0.12	-0.33	0.79	-0.34	0.78	-1.56	0.72	-0.76	0.86
CFC	-69.73	0.03			-22.36	0.41			82.61	0.40		
CFC-F			31.17	0.37			-5.48	0.86			309.37	0.01
CFC-I			-71.48	0.03			-26.98	0.33			124.84	0.20
Constant	-2.16	0.99	-11.05	0.93	-265.05	0.01	-263.74	0.01	-1581.49	0.00	-1690.63	0.00
LR chi2 (6,7)	134.7		135.9		204.8		205.0		42.2		50.5	
Log Likelihood	-9213.8		-9213.2		-9231.1		-9231.0		-2671.7		-2667.6	
Pseudo R2	0.0073		0.0073		0.011		0.011		0.0078		0.0094	
#	1213		1213		1213		1213		1213		1213	

5. Conclusion

This is the first study to analyze the influence of CFC, CFC-I, and CFC-F on the balance of financial assets and liabilities by using data on Japanese individual investors. Regarding demographic parameters, our findings show that the higher the age is, the higher is the amounts of deposits, stocks, and mutual funds are. We can interpret the relationship as a higher age being associated with more financial assets due to the increased number of chances to increase savings. However, regarding the debt amount, the higher the age, the smaller the debt amount this is consistent with the life cycle viewpoint of taking mortgages and other loans at a young age. In addition, we find that individuals with long investment experiences tend to have more deposits and stocks, among others. However, CFC, CFC-F, and CFC-I have various influences on the individual holding of financial assets. Regarding CFC, the deposit amounts decrease as the indicator is high (short-term preference is strong and impatient). As discussed by Ammerman and MacDonald (2017), when CFC is low, impatient individuals value current consumption and the savings rate tends to be low.

Thus, their deposits tend to decrease. This result is consistent with result using Japanese data, although their CFC measurement method is different. Moreover, we find that CFC-I has a negative impact on the amount of deposits (i.e., the stronger the tendency to value the present, the fewer the deposits and overall financial assets are). In other words, the influence of ego depletion on the deposit amount is important with respect to

current time valuation. As for the debt amount, we find that the higher the CFC-F is, the higher debt is. People with a high CFC-F do not place importance on the future, meaning that a low concern for future repayment leads to an increase in current debt. In this study, we analyzed the influence of CFC on the possession of financial assets, which has not been previously studied. As a result, we found that CFC-I has a negative impact on the amount of deposits (i.e., the stronger the tendency to value the present, the fewer the deposits and overall financial assets are). This study contributes to deepening our understanding of the determinants of the time discount rate.

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Appendix: Influence of CFC on "Deposit Ratio" and "Stock Ratio": This study analyzes the impact of CFC on the financial assets and liability holdings of individual investors. However, there are various prior studies on the influence of deposit and stock ratios on total financial assets, as shown below. Previous studies have derived several conclusions in this field. For instance, Kinari and Tsutsui (2009) indicate that the time discount rate has no significant influence on the holding ratio of risky assets. They argue that the time discount rate is important in the estimation of the CCAPM Euler equation, but there is no reason for the significant influence on the holding status of financial assets indicated by cross-sectional data at one time point. Kitamura and Nakashima (2010) also show that the time preference rate for stock allocation is not

significant. Meanwhile, Nogata and Takemura (2017) demonstrate that the higher the time discount rate, the higher the risky asset holding ratio is they contend.

That individual may desire to earn high earnings in the near future, meaning they are investing in risky and high return risky assets. Feng et al. (2017) show that the time discount rate significantly reduces the risky asset ratio in our study, "deposit ratio" and "equity ratio" (total of stocks and stock investment trusts), which individuals indicate directly from 0 to 100% in the 2017 survey, are dependent variables, while gender, age, college graduate dummy, investment experience dummy, risk aversion parameter, CFC, CFC-F, and CFC-I are independent variables (Table A1). According to the estimation results, age is not related to the deposit ratio, while individuals with higher age have higher share ratios. In addition, regarding investment experience, the deposit is low and stock ratios are high, among others. However, CFC, CFC-F, and CFC-I do not show statistically significant impacts. Although they all affect the outstanding balance of financial assets, there is no effect on holdings.

Table A1: Estimation Results of the Models for Deposit Ratio and Stock Ratio

	Ratio of deposit				Ratio of stocks			
	model 1		model 2		model 1		model 2	
	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
Male dummy	-6.93	0.00	-6.85	0.00	6.29	0.00	6.37	0.00
Age	1.06	0.15	0.96	0.19	0.04	0.96	-0.07	0.91
High education	-2.62	0.13	-2.53	0.14	0.71	0.65	0.79	0.62
Experience	-12.54	0.00	-12.52	0.00	7.77	0.00	7.79	0.00
Risk aversion	0.00	0.99	0.00	0.94	0.04	0.25	0.04	0.27
CFC	-1.45	0.11			0.51	0.54		
CFC-F			-1.28	0.20			-1.24	0.18
CFC-I			-1.68	0.07			0.33	0.70
Constant	60.27	0.00	60.60	0.00	25.22	0.00	25.55	0.00
LR chi2 (6,7)	81.0		83.1		48.7		50.3	
Log Likelihood	-5651.8		-5650.8		-5501.7		-5500.9	
Pseudo R2	0.0071		0.0073		0.0044		0.0046	
#	1213		1213		1194		1194	

The Challenges/Barriers Preventing the South African Youth in Becoming Entrepreneurs: South African Overview

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Abstract: Youth entrepreneurship is commonly measured as a significant determinant of poverty reduction, economic development and job creation but the participation of the youth in entrepreneurship is worrisome. Against this background, this study aims to evaluate the challenges that are preventing the youth in starting their own businesses. A qualitative research approach was adopted to enable the use of secondary data literature. The research methodology was undertaken by systematically reviewing and contextualizing the literature regarding the challenges preventing the youth from participating in entrepreneurship activities. The data was analyzed using thematic content analysis. The results showed that the lack of education, society's attitude towards youth entrepreneurship, lack of access to finance and a poor entrepreneurship culture are the barriers that prevent youth from engaging in entrepreneurial activities. A policy implication arising from these findings is that there is a need for entrepreneurship education, better support from society and the provision in terms of the easy access to finance.

Keywords: *Youth, Entrepreneurship, challenges*

1. Introduction

South Africa has made a great effort in encouraging entrepreneurial activities, especially when it comes to youth development and involvement. In an environment where jobs are scarce and where unemployment is high, there is an urgent and important need for nurturing entrepreneurship, especially among the youth, particularly in township areas (Nafukho & Muyia, 2010). In 1994, Former President, Nelson Mandela articulated that the youth are a treasured possession of any nation's quest to develop (Gordon-Davis & Cumberlege, 2007). Subsequently, the South African government created youth initiatives such as Junior Achievement South Africa (JASA) and National Youth Development Agency (NYDA) to promote the development of youth entrepreneurship and also to help in fighting the challenges that prevent the youth from partaking in entrepreneurship activities or ventures. However, regardless of the support, the rate at which the youth is participating in entrepreneurship activities is worrisome, considering that youth unemployment currently stands at 55.2% between the ages of 15-34 (Statistics South Africa, 2019). Therefore this study seeks to examine the challenges that prevent the youth from participating in entrepreneurship activities. Additionally, this study seeks to understand why the youth are not participating in entrepreneurship activities, since entrepreneurship has been touted as key in fighting the high unemployment rate in South Africa.

2. Literature Review

Entrepreneurship plays an important role in uplifting the economic growth in any country. Nafukho & Muyia (2010) contend that entrepreneurship, from a global perspective, has been seen as an approach to assist in ensuring the economic participation of young people. Fatoki and Garwe (2010) argue that entrepreneurship is the best method of fighting unemployment & poverty. Several institutions meant to support youth involvement in entrepreneurship have been created in South Africa and in other countries such as Nigeria. Nonetheless, poverty mitigation, unemployment reduction, and formation of a favourable youth business environment to partake fruitfully and effectively in the economy of the country remain an obstacle in the country (NYDA, 2011). Musengi-Ajulu (2010) agrees that even though there are programmes that are being established which have resulted in many economic opportunities being established for the youth; it seems that they have not made a major impact in reducing the high unemployment rate that is currently affecting the youth. James (2012) argues that nurturing young entrepreneurs could provide an important solution to the country's unemployment dilemma. Entrepreneurship has been seen as vital for job creation, economic development and poverty mitigation (Chiloane-Tsoka & Mmako, 2014). Nafukho and Muyia (2010) asserted that there is a strong need for entrepreneurship education and training in schools.

Government Support Initiatives in Promoting Youth Entrepreneurship: The government has recognized the importance of youth entrepreneurship and thus has invested heavily in programs aimed at ensuring entrepreneurial youth development. There are several government programs and private agencies that support and ought to ensure the growth of youth entrepreneurs. For example, in Malaysia, the government plays an active role in supporting and encouraging entrepreneurs by establishing institutions, technology parks, and incubators to encourage young entrepreneurs. Some key institutions or agencies are Technology Malaysia Park (TPM), Malaysian Technology Development Corporation (MTDC), Small Medium Enterprise Corporation (SME Corp), and the Malaysian Global Innovation and Creativity Centre (MaGIC) (Khin and Kee, 2017). In addition, the development of a range of financial institutions enables funds to be utilized effectively and resourcefully ensure continuous investments. In 2011, the Malaysian government established a programme called, '1Malaysia Young Entrepreneurs Challenge' (1MYEC). This programme aims to implant a spirit of entrepreneurship among university students and inspire them to partake in entrepreneurship programmes (MITI, 2011).

Despite the reported efforts of the Malaysian government to promote entrepreneurship, there is still a need to identify whether those efforts meet the need of promising entrepreneurs and what kind of support is still needed. Yet, Africa still has more to catch-up. From a South Africa perspective, the most prominent initiative aimed at supporting young entrepreneurs is known as the National Youth Development Agency (NYDA), whereas, Kenya's quest to ensure entrepreneurship development involved the introduction of

entrepreneurship education into the curriculum of all country's technical training institutions. The government of Kenyan government has developed various programs such as the Youth and Women Enterprise Development Fund which aims at assisting in the formation of entrepreneurial projects (Sagwe, Gicharu & Mahea, 2011). The Youth Enterprise Development Fund has been developed by various private financial intermediaries in partnership with the Ministry of State for Youth Affairs; this fund has been precisely made to improve the youth and to ensure that the youth has the resources to ensure self-employment via entrepreneurship initiatives (Moraa New Hope Foundation, 2015). The authors further emphasized that the funds can be accessed by the youth either in groups or individually.

In most cases, collateral that is needed to secure money loaned out has been made reasonable and inexpensive in such a way that it can be guaranteed by parents, group guarantee, community leaders or even relatives. With these regulations being improved, the Moraa New Hope Foundation (2015) believes that young people in the country will be able to put an effort towards their life goals that were seemingly delayed by the tough regulation which was hindering them from accessing credit services (Kimando, Njogu & Kihoro, 2012). Similarly, it was found that in South Africa, none of the municipalities, provincial departments and national agencies had concrete frameworks on small business expansion to monitor their activities (Mazwai, 2012). Moreover, Mazwai (2012) reasoned that local frameworks in developing economy were disadvantageous when it came to empowering communities, and the leadership that was given by the state was not strong. The Nigerian government has put more effort in maintaining order and law and developing an enabling environment where business ventures can succeed. The government encouraged the culture of entrepreneurship by providing opportunities such as business competitions and grants for enterprises. Specific efforts to develop innovation and enterprise have been made in Nigeria.

For instance, there are entrepreneurial oriented institutions that have been developed such as the Youth Enterprise with Innovation in Nigeria (You Win) program (Egwu, 2014). Other opportunities in Nigeria for the development of enterprise include; organizing workshops and seminars at both international and local levels to inspire the creation, registration and cooperation of micro, small and medium business relations. There are also professional relations that were formed with the purpose of stimulating the advancement of industrial organization and businesses through franchising, linkages and co-operation of entrepreneurship activities. For instances, such associations are the Abuja Enterprises Agency (AED), Acadia Centre for Small Business and Entrepreneurship (ACSBE), International Council of Small Business (ICSB) and Nigerian Association of Small and Medium Scale Enterprises (NASME) (Osunde, 2014). In South Africa, the Junior Achievement South Africa (JASA) aims at empowering the youth people who are the seekers and creators of opportunities. The programme also aims to nurture entrepreneurial thinking among youth people (JASA, 2012). One of the objectives of this organization is to train youth individuals for life after school by nurturing the mindfulness of economic issues.
Changing their mindsets to think entrepreneurially by teaching them entrepreneurial skills, make them understand the business world and improving their intelligence of individual responsibility through practical business knowledge (JASA, 2012). Another agency that the government has developed is National Youth Development Agency (NYDA) which is aimed at ensuring the government and private sector societal development through entrepreneurship by identifying and implementing solutions to the challenges facing the youth in society (Echezona, 2015). Entrepreneur Magazine (2015) argued that this agency is responsible for the provision of grants and soft-loans for both financial and non-financial funding to young entrepreneurs. It also provides grants for mentorship programmes, market linkages, youth co-operative development programmes.

Youth Participation in Entrepreneurship Activities: The United States is well-known for its positive entrepreneurial energy and drive, and its attitude towards entrepreneurship. Young Americans are extra likely to see opportunities compared to the older population in the United States, but they are less likely to be certain that they have the required capabilities for entrepreneurship, and they have a high fear of failure (GEM, 2017). Whereas those who have passed their youth age, in contrast, express much confidence in their capabilities and they are less afraid of failing but they don't see as several opportunities. Entrepreneurial activity in the United States in 2016 revealed extensive involvement across various age groups. Intentions to participate in entrepreneurial activity among non-entrepreneurs declined in the older age groups and among those between 25-34 years old have reached a high of 10%. This development indicates that the younger

population thinks through owning and opening a new business as a sustainable career option in the early stages of adult life (GEM, 2017). It appears that the middle-career population is either constrained by personal obligations, family or is comfortable to employment and is not planning to establish new businesses in the near future. Yet this age group is most probable to start a business. This shows that both startups and organizations among young age group involved in most entrepreneurial activities. However, in the United States, individuals are much involved in entrepreneurial activity when they work on their own rather than for employers. Young people are less likely to feel they have the necessary skill sets to start businesses and more likely to see opportunities to undertake such endeavors.

For the older age groups, the picture is precisely opposite. As individuals grow older, they trust that they have gathered the experience, capabilities and knowledge to start a new venture but they are less likely seeing enough opportunities (GEM, 2017). In South Africa, youth participation in entrepreneurship activities is very worrisome. GEM report 2016 revealed that there is a decline in the involvement of people aged between 25-34 years old in entrepreneurial activities, with over 40% decrease, compared to 2015 and this worrying as this age group tend to be entrepreneurially vibrant. However, the individuals between the age of 25 and 34 years old in 2016 were least entrepreneurially active in South Africa, with even lower rates than those between 18 – 24-year-olds. Out of 65 economies, South Africa is ranked 58th in terms of participation in entrepreneurial activities by 25 to 34-year-olds. Youth entrepreneurship participation is less effective compared to those of adults group. In 2016, 45-55 age groups are accounting for more than a quarter 28% of all early-stage entrepreneurial actions and they are most entrepreneurially active. This growth in entrepreneurship activity might be a cause of older workers who are aware that there are high chances that they can face inadequate prospects on the job market and who are made redundant (GEM, 2017). GEM report (2016) revealed that the percentage of people aged between 18 – 24 years old that are participating in early-stage entrepreneurial activities in South Africa is noticeably lesser than the average for Africa (which is 2.4 higher the South African number for this group) as well as lesser than the average for efficiency-driven economies, which is nearly double South African number which is at 12%. Given the high unemployment rate of South African youth, this is cause for concern.

Barriers that Hinder Youth Entrepreneurship Development

Access to Credit: Access to credit remains a big challenge in many countries. Sambo (2015) alluded that there is a positive association between the expansion of youth entrepreneurship and access to credit. A study by Mwangi & Shem (2012) revealed that accessing credit is a huge barrier to the growth and development of small and micro enterprises (SMEs) and, also, to deprived urban and rural families. Access capital for a start-up is a huge barrier in one's quest to venture into business. Chimucheka (2012) stated that all businesses require finance to start, operate, sustain and grow. Boates (2013) alluded that most of the business people who run small businesses repeatedly discover that they do not qualify for loans and credits due to the fact that they have high debt to equity and no collateral. Turton and Herrington (2012) revealed that 79% of local entrepreneurs find it difficult for them to access funding, while various believe that funding settings are slowly failing, in terms of the initial public offering, angel investors or bank lending. Further stated that funds for entrepreneurs are not made easily available, and much of the capital is regularly too expensive, which limits the progress of promising businesses. As a result of lack of funding many South African entrepreneurs are discouraged to embark an entrepreneurship journey (Boates, 2013).

Entrepreneurship Education: Around the world the governments have put more effort into interventions that encourage success in entrepreneurship, making an important contribution in entrepreneurship education and training (Valerio, Parton & Robb, 2014). It is not only happening in developed nations, but it as well happening through the emerging world. According to Njongeri (2015), for example, in Kibera as well as in the rest of Kenya, the alternative forms of education are lacking, and there is inadequate access to secondary schools. Globally, research in entrepreneurship education and training is failing to draw a straight fundamental link associating the improved knowledge with the business successive performance (Valerio, Parton & Robb, 2014). Nevertheless, compared to their counterparts from other countries, South African youth are still relatively left behind at the pace at which they are setting up their own business projects (GEM, 2017). Fatoki & Chindoga (2011) alluded that the continuity of this state may not accelerate the pace of youth economic participation, especially considering the high unemployment rate. Sandrock (2011) proposes that

matriculates, as well as graduates from universities, should be prepared with entrepreneurial skills to avoid job seekers and promote job creators. Varblane and Mets (2010) stated that learning institutions are failing to equip students/learners with necessary skills that are needed to start, sustain and grow their businesses.

Learners are educated just to pass an exam. Therefore; there is also a necessity in education curriculum at present to include life skills training (Kaburi et al., 2012). Nani (2016) pointed out that learning institutions are still lacking when it comes to entrepreneurship studies, as most institutions focus more on the theoretical aspect of entrepreneurship and less of a practical aspect of entrepreneurship. The author further stated that the education that is taught to students seems to promote job seekers than job creators. Sandrock (2011) stresses out that a group of job creators would be much useful than that of workers. Likewise, Mahadea et al. (2011) trust that discovering the talent of young people by fostering entrepreneurial culture amongst school leaners would be helpful in their well-being. The authors further pointed out that, the education system should be able to advance entrepreneurship knowledge, skills and attitudes in a student. Varblane and Mets (2010) acknowledge that several higher learning institutions in South Africa provide entrepreneurship education. However, they are likely to focus more on the theoretical aspect of entrepreneurship. Nonetheless, the authors suggest that the establishment of business incubators within universities is required in order to successfully deal with the matter of unemployment. Society believes that the white-collar jobs are superior to entrepreneurship, they believe that becoming a nurse, lawyer or a teacher is the best job to pursue (Echezona, 2015).

The authors argue that incubators could assist students with practical exposure by connecting theoretical training with practical training. The author added that such incubators must be able to offer technical assistance and management guidance to youth individuals and potential young entrepreneurs in any issues related to business. Mahadea et al. (2011) argue that on the foundation of the active South African labour market, lots of youth people after completing their secondary education will struggle to find jobs. Thus, the fact that youth should consider starting their jobs as a choice, instead of chasing for paid work in order to fight against this high unemployment rate. The authors suggested that learning systems should be able to influence learner's attitude towards entrepreneurship, and also be able to equip learners with entrepreneurial skills, knowledge. Isaacs, Visser, Friedrich & Brijal (2007) concur that learning system remains the much important aspect even though there are many components that can inspire people to start a business, such as role models, exposure to entrepreneurship from close families, and so on. The introduction of entrepreneurship studies should be included in the primary school curriculum as it will help to build a solid basis for future entrepreneurial growth to the learners (Udu and Amadi, 2013). Nani (2016) stated that when learners are mentored and taught how to start, run and sustain a business from an early age, the high failure rate of entrepreneurship might be abridged when these graduates arrive in the real business world.

Parents and Society's Attitude towards Youth Entrepreneurship: The attitude from society is also one of the obstacles that hinder the development of youth entrepreneurship. In Kenya, society's expectations from young people have input in the low development of entrepreneurship among the youth (Kaburi et al., 2012). Parents and older generations have different expectations from the youth and most of them encourage white-collar jobs because they think is the best way of getting money. Therefore there is little encouragement that is offered to the youth to start their businesses and this overwhelms young people (Kimando, Njogu & Kihoro, 2012). South African youth also face pressure from parents who believe that after graduation their children have to go look for the jobs to make money (Echezona, 2015). The author further stated that the parent's attitudes make it hard for the youth to create businesses because they put pressure that they have to work in order to fight poverty (Nani, 2016). This perception makes it difficult for youth to start their businesses. Many economies encourage entrepreneurship education and training so as to inspire their citizens to establish encouraging attitude towards entrepreneurship, establish managerial skills for running fruitful businesses, and represent a need to venture into business, inspire new start-ups and other entrepreneurial businesses and identify viable business opportunities (Njoroge & Gathungu, 2013).

Red Tape and Burdensome Regulations and High Cost of Hiring Workers: The regulations in South Africa have been identified as a critical obstacle facing Small Businesses in South Africa (Echezona, 2015). According to SME Growth Index (2013), small businesses spend much of time dealing with red-tape and that leads to the loss of income. Furthermore, dealing with South African Revenue Services (SARS), labour issues

and compliance with Black Economic Empowerment (BEE) is identified by some SMMEs as their red tape. Da Silva (2013) added that the laws that regulating entrepreneurship in South Africa is to some extent inflexible and severe. The author further revealed that registered small and medium businesses in South Africa are more than 1.5 million, which are trusted to contribute 40% of jobs in the country, but the sad and disappointing part is that these businesses are said to be operating in some kind of unfriendly regulatory environment made by the country's unfavorable entrepreneurship laws (Da Silva, 2013). Entrepreneurship has the potential of inducing job creation in South Africa. However, there is a big challenge when it comes to the high cost of the country's labour system which hampers their willingness to hire workers (Echezona, 2015). Some of the entrepreneurs find it difficult to hire specialist employees that will provide advice and guidance on compliance issues due to the fact that there are more than 45 laws that the businesses need to comply with and have to submit up to 24 returns (Boates, 2013). He further stated that complying with all of these regulations can be a large cost to a business.

Entrepreneurship Culture: The South African business environment and entrepreneurial culture is another challenge that hinders the sustainability of entrepreneurship. This is because the current entrepreneurship environment is very difficult, risky and not conducive for running small businesses and also the failure rate is very high (GEM 2018). The report further specified that the South African environment is not conducive for businesses to grow and in promoting the culture of entrepreneurship, and South Africa was ranked lower than other Sub-Saharan nations when asked about their capabilities as well as their perception of good opportunities.

3. Research Design and Methodology

A research design is defined as a plan or strategy for the gathering and analysis of information based on the study research questions (Sekaran and Bougie, 2013). A qualitative research approach was adopted to enable the use of secondary data literature. The researcher chose this research approach because it allows the researcher to provide depth and detailed information. The purpose of this approach was to contextualize the understanding of the barriers that prevent the youth from starting their own businesses. The research methodology was undertaken by systematically reviewing and contextualizing the literature regarding topic under study. Furthermore, there have been many studies undertaken to understand challenges that prevent the youth to participate in entrepreneurship activities. Some studies have also gone to the government support initiative in promoting youth entrepreneurship, hence; the study will have sufficient information to explore and draw conclusions from. Moreover, Gratton & Jones (2010) claimed that there are always loopholes and gaps in the available literature on specific topics and at times re-examining the literature is often helpful as these gaps may not have been previously uncovered.
The authors also claimed that using secondary sources can be extremely beneficial in reviewing a current phenomenon that spans a wide geographical range. Moreover, taking into account the historical understanding and debates regarding challenges that prevent the youth to engage in entrepreneurship activities the research approach was adequate as there is vast information regarding the importance of youth entrepreneurship, contribution to the country's economy and challenges hinder the youth to participate in entrepreneurship activities. Therefore, the vast availability of data and the used research approach allowed the study to draw analysis, commentary, opinion pieces and scholarly contributions, sources which are very important allowing the study to draw conclusions from a wide range of sources, hence the reasoning behind the use of this methodological approach. Sources of data included but were not limited to institutional reports from organizations such as the World Bank, journal articles and credible online sources that possess the required data. Therefore, the vast availability of data in a literature context relating to entrepreneurship and the involvement of the youth in South African was the reason this method was selected as a method of preference.

Data Analysis: As stated in the abstract, the research opted to use qualitative data (a thought a systematically reviewing literature), subsequently, data was analyzed using thematic content analysis. The researcher chose thematic content analysis because it allows the researcher to improve and inspect the nuances of people's opinions and trends. Sekaran and Bougie (2013) state that content analysis is the get-together and analysis of textual content and this method of analyzing allows the researcher to analyze a large amount of written information and systematically identify its properties, such as concepts, the presence of certain words and

characters. Content analysis is meant to use qualitative methods to recover and analyze data collected from the message content. Basically, this analysis permits the researcher to validate theoretic text to better enrich the understanding of gathered data. Content analysis assists in shedding light on the topic under investigation. Hsieh & Shannon (2005) suggest that the advantage of utilizing content analysis is that it may fill some gaps which may often be left out through the utilization of other data analysis approaches. Secondary sources allowed the researcher to come up with valid and strong explanations and understandings related to regional integration and their possible benefits for these regions. Seuring & Gold (2012) maintain that textual analyses are used to analyze literature work for the intention of explaining their originality and validity. This among others covers reading and reviewing and from the discussion of applicable data retrieved. Hence, the aim of textual criticism is to define the message, purpose and structure of the text.

Theoretical Framework

The Process Driven Theory Developed by Bandura in1986: This theory articulates that action is reliant upon the perception of an individual that can lead to the intended action. This theory emphasized that the external environment affects thought, which forms an intention and shapes attitude, which is solid enough leads one to action (Fatoki and Chindoga, 2011). Hence this study examines the external influence that prevents the youth in participating or engaging in entrepreneurship activities.

The Need for Achievement Theory (NAT): This theory is a psychological theory suggested by David McClelland in 1965. The theory points out a strong relationship between entrepreneurial activities and the need for achieving economic expansion (Echezona, 2015). Echezona (2015) further stated that supporters of the theory explain that in a society where the need for entrepreneurship is high there would be a fairly greater quantity of entrepreneurial activities. Meaning the support from society has an influence on the adoption of entrepreneurship activities. The root of the theory is that when learners or students are adequately encouraged through entrepreneurship education to become job creators, there is a greater chance for them to start-up their businesses after school (Echezona, 2015). This theory is relevant to this study because it stresses that when learners or students are motivated to engage in entrepreneurship activities that will inspire them to start their own businesses, which of support to this study because it is found that one of the challenges faced by the youth is lack of support from the society and lack of entrepreneurship education.

Schumpeter Theory of Innovation: The theory regards the challenges of unemployment as the absence in new businesses that are being created when new businesses are established employment is created through the formation of those businesses (Garofoli, 1994). Echezona (2015) in Jovanovic (1982) stated that high unemployment rate is often related with poor entrepreneurial activities, which means where people do not have the pleasure to acquire innovation, business skills and knowledge to start their own businesses, the unemployment rate remains very high. The suggestion of Schumpeter is that unemployment is likely to be precisely high because most people are not well prepared with entrepreneurial talents and human capital necessary to start and sustain new business ventures (Echezona, 2015).

4. Findings and Discussion

The findings revealed that there are various barriers that prevent the youth to engage in entrepreneurship activities. Barriers that have been found as have the major effect in preventing the youth from participating in entrepreneurship are entrepreneurship education, lack of access to credit, parents and society's attitude towards entrepreneurship, red tape and burdensome regulations, high cost of hiring workers and entrepreneurship culture. The findings revealed that the education that is given to the youth does not equip them with entrepreneurial skills and it promotes white-collar jobs rather than the self-employment. It is also found that parents and society have the belief that the white-collar jobs are superior to entrepreneurship which gives the youth the mindset that in order for them to survive and become successful they have to work for other people. In Zambia, Masanta (2017) found that there was great potential for the youth to participate in entrepreneurial activities, the study conducted by Gwija, Eresia-Eke & Iwu (2014) revealed that South African youth faces wide range of challenges which are: lack of start-up and development capital, absence of government support, red tape, labour laws and harsh business regulation and inappropriate entrepreneurship education.

Another study conducted by Ceptureanu and Ceptureanu (2015) revealed that youth entrepreneurs parents and social support, financial support, lack of information and skills, socio-cultural attitude, the low value of entrepreneurship education and difficulties to access finance are found to be the challenges that are preventing the youth in starting their own businesses. The environment also should be conducive and impose opportunities for businesses. However, efforts to ensure youth participation in the country were compounded by a lack of policy direction, credit facilities and the entrenchment of business guidance services. Similarly, in Nigeria, Okeke (2014) revealed that as a result of many issues preventing and affecting its growth and development, leadership and entrepreneurial ability tend to be lacking in Nigeria, the author further expounded that economic and social progress in Nigeria still falls far short to influence the wellbeing of the average Nigerian given that half of Nigeria's population earn less than one dollar a day and regrettably, the government has not prioritized policies that would boost youth participation in the country entrepreneurial sector and this is unfortunate as youth entrepreneurship has the ability to reduce the socio-economic challenges being experienced by the country.

One may, therefore, conclude that challenges facing the participation of youth in entrepreneurial activities are not only affecting South Africa but are a continental problem which seemingly has governments in the continent with little or no policy as to how to respond to this growing crisis. The findings revealed that the South African environment is not conducive enough for young people to participate in entrepreneurship activities. The environment is not conducive for businesses to grow and in promoting the culture of entrepreneurship. It was also found that South Africa is still lacking when it comes to good opportunities and capabilities when it is compared to other countries. It was found that even the laws in South Africa that regulating entrepreneurship is inflexible and severe. Businesses in South Africa are operating in some kind of unfriendly governing environment made by the country's unfavorable entrepreneurship laws, which makes it tough for businesses to continue operating and grow in this kind of the environment (GEM, 2018). The study conducted by Boates (2013) also revealed that financial institutions want the collateral in order to finance businesses and for those with no collateral it is difficult to get finance. The study further revealed that access to finance is a big challenge that hinders the establishment of businesses.

5. Conclusion and Recommendations

The educational curriculum should be improved in terms of entrepreneurship education, the entrepreneurship education should start at the primary level so that the learners will grow up with entrepreneurship mindset and entrepreneurship education must be offered to all students. Learning institutions should establish incubators that will help in terms of the practice entrepreneurship where learners will put entrepreneurship theory that they obtained into action. Society and parents should support and promote entrepreneurship to their children, teach them the importance of being your own boss instead of promoting white-collar jobs. This will nurture and develop the entrepreneurship mindsets. Finance is important in the operation of all businesses. Therefore, finance must be made available to start-up businesses. If you have a brilliant idea the financial institutions must grant you finance without asking things like collateral. Policymakers should establish laws and regulations that will favour businesses, laws that will allow businesses to grow and encourage youth to start businesses. Entrepreneurship is an important factor for reducing poverty, creating job opportunities and the economic growth of every country. Therefore, looking to the challenges that hinder the development of entrepreneurship is very important especially to this high unemployment rate that South Africa faces.

Equipping the youth to engage in entrepreneurship activities could help to reduce the high unemployment rate that the South African youth are facing, it will also help to improve the South African economy. Society needs to be taught about the importance of entrepreneurship so that they will be aware what the role it plays to the economy and that will encourage them to support their children and encourage them to start their businesses instead of encouraging job seeking. Furthermore, apart from the above, there is a great need for the creation of a coalition of private and government entities to ensure that policies meant to entice the youth into participating in entrepreneurship are streamlined and speak to each other. Moreover, from a government's point of view, there is great need of policy consultation with the youth to better understand what the real barriers are and how government can address such as collective through collaboration and

robust stakeholder engagement. Furthermore, one notes that there are institutions which have been set up by governments to ensure the business support for young and upcoming entrepreneurs, however, young people looking into venturing into entrepreneurship have cited the lack of finance and advice as major factors hindering their development and entrance in this sector, which then means there is greater need for government to strengthen the overall stability and governance of these institutions.

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The Effect of Climate Change on Agricultural Crop Returns in Uganda

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Abstract: The study examined the effect of climate change on agricultural crop returns in Uganda using the Ricardian Panel Tobit technique and the World Bank Living Standards Measurement Survey (LSMS) data, climate data from Uganda National Meteorological Authority (UNMA) and global weather data. The findings showed that climate related risks account for over 67 percent of agricultural risks and less than 2 percent of the farming households practise irrigation. Farmers that practised irrigation earned higher agricultural returns nationally than their counterparts did. The findings show that the output elasticities with respect to temperature range from -2.02 percent to 0.543 percent. This implies that for the average temperature increase by 1 percent, maize farm returns decreased by 2.02 percent, banana by 1.7 percent, cassava by 1.50 percent and beans by 1.01 percent. While 1 percent increases in rainfall, lowered banana returns by 0.02 percent, beans by 0.08 percent, cassava by 0.035 percent, maize by 0.025 percent except for groundnuts' returns increased by 0.115 percent. Apart from climate factors, non-climate factors such as capital, labour, farm size, fertilizers and soil quality are equally important inputs and significantly impact on agricultural farm returns. The study proposes that due to unrelenting adverse climate change effects in Uganda, adoption

of multi-pronged approaches such as extensive irrigation, agro-insurance, diversification of agricultural activities, use of food cribs during bumper harvests would be the breath of life for Ugandan farmers.

Keywords: *Climate change, agriculture, crop returns, Ricardian model and panel Tobit model.*

1. Introduction

Global climate has warmed since 1950s and anthropogenic influence is the most likely dominant cause (IPCC, 2014; Angélil et al., 2017). Global surface temperature in 2016 shot up by 1.0^0C, making it the warmest year ever relative to 1951-80 base period (Hansen et al., 2019). With intermittent global warming, ice sheets, glaciers, snow cover and permafrost have significantly decreased in area and volume. In many regions, historical droughts and floods have been ever more severe since 1900. Tropical cyclones, hailstorms, thunderstorms, wave heights have soared since 1970s. As a result, the undulating climate change has affected water resources, food and agricultural systems globally (Hanjra & Qureshi, 2010; Nielsen & Vigh, 2012; Teixeira et al., 2013). In Sub-Saharan Africa (SSA) where the majority of the population depends on climate-sensitive agriculture (World Bank, 2010), the frequency of meteorological disasters have caused both prevalent economic and life losses in the region (Gasper et al., 2011; Thurlow et al., 2012) and derailed poverty alleviation efforts (Dell et al., 2009; Skoufias, 2012). Evidence also shows that exposure to high temperatures reduces work capacity and labour productivity (Zivin & Neidell, 2014; Dunne et al., 2013). The preceding impacts are likely to have unequal distribution globally, with developing countries at disadvantage, given their geographical position, limited resources, and low adaptive capacities (Peña-López, 2009).

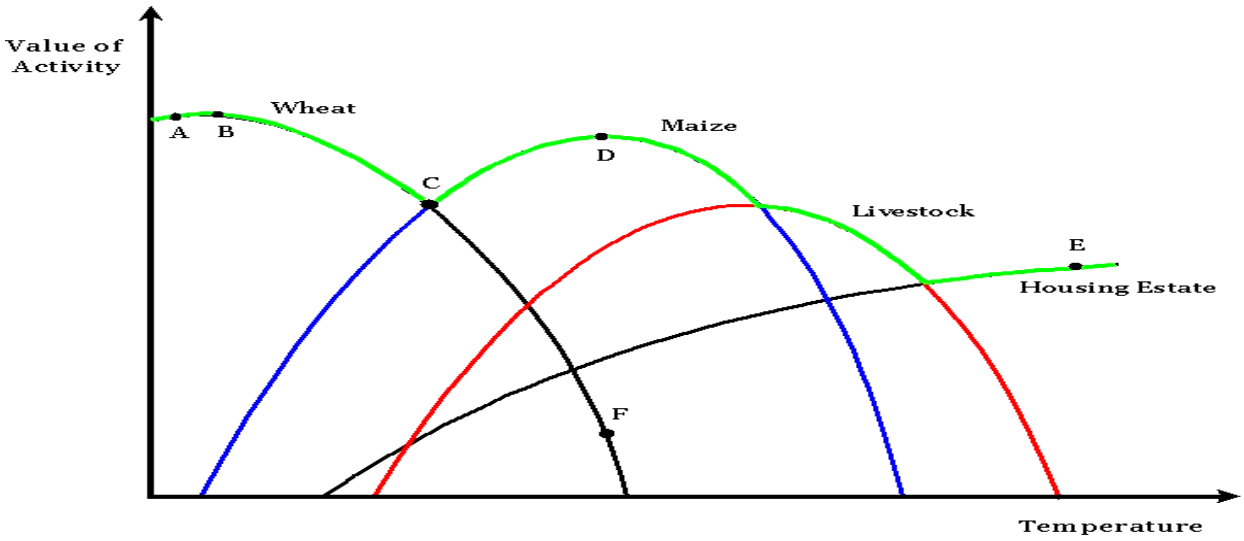
Africa contributes the least amounts of greenhouse gases; making it the least responsible for climate change, but it experiences the worst effects of climate change (Sy, 2016). Uganda is one of the agriculture-dependent economies in SSA where climate change manifestations have been real. The reviewed literatures of IPCC (2013; 2014), Caffrey et al. (2013) and Guloba (2014) affirm that climate change has taken place in Uganda, hence this study did not need to spend time on fishing expedition with no major fish to catch. Over the past three decades spanning from 1981 to 2010, the country experienced substantial increase in temperature ranging from 0.5^oC to 1.2^oC (Caffrey et al., 2013). In addition, GoU (2015) documents that for the period ranging from 2010 to 2014, Uganda's GDP on average decreased by 3.5 percent due to natural disasters such as floods, landslides, drought, famine, severe storms and earthquakes. The natural disasters destroyed hectares of crops, causing huge economic losses to the economy amounting to USD 1.2 Billion between 2010 and 2011. In farming communities, men go far away to look for pastures, while women walk longer distances in search of water and firewood, limiting the time for agricultural production. Due to adverse weather related factors, Uganda's GDP contracted by 0.2 percent in the first quarter of the Financial Year 2016/2017.
This was majorly due to a contraction of the agricultural sector, which was consistent with the relatively feeble growth in household incomes (BoU, 2018). The continued occurrence of climate change effects severely undermines the growth prospects of the country and consequently deters the realization of the country's Vision 2040. The solution to manage and mitigate climate change effects lies in understanding its effect. However, there is limited empirical analysis on the hurtful upshots of climate change on agricultural crop returns. The only known study by Matovu (2013) used cross-sectional Ricardian analysis approach. The use of cross sectional data is limited given that climate change coefficients vary over time, also there are distortions emanating from the correlations between climatic variables, and farmer's adaptation strategies (Thomson, 2010). Numerous studies on the climate change- agriculture nexus in the region have ignored a subtle and prevalent fact of "nothingness" or "missingness" of agricultural output in their analysis, caused by climate related risks such as drought, floods. This study employs a modified version of panel called pane Tobit analysis to address this omission. The paucity of analytical work on climate change impact affects the cost-benefit analysis interventions to mitigate effects. It is against this background that the study sets out to examine the effect of both rainfall and temperature on crop returns in Uganda.

2. Literature Review

The longing to analyse the effect of climate change on agricultural returns led to the advent of the Ricardian theory as credence. The motivation for the development of the Ricardian analysis according to Mendelsohn et al. (1994) based on the bias that tends to overestimate the damage of climate change embedded in the

traditional production function method initially used in the studies of Adams et al. (1988), Adams et al. (1998) and Rosenzweig & Parry (1994). The traditional production function estimated impact of climate change by altering few input levels such as precipitation, temperature and carbon oxide levels. It omitted a variety of adaptations customarily used by farmers to mitigate the effects of climate change. Similarly, Easterling et al. (1993) ignored adaptations such as application of fertilizers, use of irrigation, introduction of new crops in the region, use of new technology, shifts in land use from farming to livestock, or from planting rice to fruit farming. Mendelsohn et al. (1994) use an illustration in Figure 1 to explain the bias using values of various activities and temperature.

Figure 1: Bias in the Production Function Adapted from Mendelsohn et al. (1994)



The functions shown in the figure illustrate how the values of wheat, maize, and livestock respond to temperature increases. For example, the "wheat production function" shows how the value of wheat responds to temperature increases from point A to peak B and finally decreases as temperatures shoot up. Mendelsohn et al. (1994) cite the source of the bias as the failure to allow for economic substitution as temperatures rise. For instance, for temperature above C, adaptive and profit- maximizing farmers would replace wheat with maize. With temperature increases, the wheat production function estimates output to fall to point F, yet in reality farmers no longer produce wheat, and however, it would be profitable to produce amount D of maize at the same temperature. With increased temperature, land is no longer optimal for maize growing. Lastly, at point E, agricultural model predicts that neither farming nor livestock is worth undertaking. The most prudent activity would be to convert land to housing estate as per Figure 1, however, given the expensive nature of developing the housing estate; it is neither affordable nor optimal scheme for Uganda's case. The most appropriate strategy would be adoption of adaptation strategies such as irrigation in case temperatures increase persistently overtime. Mendelsohn et al. (1994) infer that the traditional function overestimates the damages of climate change because it does not take into account the myriad options of substitution, adaptation, and new options of replacing the old-no-longer –advantageous activities as climate varies. To address the bias Mendelsohn et al. (1994) recommend a new approach called the Ricardian that permits options of adaptation like use of fertilizers, switching the use of land such that farmers lessen the severity of damage of climate change. Figure 1 illustrates the value of the net yield per acre of land measured along the vertical axis.

The green lines represent the best-use value function. Mendelsohn et al. (1994) term the approach Ricardian because of the focus on the land values[2]. The Ricardian analysis employs regression method to analyse the effects of various climate, economic, and other factors on farm values (Adams et al., 1998; Sanghi, et al., 1998). According to Mendelsohn et al. (2010), the model is easy to estimate, yields geographically precise values and captures adaptation. Further, it satisfies the key properties of economic models such as parsimony, tractability, empirical consistence and predictive precision as explained by Friedman & FRIEDMAN (1953) and Jasso (2004). Empirical evidence shows that temperature is a major factor affecting the growth of crops, for instance Tian et al. (2014), reveal that rises in winter warming, increase wheat yield in China. Increase of all-day, daytime and night time mean temperature by 1.5^{o}C reduced the length of pre-anthesis period averagely by 12.7, 8.3 and 10.7 percent respectively, and increased grain yield by 16.3, 18.1, and 19.6 percent respectively. While Hou et al. (2012) found that increasing temperature by 1.6^{o}C, increased wheat production. In contrast, Fang et al. (2013) in their experiment with warming of 2^{o}C and irrigation of 100mm, find that warming decreases yield, but increasing irrigation by 200mm, increases wheat yield. This clearly emphasizes the importance of irrigation. Asseng et al. (2011) carry out an investigation in Australia to assess the effect of temperature on wheat yield. They find that each additional day of temperature above 34^{o}C in any region of Australia on average; reduces grain yields by 5 percent. Inferably, one argues that rising temperatures lower soil moisture content, subsequently decrease output.

In Nigeria, Ayinde et al. (2010) using time series data from 1987 to 200, found that agricultural values were independent of temperature but highly dependent on rainfall variations. They recommend that government intervention with appropriate policies can mitigate climate change effects. However, without SSA governments increasing agriculture budgetary allocations to 10 percent as resolved in the Maputo declaration (Union, 2003), the adverse effects of climate change may exacerbate. Benin (2015) reveals that Niger and Malawi met the budgetary allocation to agriculture sector. Maganga & Malakini (2015) use a quintile Ricardian Analysis to estimate the economic impact of climate change on agriculture in Malawi. They use the cross-sectional data on climate, soil, hydrological and household level data with a sample size of 8,832

[2]Mendelsohn et al. (1994) based on David Ricardo who developed the theory of the rent of land in the book titled Principles of Political Economy and Taxation in 1817. He said rent tends to increase as population grows. Premised on a fact that with diminishing returns to land, the magnitude costs of cultivation rise and with its rent.

households. Their findings show that climate had effect on net farm revenue, non-linear relationship between temperature and revenue existed, so is precipitation and revenue. The empirical results show that an increase of warming by 2.5^{o}c magnifies the losses up to US$0.018 billion. Reducing rainfall by 7 percent lowers net revenue by approximately 8.13 percent per hectare. However, the use of cross-sectional data in the analysis of the effect of climate change on agricultural production disregards the premise that cross sectional climate coefficients change overtime (Thomson, 2010). Fezzi & Bateman (2012) use panel Ricardian analysis in the United Kingdom to analyse the non-linear effects of climate change on agricultural production. The results show a significant non-linear interaction effect, with high levels of rainfall acting as a moderating factor for increased temperatures.

When they compared the results of other competing models that used aggregated data across regions, the results showed a strong bias afflicting climatic coefficients based on aggregated data and hence the desire for use of econometric Ricardian panel data approach. Further, higher temperatures positively increase agricultural production or land values amidst sufficient precipitation that thwart the risk of drought. Empirical results show that developing countries are hit hardest by adverse effects of climate change compared to the rest of the globe. Exenberger et al. (2014) use a panel of about 127 countries for the time spanning from 1961 to 2002. The findings show that climate change had no significant impact on agricultural production across a spectrum of high-income countries, however a significant harmful effect on both middle and low-income countries. The negative consequences of rising temperature and frequent reductions in rainfall lower agricultural output in developing countries. The adverse effects were strongest in SSA due to over reliance on rain-fed agriculture with minimal adaptation strategies. The results show that moderate moisture increases are conducive for food production unlike excess moistures. They use total livestock units as one of the regressors.

However, including total livestock units as a regressor, assumes livestock as climate change neutral, yet temperature increases and excessive rainfall have significant impact on livestock. Similarly, Bezabih et al. (2014) use the number of oxen as one of independent variables in the study carried out in Ethiopia, but Skonhoft (2008) treats livestock as capital goods. Kurukulasuriya & Ajwad (2007) estimate the Ricardian model and treat the dependent variable as composite of agricultural returns from both livestock and crops in the study carried out in Sri Lanka. This methodology too creates difficulty in discerning which is more vulnerable to climate change between livestock and crop husbandry. In conclusion, this section reviewed literatures on the impacts of climate change on agricultural returns using the econometric Ricardian analysis. Further, classical economics identifies labour and physical capital as major sources of growth or output. Strangely, most studies exclude these traditional and vital sources of growth in their analyses. All studies reviewed show that agricultural production is nonzero, yet agricultural risks such as storms, droughts and floods cause total destruction with no harvest. This study considers this fact and uses panel Tobit model. The study attempts to address these existing gaps spotted during literature reviews.

3. Methodology

The most appealing technique to measure the effect of climate change on agriculture is the Ricardian technique due to its knack to use extensive country-level farm data. Studies of Mendelsohn et al. (1994), Massetti & Mendelsohn (2011) and, Fezzi & Bateman (2012) provide a motivation to use the Ricardian approach instead of the traditional production function or agronomic models. Other methods underestimate positive effects and overestimate the negative effects of climate change due to their failure to account for adaptation choices such as use of irrigation and switching of crops, options often adopted by farmers amidst climate pressures. Several studies to empirically examine the impact of climate change on agriculture using Ricardian approach have varied quite heterogeneously in terms of; (i) data, cross-sectional versus panel data, and country-level versus household–level; (ii) methods; Computable General Equilibrium (CGE) versus partial equilibrium; and (iii) focus; regional versus country- specific (Skoufias, 2012). Further, modified applications include individual farm data and various functional forms that are more versatile and flexible (Salvo et al., 2014).

A proper scrutiny of these studies shows that the Ricardian method is a profoundly common estimation procedure used in microeconomic studies. Mendelsohn et al. (1994) originally proposed it because of its

prominence over the traditional production function approach. It has continuously gained a wide scope of application because it is easy to estimate, gives geographically precise values and permits use of adaptation strategies like irrigation. Therefore, the paper employs the Ricardian method to assess the effect of climate change on agricultural returns. The original Ricardian model used cross-sectional data to analyse the impact of climate, change on land values (Mendelsohn et al., 1994). Multitudes of studies that have applied the Ricardian method using cross-sectional data have yielded the results that are not stable over time (Deschenes & Greenstone, 2006). They instead propose use of panel data models since coefficients are constant over time. This discovery enables researchers to analyse climate change without having to consider a time span of 30 years since climate coefficients are constant overtime. Salvo et al. (2014) also supplement that a panel data approach removes year effects and produces more stable estimates of climatic coefficients.

However, basing on their methodology used in their study, there is a likely possibility that agricultural output in SSA was underestimated since most households are subsistence based yet their estimations were market based. Kabubo-Mariara et al. (2016) analyse the climate change impact on food production in Kenya using the Ricardian panel approach. The choice of econometric panel Ricardian model amongst other competing models is due to the following reasons. First, climate coefficients change often over time (Thomson, 2010). Second, it is possible to have biased estimates if the dependent variable is the farms' net revenue measured in unrepresentative year. Third, panel data eliminates the distortions caused by the correlation between climatic variables and farmer's strategies treated explicitly in the model such as irrigation (Salvo et al., 2014). Fourth, the model apart from climate variables such as temperature and rainfall, includes other factors such as capital, labour, adaptation choices, namely use of irrigation and application of fertilizers. As a result, several studies have used panel data (Lang, 2007; Massetti & Mendelsohn, 2011; Fezzi & Bateman, 2012). Therefore, given the eminence of panel over the cross-sectional data models, the study adopted panel data to analyse the impact of climate change on agriculture. Secondly, availability of panel data in Uganda aids the undertaking of the study. Uganda's agriculture being largely dependent on climatic variables such as rainfall and temperature, it also relies on other factors such as physical inputs like capital, land, labour among others. As a result, the overall agricultural values are dependent on these factors.

The estimation model specification appears as:

$$Y_{ij} = f(Z_{ij}, C) + u_{ij} \quad , \qquad (1)$$

The relationship specified in equation 1 is the original Ricardian reduced form of Mendelsohn et al. (1994) with land values as the dependent variable. Where Y_{ij} is the land value for household i, planting crop j, Z is the vector of input variables. C represents a set of exogenous environmental factors such as temperature, precipitation and a set of geographic factors such as soil characteristics. u_{ij}-error term assumes a normal distribution with zero mean and constant variance. The assumption is that climate, socio-economic and soil factors influence the land values (Y). Empirically, authors have variously defined the dependent variable, Y_{ij}. In some studies of Lippert et al. (2009), Mendelsohn et al. (2010), Massetti & Mendelsohn (2011) and Fezzi & Bateman (2012) express it as land price, while others like Kurukulasuriya & Mendelsohn (2008),Wang et al. (2008) and Salvo et al. (2014) express it as net farm revenue. Lastly, Schlenker & Roberts (2008) and Rowhani et al. (2011) use agricultural output. Indeed, the economic theory gives little guidance on the nature of the functional form (Fezzi & Bateman, 2012) and as such, several studies that have used it, based on the nature of research questions and data availability. Fezzi & Bateman (2012) affirm that modellers have transformed equation (1) into empirically tractable model assuming a linear or semi-log specification with a quadratic or linear formulation for the climatic variables and a linear functional form for all other determinants.

Fezzi & Bateman (2012) further recommend the use of smoothing function but, Salvo et al. (2014) caution that the use of modelling data without imposing a specific functional form is limited to continuous variables. Due to unavailability of data, control variables are frequently expressed using dummy/categorical variables for which it is not possible to use smoothing function. Model (1) was re-defined in terms of panel data model and the variables that are changing overtime were indexed with subscript t while following Deschenes & Greenstoe (2006) specicification as;

$$\boldsymbol{Y}_{it} = \acute{a}_i + \boldsymbol{X}_{\boldsymbol{it}}^{\prime}\hat{a} + \sum_d \tilde{a}_d f_d(C_{dt}) + \boldsymbol{u}_{it} \qquad (2)$$

Where Y, is agricultural farm values of crop i at time t. X_{it} is a vector comprising of the factors that influence output production, C_{dt} is climate variable. á$_i$ is a set of fixed effects, â is the vector coefficient of non-climate factors. The coefficient vector ã$_d$ represents the effect of climate change on the agricultural production. The effect of climate change in this model is a linear function of the parts of the ã$_d$ vector. u$_{it}$ is the error term. The unique nature of the agricultural sector largely makes it susceptible to a variety of negative shocks such as pests, disease epidemics, drought, floods, and hailstorms among others. These shocks adversely lower agricultural production levels to nothingness. The nature of agricultural shocks causes agricultural returns (dependent variable) to assume dual possible values, nothingness (zeros) and positive values. Nothingness is the lower limit one can have. White (2007) says, "Nothing is absolutely the limit of nothingness". Tobin (1958) using a specific example observed that households reported zero expenditures on key household durable goods or automobiles in a given year.

He advised that it is inefficient to do away with such information if the value of the dependent variable is not available. This resulted into the popularly known Tobit regression model. McDonald & Moffitt (1980) supplement that the Tobit analysis assumes that the dependent variable has many numbers of its values clustered around limiting value, usually zero and provide an example of data on hours of work that are often clustered at zero. Splett et al. (1994) note that Tobit model is appropriate for conditions under which the dependent variable is observable for values over and above zero but latent for values at most zero. Calzolari et al. (2001) aver that due to the censoring or "missingness" in the data, the Tobit regression estimated parameters do not signify the decrease or increase in the value of the independent variables. The standard Tobit model specification follows:

$$Y_{it}^{*} = \boldsymbol{X_{it}^{/}}â + å_{it} \quad (3)$$

With the assumption that $å_{it} \sim N[0, ó_u^2]$, i.i.d. and independent from X_{it}, $i = 1, \ldots, N$; $t = 1, \ldots, T$ and we observe,

$$Y_{it} = \begin{cases} Y_{it}^{*} & if \quad Y_{it}^{*} > 0 \\ 0 & if \quad Y_{it}^{*} \leq 0. \end{cases} \quad (4)$$

$$å_{it} = á_i + \lambda_t + \boldsymbol{u}_{it} \quad (5)$$

Where á$_i$ is the individual effects and represents unobservable specific characteristics for individual i and remains constant across time, the time effect is denoted by λ_t and represents all unobservable characteristics of time at period t, and assumed to remain constant for all the cross-sectional units in the sample. While u_{it} is the stochastic error term that varies across individuals and time. In this study, λ_t assumes zero values for all values of t. Hence, equation (3) of the standard Tobit panel specification following the Cameron & Trivedi (2005) becomes:

$$Y_{it}^{*} = á_i + \boldsymbol{X_{it}^{/}}â + \boldsymbol{u}_{it} \quad (6)$$

Following the above explanations, the study uses equation 7, a result of modifying equations 2 and 6.

$$Y_{it}^{*} = á_i + X_{it}^{/}â + á_c D + \sum_d ã_d \, f_d(C_{dt}) + u_{it} \quad (7)$$

Where $X_{it}^{/}$ is a continuous vector of non-climate factors such as capital, labour and farm size, D is a set of vectors, namely irrigation, use of fertilizers, flooding and soil quality while C_{dt} represents climate factors such as rainfall and temperature.

Data, Study Area and Sampling: The study uses Uganda National Panel Survey (UNPS) datasets of 2009/10(wave1), 2010/2011(wave II), 2011/2012(wave III) and 2013/2014(wave IV) collected by Uganda Bureau of Statistics (UBOS). These data are part of the World Bank's Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA) undertaken in some African countries, such as Uganda, Ghana, South Africa inter aralia. The UNPS conducted throughout the country covered five modules, namely price, woman, socio-economic, community and agriculture. Specifically, the agriculture module questionnaire covered the subset of UNPS households engrossed in agricultural activities such as crop and livestock production. The agricultural module captures data on various aspects such as data on current land holdings and household land user rights, agricultural inputs (capital, labour, and fertilizers), crops grown among others. In other words, the module permits the land area estimation, both owned and cultivated, as well as production quantification for major crops inter alia. It also allowed collection of information on irrigation, flooding and access to extension services.

In each wave, the sampled household was visited twice per year to cover two agricultural cropping seasons. The first season refers to the cropping cycle of temporary crops that are grown and reaped at the end of the second quarter of the year, usually stretching to the end of June. It therefore covers the months ranging from January to June. While the second cropping season usually runs from September to December. The seasons directly coincide with the rains as well as the growing cycle of crops (UBOS, 2009a). The questionnaires administered to each household were similar for each wave with little or no modifications. Due to two cropping seasons per year, two other sub-waves resulted for each year, making it eight sub-waves in total. By end June of 2008, the numbers of districts were eighty in Uganda (UBOS, 2009b). The first wave (2009/10 UNPS) collection exercise began from September of 2009 to August of 2010 and covered all the 80 districts as of 2009. The random selection comprised of 2,975 households across the country, indicating that LSMS survey was nationally representative. The 2009/10 UNPS covered 2,975 households stretching over 322 Enumeration Areas (EAs) in the four regions of Central, Eastern, Northern and Western.

The 2010/11 UNPS sampled 2,716 households. The 2011/12 UNPS covered 2,346 households. Comparing the waves, we notice attrition of households. World Bank (2011) reveals that incidences of death, migration, imprisonment or hiding from creditors among others create attrition problems faced in panel surveys. While the 2013/14 UNPS involved refreshing a third of the sample of the first wave that had 2,975 households. UBOS (2015) posits that the approach of refreshing the sample does offset the loss of representativeness, since the new households have equal probability of selection. Baltagi (2008) instead calls the refreshing sample, a rotating panel. The preceding paragraphs provide a clear argument why the study opted for the unbalanced panel data despite the problems of attrition and selection biases. The crops for analysis used in the study include fruits, such as bananas; cereals such as maize; oil seeds such as, groundnuts; root tubers such as cassava and leguminous crops such as beans. These crops were selected for the study because Caffrey et al. (2013) cite them as the most affected by the vagaries of climate change in Uganda. Secondly, these crops were the major crops grown by almost every household countrywide (UBOS, 2013).

Climate data specifically for precipitation and temperature were obtained from Uganda National Meteorological Authority (UNMA). The climate data was from 13 weather stations, which include Entebbe, Makerere-Kampala, Soroti, Kasese, Namulonge, Gulu, Lira, Mbarara, Kabale, Masindi, Kitgum, Arua and Jinja. The UNMA precipitation and temperature data of each district was either incomplete or missing. Global weather data for SWAT was found to be complete and fully available for each district. The data was downloaded from the website www.globalweather.tamu.edu for Uganda from 1979 to 2014 covering 417 weather stations. Despite the presence of climate data over a long period, the study utilized only climate data that corresponded with the four waves only. Using Google maps, latitude and longitude coordinates for each district were mapped to global weather data. It aimed at attaining all temperature and rainfall data for each district that prevailed during agricultural production periods. The average monthly climate data was combined with agricultural data to form one complete data set for analysis.

Table 1: Variable Description and Expected Signs

Variable	Description	Expected Sign
Agricultural farm returns	Estimate of the market value of output in dollars per household	Dependent variable
Labour	Labour was computed as person days. Person Days represent labour input. Person Days=Number of days worked *Number of workers.	+
Capital	Total amount of capital expressed in US $. Capital valuation involved aggregation of the cost of hand hoes, ploughs, pangas, harrows, wheelbarrows, slashers, planter, pruning saws, knives, watering cans, sprayer, sheller, wheeler, planter, tractor and spades;	+
Farm size	Plot/farm size, expressed in acres.	+
Fertilizers.	It is a dummy variable, 1 if a household used fertilizers and zero, otherwise.	+
Soil Quality	It is a dummy variable, 1 if a respondent perceived soil quality as good/fair and 0 otherwise.	+
Irrigation	A dummy variable, 1 if a household practised irrigation and 0 otherwise.	+

Flooding	A dummy variable, 1 if a particular household experienced flooding in a given cropping season and 0 otherwise.	-
Temperature	Monthly average temperature in degrees Celsius as units of measurement.	-
Rainfall	Monthly average rainfall, expressed in millimeters.	+

Source: Authors' own

4. Results and Discussion

Agricultural farm returns are expressed in dollars with threshold value appearing as zero for various periods farmers harvested and this demotivates farmers from undertaking agricultural activities that are largely prone to losses. We note that the reasons for the pre-harvest loss in crop agro-based households were drought, floods, animals, pests, and hailstorms as shown in Table 2.

Table 2: The Main Reasons for the Pre-Harvest Loss per Crop

Crop	Drought	Floods	Animals	Pests	Hailstorms	Others	Tot	Observations	%gee
Banana	11	1	5	10	3	20	50	2550	1.96
Maize	208	28	36	14	9	30	325	4487	7.24
G/ nuts	93	12	12	7	2	6	132	1787	7.39
Cassava	58	19	19	20	3	85	204	2638	7.73
Beans	164	29	7	15	10	34	259	4534	5.71
Total	534	89	79	66	27	175	970	15996	

Source: Author's calculations based on UNPS data

Table 2 shows that most households cited drought and floods as some of the major challenges affecting agricultural returns. The climate related disasters such as drought, floods and hailstorms accounted for over 67 percent of the factors affecting agricultural returns. The worst adversely affected crops were maize, beans and groundnuts. The main reason why most agricultural households experience large amounts of pre-harvest losses is due to overdependence on rain-fed agriculture as shown in Table 3, which shows water sources for agricultural production. Rains fall unexpectedly, for example, rains may appear early before gardens are prepared for planting and in some instances, rains stop when crops are starting to flower. Agricultural households with limited means to adapt irrigation watch their crops wither during dry spells. Various reasons explain why households fail to undertake adaptive strategies among which include low household incomes, limited sensitization of farmers, and lack of water tank reservoirs to store water that could be used during dry spells. Government's sloppiness to provide the high cost irrigation infrastructure worsens the situation. Largely, these factors leave agricultural households without any other practical options; hence despairingly depend on natural rains instead of irrigation as shown in Table 3.

Table 3: Water Sources for Farming

Crop	Source	Frequency	Percentage
Banana	Rain-fed	2510	98.4
	Irrigated	40	1.57
Maize	Rain-fed	4405	98.17
	Irrigated	82	1.83
G/nuts	Rain-fed	1758	98.38
	Irrigated	29	1.62
Cassava	Rain-fed	2583	97.92
	Irrigated	55	2.08
Beans	Rain-fed	4457	98.3
	Irrigated	77	1.7

Source: Authors' calculations based on UNPS data

Table 3 shows that on average, over 98.24 percent of the agricultural households entirely rely on the rain-fed agriculture. The percentage of households that irrigated on average was 1.76 percent. Amidst these climate shocks such as rainfall deficits, farmers without adaptive and cushioning strategies like irrigation are more food insecure, famine-prone, hunger stricken and subject to welfare loss and lower standards of living. In addition to the large agricultural losses emanating from long drought spells, prevalent floods at the end of dry hexes together with heavy destructive rains characterized by gales and hailstorms magnify the losses. The flooding incidences are repetitive in nature across the country. Agricultural households located on mountain slopes experience repetitive mudslides. Apart from being destructive to agricultural production, at worst, people lose their lives to mudslides that heap over their homesteads. The coefficients of labour input were positive and statistically significant for regressions of banana and beans. Households have stayed continuously in mudslide-prone areas due to scarcity of land favourable for extensive farming. As a result, land wrangles and conflicts are common in the country.

Regressions: The dependent variable has some zero values for each crop, the Tobit model was appropriate (Tobin, 1958). Panel Tobit and Pooled Tobit regression estimates appear in Table 4 and all continuous variables are in logarithmic form. The regression coefficients of capital, labour, farm size, temperature and rainfall represent elasticities, while soil quality, irrigation, fertilizers and flooding are dummies. The Pooled Tobit coefficient estimates are matching in sign with those of the panel Tobit model, and the statistical significance of all regression estimates are found similar except for the coefficient of flooding in the regression of banana. Basing on the Akaike (1973) Information Criterion (AIC) and Schwarz (1978) Bayesian Information Criterion (BIC), all the interpretations are based on the Tobit panel regression results. The next discussion is for the results presented in Table 4.

Table 4: Panel Tobit and Pooled Tobit Regression Estimates

	Banana		Beans		Cassava		G/nuts		Maize	
Variables	**Panel**	**Pooled**	**Panel**	**Pooled**	**Panel**	**Pooled**	**Panel**	**Pooled**	**Panel**	**Pooled**
Capital	0.137***	0.144***	0.195***	0.199***	0.042	0.042	0.203***	0.189***	0.176***	0.185***
	(0.023)	(0.025)	(0.017)	(0.018)	(0.028)	(0.028)	(0.03)	(0.031)	(0.016)	(0.017)
Labour	0.050**	0.052**	0.043**	0.045***	-0.12***	-0.12***	-0.02	-0.026	-0.12***	-0.117***
	(-.021)	(0.021)	(0.017)	(0.017)	(0.024)	(0.023)	(0.029)	(0.03)	(0.02)	(0.021)
Farmsize	0.206***	0.226***	0.032	0.032	0.086***	0.086***	0.087***	0.109***	0.116***	0.122***
	(0.024)	(0.026)	(0.02)	(0.02)	(0.025)	(0.027)	(0.033)	(0.035)	(0.02)	(0.021)
Fertilizers	0.131*	0.148**	-0.033	-0.018	0.239***	0.239***	0.065	-0.032	-0.46***	-0.469***
	(0.07)	(0.067)	(0.061)	(0.054)	(0.055)	(0.053)	(0.119)	(0.109)	(0.078)	(0.064)
S/Quality	0.001	-0.036	-0.16***	-0.156**	0.029	0.029	0.365***	0.312***	0.351***	0.356***
	(0.104)	(0.109)	(0.055)	(0.063)	(0.078)	(0.085)	(0.101)	(0.11)	(0.061)	(0.064)
Irrigation	0.084	0.11	0.107	0.094	-0.161	-0.161	0.359	0.338**	0.038	0.038
	(0.188)	(0.182)	(0.137)	(0.157)	(0.182)	(0.193)	(0.238)	(0.164)	(0.152)	(0.144)
Flooding	-0.128	-0.159*	-0.074	-0.076	-0.019	-0.019	-0.195*	-0.175*	-0.24***	-0.270***
	(0.091)	(0.094)	(0.064)	(0.068)	(0.087)	(0.092)	(0.1)	(0.104)	(0.064)	(0.07)
Temp	-1.700***	-1.86***	-1.01***	-0.97***	-1.5***	-1.50***	0.543***	-1.26***	-2.02***	-2.005***
	(0.304)	(0.301)	(0.197)	(0.206)	(0.309)	(0.309)	(0.063)	(0.32)	(0.238)	(0.221)
R/F	-0.02	-0.03	-0.08***	-0.08***	-0.035	-0.035	0.115***	0.032	-0.025	-0.026
	(0.025)	(0.026)	(0.018)	(0.017)	(0.027)	(0.027)	(0.024)	(0.029)	(0.02)	(0.02)
Sigma_u	0.445***	1.191***	0.267***	1.180***	0	1.308***	0.338***	1.251***	0.424***	1.348***
	(0.044)	(0.021)	(0.046)	(0.017)	(0.118)	(0.025)	(0.087)	(0.029)	(0.04)	(0.019)
Sigma_e	1.106***		1.150***		1.308***		1.216***		1.280***	
	(0.021)		(0.016)		(0.019)		(0.031)		(0.018)	
AIC	8119.65	8234.7	14310.1	14318	8794.51	8792	5804.27	5806.38	15222.2	15263.5
BIC	8189.77	8234.7	14380.6	14382.6	8859	8851.22	5864.53	5861.17	15292.6	15327.5

Wald chi2	206.14***		19203***		10760.51***		7791.00***		14531.85***	
F		2333.15**		2494.19***		1264.77***		960.58		2058.16
N	2,549	2,549	4,516	4,516	2,621	2,621	1,769	1,769	4,469	4,469
N	1,207		1,860		1,510		1,017		1,936	

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The results indicate that the coefficients of capital have the expected positive sign and are significantly different from zero at one percent level of significance, for crops such as banana, beans, groundnuts and maize. In the same vein of research, Odhiambo et al. (2004) and, Raza & Siddiqui (2014) identify physical capital as a major determinant of agricultural farm returns. The results affirm a fact that capital remains a vital input for agricultural production as it greatly affects agricultural returns or farm revenues. Ajwad et al. (2004) in the same steps affirm that at the household level, over a half of the changes in the agricultural revenues are explained by non-climate factors such as physical capital available to farmers as well as capacity to adapt it at the farm level. Despite agricultural physical capital's importance, limited affordability, accessibility and low absorption of improved technology remain major challenge to farmers in Uganda according to UBOS (2013). Labour is another vital input for agricultural production. The output elasticities with respect to labour are 0.05 for beans and 0.04 for banana. The positive coefficient validates a fact of great importance of labour input in the production process. In contrast, the coefficients of labour input in the regressions of cassava and maize are statistically significant and negative. These output elasticities with respect to labour input for Uganda are the lowest compared to other countries such as Japan, 0.26 for rice; 0.59 for vegetables and potatoes (see Tokunaga et al., 2015) and Fezzi & Bateman (2015) obtained 3.751 for United Kingdom.

The difference in output elasticities due to labour is not surprising since labour is highly skilled unlike in Uganda where majority of workers are unskilled. Secondly, the sector employs labour force rejects from other sectors. UBOS (2013) posits that agricultural sector absorbs the biggest percentage of the labour force left out by other various sectors of the economy yet it absorbs 32 percent of the total labour force. Deductively, one could allude that these are the majority-disgruntled workers. However, the sample of 88 observations used in the study of Tokunaga et al. (2015) was small; we are of the view that with a larger sample, the elasticities could have looked different. The elasticities due to labour input for cassava and maize are -0.120 and -0.123, respectively, however, groundnuts had negative coefficient but not significant. In the same line, Kabubo-Mariara & Kabara (2018) using population density to represent availability of farm labour, find elasticity for beans as 0.00001. They also found that maize elasticity was positive but not significant. The sign of coefficient of labour is a mixed bag since labour can be associated with both low and high agricultural returns or output because of the law of diminishing returns (Shephard, 1970). The farm size coefficients are positive and significant for almost all crop regressions under study, explicitly: banana, cassava, groundnuts and maize, although the farm size coefficient for beans was not significant. The output elasticities due to farm size are 0.206 for banana, 0.086 for cassava, 0.087 for groundnuts and 0.116 for maize.

These elasticities are not different from what Tokunaga et al. (2015) got in Japan, for example 0.16 for rice. The results indicate that acquisition of more land acreage increases agricultural returns in Uganda. Most farmers in Uganda are smallholder farmers cultivating less than one hectare of land, with probability of increasing up to 10 hectares in the less populated semi-arid zones (Salami et al., 2010). Acquiring more land with intention of expanding agricultural activities remains a mirage due to high population densities. UBOS (2013) advises that, despite scarcity of land, hope is not entirely lost, with appropriate use of inputs and adoption of improved farming methods, the quality and quantity of agricultural yields can increase with the same plots of land. Farmers that applied fertilizers significantly had more farm returns in particular for banana, and cassava growers. According to UBOS (2010) organic fertilizers are widely used by farmers in Uganda. These include green manure, farmyard compost and seaweed. Farmyard manure is made of mixture of cow dung, urine and litter, mostly straw that often absorbs urine. The findings are in agreement with the Mall et al. (2006) who find that farmers applying fertilizers obtain the same harvest; they were getting without fertilizers 20 to 30 years ago. Inferably, tilling land for long, exhausts the soil fertility hence need for use of fertilizer to increase farm values. Further, Mall et al. (2006) contend that changes in both temperature and precipitation are having greater effects on run-off and soil erosion, biodiversity, salinization and soil water content, all of which are impactful in dissolving nutrients in the soil. All these have greater impact on soil fertility hence the need for continued application of fertilizers. This replenishes soil fertility if correctly applied with appropriate soil tests for salinity and alkalinity.

In contrast, maize growers significantly earned less farm returns. Application of fertilizers had no effect on farm returns for farmers that grew beans. Usually, smallholder farmers are often reluctant to apply fertilizers since leguminous crops such as beans and peas regularly fix their nitrogen in the soil. Sharma et al. (2014)

establish that continued application of imbalanced inorganic fertilizers culminated into lesser crop yields of wheat and maize as it increases carbon soil content and decreases PH. Chang et al. (2014) and Han et al. (2016) caution that using inorganic fertilizers over a continuous longer period is more harmful than organic fertilizers derived from sawdust and livestock products such as cow dung. Further, application of inorganic or chemical fertilizers demands soil tests. Findings reveal that farmers that applied fertilizers were significantly not different from those that did not in terms of farm returns. We find this revelation not surprising since the farmers scarcely apply fertilizers in their gardens. GoU (2016) documents that farmers add only between 1-1.5kg of nutrients for each hectare per annum, for every estimated loss of 80kg, hence positioning Uganda as the least country in fertilizer usage across the globe and also this rate of usage is below the mean of 8 kg per hectare in SSA. As a result, GoU (2016) attributes soil infertility and limited agricultural growth to limited use of fertilizers. The coefficients of soil quality are positive and significant for both regressions of groundnuts and maize. Farmers whose soils were good had more farm returns than their counterparts did. Kabubo-Mariara & Kabara (2018) identify soils as good if they can keep enough moisture to support plant growth. However, growers of beans whose soils were good earned less revenues. They also find that silt soils were negatively associated with farm returns.

On the other hand, the soil quality had no significant effect on farm returns for banana and cassava growers. GoU (2016) report shows that smallholder farmers can detect the soil quality as bad by perception and not scientifically. This is attributed to several reasons. First, they lack knowledge and capacity to test the nitrogen, phosphorous and potassium (NPK) ratio of the farm soils in the laboratory. Second, majority of farmers are short of knowledge and capacity to restock the missing soil nutrients, while others have a myth that fertilizers spoil soils. Irrigation had no any significant effect on farm values for farmers that grew banana, beans, maize, and cassava. It is not strange to find that irrigation has no impact on farm returns since the number of farmers that irrigated was less than 1 percent of the total respondents. UBOS (2013) documents that less than 1 percent of the land in Uganda is irrigated and the agricultural production is widely rain-fed. UBOS (2013) further reports that irrigation remains the best option to address the unpredictable weather variations, however, lack of affordability arising from high outlay needed to install irrigation infrastructure, keeps the venture as a distant dream. The effect of unreliable rainfall patterns and drought are ubiquitous. The high dependence on rain-fed agriculture impedes agricultural production (GoU, 2017). The proportion of agricultural households that practised irrigation in 2009/10 was one percent while in 2010/11 it was three percent. Bacha et al. (2011) cite smallholder irrigation as a pillar for attaining improved agricultural production, food security and lower rural poverty levels. Flooding had a significant negative relationship with farm returns for crop regressions of groundnuts and maize.

Climatic Variables: The coefficients of temperature are negative and statistically significant for banana, beans, cassava, and maize. The output elasticities with respect to temperature lie between -2.02 percent and 0.543 percent. This implies that for the average temperature increase by 1 percent, cassava farm returns decrease by 1.50 percent and beans by 1.004 percent. We notice that cassava and beans were the most hit crops by rising temperatures. These empirical results are consistent with those of Tokunaga et al. (2015) in Japan whose elasticities are between -0.39 percent and -0.82 percent. Etwire et al. (2019) in Ghana find that for 1 percent increase in average temperature, the plantains revenues decrease by 2.612 percent, in Nigeria, Ater & Aye (2012) empirically estimate elasticity as -2.589 percent. Exenberger et al. (2014) find different elasticities for grouped countries, for example -0.004 percent for high income, -0.014 percent for middle income and -0.016 percent for low income. The difference in response to climate changes is responsible for a big output gap in agriculture between SSA and the developed countries (Barrios et al., 2008). These empirical results approve a mantra that SSA suffers more numerous adverse effects of climate change, yet it emits little greenhouse gases (Appiah, 2017). In contrast, temperature is positive and statistically significant for groundnuts. The results indicate that when average temperature increases by 1 percent, on average groundnuts' farm revenues increase by 0.543 percent. Other studies also find a significant effect of average temperature on farm revenues, for example Etwire et al. (2019) in Ghana establish that when average temperature increases by 1 percent, on average maize farm revenues increase by 0.28 percent. In addition, farmers of beans and cassava had fewer returns due to flooding although the effect was not significant.

This finding is in agreement with Bezabih et al. (2014) who find that floods were majorly responsible for low levels of output and famine in Ethiopia. In Kenya, Kabubo-Mariara & Kabara (2018) delineate how water

logging and flooding destroy crops in the formative stages, while rotting of mature crops occurs during harvest season. We deductively assert that most of flood-prone areas are wetlands. Largely, flooding is due to anthropogenic actions that have encroached on wetlands and swampy areas for cultivation. The coefficient of average precipitation was positive and statistically significant for groundnuts. When the average precipitation increases by 1 percent, the groundnuts' farm returns increase by 0.115 percent. In the same vein of research, Granados et al. (2017) and Ater & Aye (2012) obtain similar results. On the contrary, average, precipitation has a significant negative relationship with farm returns for beans. These results are in agreement with the findings of Tokunaga et al. (2015) and Nyuor et al. (2016). When average precipitation increases by 1 percent, the beans farm returns decrease by 0.077 percent. The rains are destructive, often characterized by hailstorms, strong winds, flooding, and mudslides. Mudslides and floods are so rampant in the eastern parts of the country. Rainfall has no significant effect on farm returns for banana, cassava and maize. Attrition is a common problem with panel data that cannot be ignored. Using the Heckit model, the attrition bias test results appear in Table 5. There is no evidence for attrition bias for regressions of banana and beans. In contrast, the bias was found existent for cassava, groundnuts and maize regressions. In summary, the farm value elasticities imputed to temperature are far greater in magnitudes compared to those of rainfall, an indication that rising average temperatures and rainfall deficits adversely cause greater reductions in farm returns of agricultural households in Uganda.

Table 5: Attrition Test Results

Variables	Banana	Beans	Cassava	G/nuts	Maize
Capital	0.135***	0.152***	-0.024	0.110***	0.120***
	(0.028)	(0.032)	(0.03)	(0.039)	(0.027)
Labour	0.051**	0.057***	-0.09***	-0.023	-0.072**
	(0.021)	(0.018)	(0.024)	(0.029)	(0.03)
Farmsize	0.218***	0.042*	0.028	0.104***	0.115***
	(0.032)	(0.022)	(0.026)	(0.033)	(0.021)
Flooding	-0.136	-0.047	0.12	0.029	-0.089
	(0.093)	(0.066)	(0.089)	(0.115)	(0.082)
Temperature	1.839***	-0.461	-0.351	0.762	1.274***
	(0.388)	(0.375)	(0.368)	(0.694)	(0.316)
Rainfall	-0.022	-0.042*	0.006	0.023	-0.023
	(0.024)	(0.023)	(0.027)	(0.027)	(0.02)
Biasterm	0.357	-1.033	-2.90***	-2.98***	-2.29***
	(1.343)	(0.708)	(0.443)	(0.825)	(0.656)
Irrigation	n.a	0.207	-0.262	n.a	-0.221
	n.a	(0.142)	(0.18)	n.a	(0.166)
Constant	8.863***	3.878***	4.653***	0.688	7.374***
	(1.199)	(1.135)	(1.201)	(2.082)	(0.987)
Sigma_u	0.439***	0.262***	0	0.359***	0.425***
	(0.045)	(0.047)	(0.116)	(0.081)	(0.045)
Sigma_e	1.111***	1.152***	1.303***	1.204***	1.311***
	(0.022)	(0.016)	(0.019)	(0.031)	(0.02)
N	2,509	4,516	2,621	1,740	4,144
N	1,202	1,860	1,510	1,008	1,904

Robust Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Regional Analysis Using Different Geographic Areas: In Table 6, we present regional regression results of Central, Eastern, Northern and Western. Different regions have differing social and economic backgrounds, different conditions for crop farming, and ecological environments such as rainfall, temperature, soil types, vegetation, water and topography. Because of these differences, it is relevant to analyse results regionally. Central is the reference category. Despite the regular occurrence of floods in the eastern region, mudslides/landslides in the hilly and mountainous areas of Elgon have not only tremendously discouraged

farming but also decreased farm returns (GoU, 2013). This clearly explains why increases in rainfall amounts significantly lower farm returns for households that cultivated beans and groundnuts in the eastern region.

Table 6: Regression Coefficients with Regional Dummies

Variables	Banana	Beans	Cassava	G/Nuts	Maize
Capital	0.136***	0.177***	0.052*	0.187***	0.138***
	(0.023)	(0.017)	(0.028)	(0.03)	(0.016)
Labour	0.018	0.033**	-0.11***	-0.032	-0.14***
	(0.021)	(0.017)	(0.024)	(0.028)	(0.020)
Farmsize	0.175***	0.057***	0.068***	0.098***	0.148***
	(0.023)	(0.020)	(0.026)	(0.033)	(0.020)
Fertilizers	0.087	-0.087	0.260***	-0.047	-0.44***
	(0.069)	(0.062)	(0.055)	(0.120)	(0.077)
Soil Quality	0.011	-0.118**	-0.03	0.311***	0.376***
	(0.102)	(0.055)	(0.079)	(0.101)	(0.061)
Irrigation	0.045	0.042	-0.085	0.324	-0.072
	(0.185)	(0.137)	(0.183)	(0.236)	(0.150)
Flooding	-0.091	-0.067	-0.008	-0.16	-0.17***
	(0.089)	(0.064)	(0.087)	(0.100)	(0.064)
Temperature	-0.596*	-0.449**	-1.74***	-1.32***	-1.16***
	(0.315)	(0.217)	(0.336)	(0.381)	(0.253)
Precipitation	0.007	-0.06***	-0.041	0.027	-0.01
	(0.023)	(0.018)	(0.027)	(0.029)	(0.020)
Eastern Dummy	-0.47***	-0.27***	0.182**	0.076	-0.29***
	(0.072)	(0.056)	(0.073)	(0.103)	(0.059)
Northern Dummy	-1.13***	-0.38***	0.282***	-0.068	-0.67***
	(0.133)	(0.061)	(0.080)	(0.110)	(0.067)
Western Dummy	0.064	-0.066	0.217***	0.026	-0.133**
	(0.060)	(0.049)	(0.078)	(0.100)	(0.065)
Constant	5.107***	4.138***	8.502***	6.349***	7.284***
	(1.026)	(0.714)	(1.110)	(1.251)	(0.826)
Sigma_u	0.378***	0.238***	n.a	0.365***	0.358***
	(0.048)	(0.050)	n.a	(0.079)	(0.045)
Sigma_e	1.100***	1.149***	1.304***	1.196***	1.280***
	(0.021)	(0.016)	(0.010)	(0.031)	(0.018)
N	2,549	4,516	2,621	1,769	4,469
N	1,207	1,860	1,510	1,017	1,936

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The regional dummies in Table 6 show that both central and eastern regions reap more farm returns in the farming of bananas than northern region. The results also suggest that banana farm returns for western region are not different from those of central. Further, central and northern regions reap more farm returns from the farming of beans than other regions. Northern region gained more farm returns from the farming of both maize and cassava while the growing of groundnuts was mostly statistically significant in the central region as shown by the highest significant dummy coefficient. We also examined how climate factors affect farm returns regionally; beans growers experienced the worst effects of precipitation as shown by elasticity of -0.06 percent, while cassava growers were hit most by effects of temperature across the entire regions.

Floods have more damaging effects on farm returns for both eastern and northern regions especially for maize growers.

5. Conclusion and Recommendations

The paper examined the effect of both rainfall and temperature on agricultural returns. The climate related disasters such as drought, floods and hailstorms accounted for over 67 percent of the factors impeding agricultural returns and less than 2 percent of the farming households used irrigation. However, farmers that irrigated earned higher agricultural returns. The findings show that the output elasticities with respect to temperature range from -2.02 percent to 0.543 percent, while with respect to rainfall lie between -0.08 percent and 0.155 percent. The climate coefficients show that both root tubers and legumes are the most affected crops by climate changes. Further, temperature increases were more destructive than rainfall. Apart from climate factors, non-climate factors such as capital, labour, farm size, fertilizers and soil quality are equally important inputs and significantly affect agricultural farm returns.

Recommendations: Basing on the study findings, the study proposes that due to increasing adverse climate change effects in Uganda, adoption of multi-pronged approaches such as extensive irrigation, agro-based insurance, diversification of agricultural activities, use of food cribs during bumper harvests would lessen the effects of climate change.

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Estimation of Technical Efficiency of Micro and Small-Scale Manufacturing Enterprises in Selected Towns of Jimma Zone, Oromia National Regional State

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Abstract: This study was conducted to estimate the technical efficiency of micro and small-scale manufacturing enterprises in Selected Towns of Jimma Zone, Oromia National Regional State by using the Stochastic Frontier Approach. The analysis used Cross-sectional data which was collected from 343 Micro and small-scale manufacturing enterprises in 2018. The finding shows the mean technical efficiency of sampled Micro and Small-Scale Manufacturing Enterprises is about 54.8% and output value-added is positively affected by capital input and raw material, but negatively affected by labor input. The finding from the inefficiency model indicates that technical inefficiency of sampled Micro and Small-Scale Manufacturing Enterprises is negatively affected by the amount of finance used for initial investment expenses; lower for enterprises which received land from the government, participate only in "Ekub", participate in both "Ekub" and "Edir". However, seasonal change in demand for a product is found to make technical inefficiency of enterprises higher. Thus, by improving Micro and Small-Scale Manufacturing Enterprises access to land, market, sufficient startup capital and strengthening social capital, it is possible to increase output value-added.

Keywords: *Technical Efficiency, Micro and Small-Scale, Manufacturing Enterprises.*

1. Introduction

Micro and small-scale enterprises (MSEs) have paramount importance in the economy. MSEs are a great source of employment and income. They accelerate the rate of industrialization and economic growth. They also contribute to equity in income distribution and increase efficiency in low-income countries (Essien & Yakub, 2007), (Donald & Carl, 1998), (Hinderink & Titus, 2002). The major development goals of the government of Ethiopia include: reducing poverty and unemployment, and economic transformation (industrialization). One of the strategies to achieve these goals is expanding MSEs since there is large potential of MSEs in the economy. But, the growth of performance of micro and small scale manufacturing industries has been poor and the implementation of large manufacturing projects has been delayed. These are the major reasons for the slow growth in the overall manufacturing sector of Ethiopia over the first growth and transformation plan periods (FDRE, 2016). The government of Ethiopia has tried to provide greater attention for micro and small enterprises development in last years. However, a few enterprises have been promoted to the next higher level. The reason is that greater focus was given to new establishments rather than supporting previously established ones. Besides, there is no clear separate strategy formulated for the establishment and development of SMEs even though improvements are witnessed. It is supposed that the current situation of MSMEs is seemingly continuing in the future (Amare & A. Raghurama, 2017).

According to (EEA, 2015), the contribution of manufacturing SMEs in GDP has decreased from about 1.6 percent in 2004/05 to 1.3 percent in 2012/13 in the Ethiopian economy. The number of manufacturing SMEs is by far higher than that of large and medium scale manufacturing industries. However, their contribution to GDP is lower than large and medium scale manufacturing industries throughout the periods. The existing data shows that few SMEs have been graduating into medium-size enterprises and there are those closed down. As a result the number of SMEs operating and the number of employment opportunities created is not grown. In Ethiopia, the MSE sector generates huge employment opportunities next to agriculture. According to a National survey conducted by the Central Statistics Agency in 2007, the number of people engaged in this sector is greater than 1.3 million. However, a large number of MSEs has not been grown and remain to be survival type (CSA, 2007). Furthermore, as of (Gebreyesus, 2007), about 69% of MSEs are found survival and as of (Wasihun & Paul, 2010) about 75.6% of the MSEs are unable to grow at all since start-up and only 21.9% of the MSEs had added workers. Thus, factors that influence the efficiency of manufacturing micro and small-scale enterprises should be identified and appropriate policy action should be recommended. These were the

purposes of this study. The general objective of the study is to analyse the technical efficiency of micro and small-scale manufacturing enterprises in selected towns of Jimma Zone.
The specific objectives would be:

- ✓ To find out the input-output relationship in micro and small-scale manufacturing enterprises.
- ✓ To detect the demographic and socio-economic factors which influence the technical efficiency of micro and small-scale manufacturing enterprises?

2. Literature Review

The Concepts of Efficiency in Production: As of (William, 2008) production is defined as a method of transforming inputs to outputs. In the production process, a producer may be technically and/or allocatively efficient or inefficient. A producer is said to be efficient if as much as possible is produced with the inputs used or equal output is produced at possible minimum cost. Technical efficiency indicates the ratio of actual output to the optimal value as specified by a 'production function.' If the ratio is less than one, we say that the producer is technically inefficient. (Farrell, 1957) developed the first theoretical description of production technical efficiency. The producer's production efficiency can be measured by assessing a production frontier which envelops all inputs/outputs data used in the study.

Figure 1: Technical and Allocative Efficiency

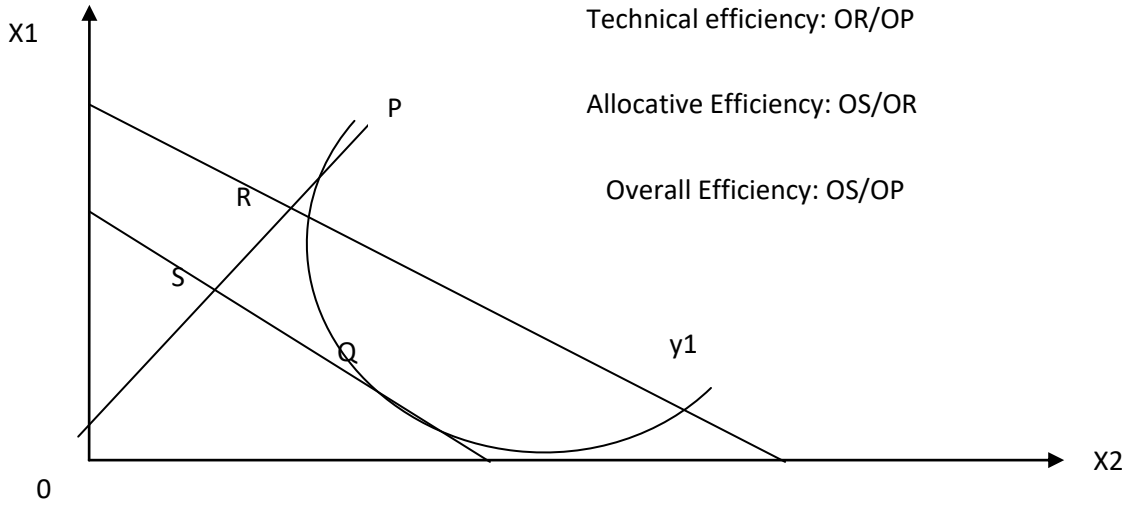


Figure 1 shows Farell's decomposition of overall efficiency into technical efficiency and allocative efficiency. Let us assume that single-output(Y) is produced by using two inputs (x1 & X2). Our production function will be Y = f (X1, X2) and is linearly homogeneous. Any point on isoquant Y shows technically efficient combinations, but only point Q indicates technical efficiency with minimum cost. Technical efficiency can be shown as OR/OP while allocative efficiency can be shown as OS/OR. The overall efficiency is the product of the two efficiencies (i.e. OS/OP).

Approaches to Measuring the Efficiency: Stochastic Frontier Analysis (SFA) and Data Envelopment Approach (DEA) are most applied approaches to measure efficiency. In this study, SFA is applied since it is a parametric approach which means that it follows a defined production function. Furthermore, the inefficiency term in composite error term of the function in the SFA model can be isolated from stochastic term (Coelli, 1996). One drawback of DEA is that it is a non-parametric and non-stochastic Approach which applies linear programming methodology to develop the efficient frontier. Another weakness of DEA is that it does not permit isolation of the stochastic noise from the inefficiency effect and it is also vulnerable to measurement errors and outliers (Erkoc, 2012), (Coelli, 1996).

Factors Affecting Efficiency: Many researchers have studied efficiency in production in the past however, the greatest number of previous researches. In the study of efficiency is related to the agriculture sector the study of technical efficiency related to Micro and small-scale manufacturing Enterprises is almost neglected

particularly. However, Micro and small-scale manufacturing Enterprises have the greatest contribution in the economic development of Ethiopia and they are the base for current economic industrialization of the government's economic policy. As of (Berihu, 2014) Ethiopia has been giving greater focus for MSEs, development. This is because MSEs have a larger contribution to economic growth, employment generation and building an industrial economy in the country. This study is, therefore, conducted to identify factors hindering the growth and efficiency of micro and small-scale manufacturing enterprises and give policy recommendation so that the solution will contribute to the economic policy objective of the government previous researches indicate that various factors affect the technical efficiency of MSEs. Age of promoters, social networking, initial capital, vocational training and investment in ICT affects the efficiency of MSEs positively while business plan and enterprises' size affect the efficiency of MSEs negatively (Tekle, Sandraa & Berhanu, 2016). The owner's age, level of education and training, and access to infrastructure affect efficiency positively while Sourcing start-up capital from financial institutions affects it negatively (Mosomi, 2011).

The efficiency of MSEs is also found to be affected by Managerial inefficiency in the optimal selection of resource (Gamachis, 2017). It is also found that the efficiency of MSEs is influenced positively by size, ownership, credit availability and employment of hired labour, but negatively by region (location) and nature of seasonality of operation (Rajesh Raj S N, 2007). As of (Zulridah & Liew, 2014) Salary and wages per worker, research and development expenditure, training expenditures affect technical efficiency in micro-enterprises positively and significantly while the ratio of unskilled labour affects it negatively and significantly. Besides, (Igbekele, 2003) found that the efficiency of MSEs is positively influenced by Education, a number of employees, level of investment and age of business, but negatively by age of the operator. As discussed before the literature shows that various factors influence the level of technical efficiency of MSEs. However, some of the findings in these reviewed researches are conflicting. Some of the factors which are found to change the technical efficiency of MSEs positively in some literatures are reported in some other literatures to change it negatively. For instance, **age** (Tekle, Sandraa & Berhanu, 2016), (Mosomi, 2011), (Igbekele, 2003); **size** (Tekle, Sandraa & Berhanu, 2016), (Rajesh, 2007); **credit** (Mosomi, 2011), (Rajesh, 2007).

3. Methodology of the Study

Data Sources and Data Type: The researchers used primary data gathered from owners/managers of micro and small-scale enterprises of selected towns of Jimma Zone. Jimma zone was selected by convenient sampling technique since it is in the catchment area of Jimma University. The multistage sampling technique was used in the collection of required data for the studies i.e. at first woredas' Towns were selected from which owners/ managers were selected. Accordingly, Jimma, Agaro, Sokoru, and Asandabo were selected based on the consultation with the Food security and Employment creation officers, as well as trade and industry officers of Jimma zone and Jimma town. These towns have a higher number of micro and small-scale enterprises in the Zone. Then, the respondents were selected by random sampling technique from each town.

Sample Size Determination: To determine the sample size, the researchers used a sample frame collected from Jimma zone office of food security and job creation by using Cochran's formula (Cochran, 1977):

$$n_o = \frac{z^2}{e^2} pq \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots . (1)$$

Where,
n_o = sample size
z = critical value
p = estimated proportion of an attribute that is present in the population and q =1 − p
e = level of precision.

For this study p = 0.5, thus q=1 -0.5 = 0.5, z = 95% (0.95), e = 5% (0.05) was used. As a result, the sample size was found to be 384. Then, the sample size was allocated proportionately to the selected towns based on secondary data found from Jimma zone and Jimma town's food security and job creation, and trade and industry offices as shown in table 1. As can be understood from this table the researchers proposed to collect data from the manager/operator of 384 enterprises. But, 11 questionnaires were not properly answered and 30 questionnaires were not distributed because the respondents were not willing to respond. It means that

the response rate is 89.3%. Thus, 343 questionnaires were used in the analysis the minimum and maximum initial investment expenses.

Table 1: Sample Size Allocation

Town	Enterprise (ownership)	Number of Enterprises	Sample size/proposed Respondents	Number of questionnaires properly filled and returned
	Proprietorship	**110**	**42*[3]**	
Jimma	**Partnership**	**692**	**265**	
	Total	802	307	281
	Proprietorship	**58**	**22**	
Agaro	**Partnership**	**29**	**11**	
	Total	87	33	26
Asandabo	**Proprietorship**	**26**	**10**	
	Partnership	**31**	**12**	
	Total	57	22-6	17
Sokoru	**Proprietorship**	**35**	**13**	
	Partnership	**22**	**9**	
	Total	57	22	19
Total		1,003	384	343

Source: Computed from Jimma zone food security and job creation, and trade and industry offices', 2018

Method of Data Analysis: In this study, we used descriptive and inferential tools of data analysis. In descriptive analysis percentage and tabular presentations of statistical tools were employed. Under the econometric analysis, in the efficiency model, we employed a stochastic frontier model to estimate the level of technical efficiency of firms by using single step. The stochastic frontier model was estimated using STATA software version 13.
The following stochastic production function is used:

$Y_i = f(X_{ij}\beta)exp(V_i - U_j)$-- 3.1

Where,
Y_i = output of the i^{th} enterprise
X_i= vector of input quantities
β= vector of unknown parameters
V_i= symmetric error term
U_j= inefficiency term which is non-negative

Technical efficiency (TE) = $\frac{Y_i}{Y_i^*} = f(X_i,\beta)\exp(V_i - U_i) / f(X_i,\beta)\exp(V_i)$........3.2

$= (\boldsymbol{exp})\ (-U_i)$ **3.3**

Where,
Y_i= observed output
Y_i^* = Frontier output
Technical inefficiency relative to stochastic production frontier is captured by one-sided error component $(-U_i)$, $(-\boldsymbol{U}) \geq \boldsymbol{0}$. **3.4**

The Model Estimated: The production technology of micro and small-scale enterprises in this study is assumed to be specified by the Cobb Douglas frontier production function as:

$\boldsymbol{LnOVA} = \boldsymbol{\beta_0 + \beta_1 LnKI + \beta_2 LnLI + \beta_3 LnRM + v_i - u_i}$................................ ***3.5***

Where,

[3]it is found by multiplying all by the factor 0.383 (384/1003)

- Ln = natural logarithm
- OVA = output value added
- KI = capital input
- LI = labor input
- RM = raw materials
- β's = parameters to be estimated
- v_i = random error
- u_i = non-negative random term

Technical Efficiency: The inefficiency function will be:

$$TE(u_i) = \delta_0 + \delta_1 ownership + \delta_2 FSize + \delta_3 Entreage + \delta_4 Busiage + \delta_5 Educ + \delta_6 SorInInvest + \delta_7 InitInvest + \delta_8 Busplan + \delta_9 Accesfinan + \delta_{10} Availinfra + \delta_{11} Training + \delta_{12} Locaenter + \delta_{13} InvICT + \delta_{14} SocNet + \delta_{15} Seasonoper + \delta_{16} Competition + \delta_{17} Land + \epsilon_i \quad 3.6$$

Where,

- ownership = Types of ownership
- F Size= Family size
- Entre age = Entrepreneur age
- Busiage = Age of business
- Educ=Level of education
- SorInInvest = Source of initial investment
- InitInvest= Initial investment
- Bus plan= business plan
- Accesfinan= access to finance
- Availinfra= Availability of infrastructure
- Locaenter= location of the enterprises
- InvICT= investment on information Communication and Technology
- SocNet = Social networking/ capital
- Seasonoper =Seasonality of operation
- δ_i=Inefficiency parameters to be estimated.
- ϵ = random error

Table 2: Description of Variables

	Variables	Description	Expected Sign
Stochastic production function	Output value added (OVA)	It was calculated as total value of output (sales revenue) minus the cost of raw materials and indirect costs	
	Capital input (KI)	Firms' capital stock (Ki) is measured as the replacement value	positive
	Labor input (LI)	Total number of workers in the Enterprise	positive
	Raw materials (RM)	costs of materials and energy which is a proxy of raw materials used by enterprises	positive
Technical efficiency function	Types of ownership(ownership)	1 if owned sole proprietor, 0 otherwise (owned partnership, others)	positive
	Family size (FSize)	Number of family members of owner/operator of the enterprise	positive
	Entrepreneur age (Entreage)	Age of business operator/decision-maker (in years)	negative
	Age of business (Busiage)	Number of years of enterprise up to survey year	negative
	Level of education (Educ)	Level of education of operator/decision-maker (in years)	negative

Source of the initial investment (SorInInvest)	1 if own self, 0 otherwise	negative
Initial investment (InitInvest)	The amount of money invested when the enterprise starts its operation (in Birr)	negative
business plan (Busplan)	1 if the enterprise has a business plan, 0 otherwise	negative
access to finance (Accesfinan)	1 if the enterprise has received credit during its operation, 0 otherwise	negative
Improve	1 if the enterprise introduced improvement to existing products in the previous five years, 0 otherwise	negative
Availability of infrastructure (Availinfra)	1 if the enterprise easily accesses to electricity, water, etc., 0 otherwise	negative
Training	Number of days the enterprise's owner/operator trained	negative
location of the enterprises (Locaenter)	1 if the enterprise is near to the main road, 0 otherwise	negative
investment in ICT(InvICT)	1 if the enterprise investment in ICT to promote its sale, 0 otherwise	negative
Social networking/capital (SocNet)	1 if the enterprise participates in Ekub (rotating saving) and develops social capital, 0 otherwise	negative
Seasonality of operation (Seasonoper)	1 if the enterprise's product demand is non-seasonal, 0 otherwise	negative
Competition	1 if the enterprise doesn't face competition, 0 otherwise	positive
Land	1 if the government provides land and premise at start-up, 0 otherwise	negative

4. Results and Discussion

Descriptive Analysis: Table 3 shows results of continuous variables. The minimum and maximum age of operator of the enterprises is 21 years and 50 years respectively while the mean of age of the operator is about 31 years. The minimum and maximum size of the family of the operator of enterprises is 1 and 6 respectively while the mean is about 3. The minimum and maximum years of education of the operator of enterprises are 5 years and 17 years respectively while the mean is about 3 years and half. The minimum and maximum years of enterprises since establishment to survey years are 1 year and 21 years respectively while the mean is about 2 years. The minimum and maximum initial investment expenses are Birr 5000 and 260,000 respectively while the mean is about Birr 73157. The minimum and maximum amount of capital input estimated as the value of equipment used in production are Birr 5000 and Birr 2500,000 respectively while the mean is about Birr 160438.5. The minimum and maximum amount of output-value added (estimated by the difference of sales revenue and costs of raw materials per month) are Birr 500 and Birr 90,000 respectively while the mean is about Birr 16,913. The minimum and maximum numbers of labors employed in the enterprises are 1 and 16 persons respectively while the mean is about 6 persons. The minimum and maximum monthly costs of raw materials used by the enterprise are Birr 500 and 95000 respectively while the mean is about Birr 25,342. The minimum and maximum days of training taken by the operator of enterprises are 0 and 14 while the mean is about 2 and half days.

Table 3: Summary of Statistics of Continuous Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Entre age	343	31.25	5.57	21	50
Fsizeo	343	2.70	1.39	1	6
EduO	343	12.29	2.48	5	17
Busiage	343	4.94	2.21	1	21
InitInvest	343	73157.73	54524.37	5000	260000
KI	343	160438.5	222634.1	5000	2500000
OVA	343	16913.41	13246.14	500	90000
Currentemplo	343	6.052478	2.392151	1	16
RM	343	25342.71	17837.4	500	95000
Training	343	2.437318	1.79701	0	14

Source: Own computation from field survey, 2018

Table 4 shows results related to dummy variables. This table shows that most of the sampled operators of enterprises are males (60.06%); are owned in partnership form (80.76%); got finance for initial investment from other sources (56.27%); didn't get land from government (66.18%); easily access to infrastructure like road and electricity (90.38%); have business plan (88.05%); are near to main road (73.47%); which didn't face competition (18027.68), which demand for their product is not seasonal (18323.15), which participate both in "Ekub" and "Edir" (19881.02), introduced major improvement to their product (99.42%); faced competition (67.35%); have seasonal demand for their product (68.51%) and participate only in "Ekub" (42.27%).

Table 4: Summary of Statistics of Dummy Variables

Variable	Category	Frequency	Percent	Cumulative
	Male	206	60.06	60.06
Sex O	Female	137	39.94	100.00
	Total	343	100.00	
	sole proprietor	66	19.24	19.24
Ownership	Partnership	277	80.76	100.00
	Total	343	100.00	
	Otherwise	193	56.27	56.27
SorInInvest	Own self	150	43.73	100
	Total	343	100	
	Otherwise	227	66.18	66.18
Land	government land	116	33.82	100
	Total	343	100	
	Other wise	33	9.62	9.62
Availinfra	easily access to electricity and water	310	90.38	100
	Total	343	100	
	Has no business plan	41	11.95	11.95
Busplan	Has business plan	302	88.05	100
	Total	343	100	
	Not near to main road	91	26.53	26.53
Locaenter	Near to main road	252	73.47	100
	Total	343	100	
	Not Introduced major improvement	2	0.58	0.58
Improve	Introduced major improvement	341	99.42	100
	Total	343	100	
Competition	No competition	112	32.65	32.65
	Faced competition	231	67.35	100
	Total	343	100	
	Demand for product is not seasonal	108	31.49	31.49
Seasonoper	Demand for product is seasonal	235	68.51	100
	Total	343	100	

	Not participate both in “edir” and “ekub”	28	8.16	8.16
SocNet	participate in "ekub"	145	42.27	50.44
	participate in "edir"|	33	9.62	60.06
	participate in both "ekub" & "edir"	137	39.94	100
	Total	343	100	

Source: Own computation from survey data, 2018

Table 5 indicates the average amount of output value-added per enterprises across dummy variables. One can understand that the mean of output value-added is larger for female operators (17668.61), sole proprietorship (19272.73), those which got initial investment fund from other sources (18106.22), provided land by government (18841.38), easily access to infrastructure (17054.52), which have business plan (17023.64), which didn't access to credit (18356.16), which are near to main road (17104.37), which made major improvement in their product (16963.34), which didn't face competition (18027.68), which demand for their product is not seasonal (18323.15), which participate both in "Ekub" and "Edir" (19881.02). This validates that output among enterprises in the sample might vary as a result of technical inefficiency. On the other hand, the mean of output value-added is lower for male operators (16411.17), partnership (16411.17), those which got initial investment fund from their own sources (15378.67), not provided land by government (15928.19), didn't easily access to infrastructure (15587.88), which haven't business plan(16100), which access to credit (18356.16),which are not near to main road (16384.62), which didn't made major improvement in their product (8400), which faced competition (16373.16), which demand for their product is seasonal (16265.53), which participate neither in "Ekub" nor "Edir" (11967.86).

Table 5: Summary of Statistics of Dependent Variable across Dummy Variables

		Dependent Variable: OVA				
Dummy Variables		**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
	Male	206	16411.17	14380.94	500	90000
SexO	Female	137	17668.61	11337.39	1500	80000
	Total	343				
	Partnership	277	16351.26	13266.52	500	90000
Ownership	Sole proprietorship	66	19272.73	12994.89	1500	80000
	Total	343				
	Other	193	18106.22	14367.5	1300	90000
SorInInvest	Own	150	15378.67	11511.86	500	78000
	Total	343				
Land	Not provided by the government	227	15928.19	14103.24	1300	85000
	Provided by the government	116	18841.38	11191.68	500	90000
	Total	343				
	Not easily access	33	15587.88	18015.74	500	80000
Availinfra	Easily access	310	17054.52	12664.09	800	90000
	Total	343				
Busplan	Has no business plan	41	16100	16961.35	500	80000
	Has business plan	302	17023.84	12689.64	12689.64	90000
	Total	343				
Crdt	Didn’t Received credit	73	18356.16	12018.04	500	78000
	Received credit	270	16523.33	13553.58	1300	90000
	Total	343				
Locaenter	Not near to the main road	91	16384.62	11645.63	500	78000
	Near to main road	252	17104.37	13795.16	1300	90000
	Total					
Improve	Not Major improvement	2	8400	5515.433	4500	12300
	Major improvement	341	16963.34	13265.52	500	90000
	Total	343				

Competition	No competition	112	18027.68	16181.02	1500	90000
	Competition	231	16373.16	11560.49	500	80000
	Total	343				
Seasonoper	Demand for the product isn't seasonal	108	18323.15	16762.88	2000	90000
	Demand is seasonal	235	16265.53	11252.31	500	80000
	Total	343				
SocNet	Not in both edir and ekub	28	11967.86	14673.86	2000	78000
	In ekub only	145	14946.9	9436.97	800	45000
	In Edir only	33	17430.3	9841.858	500	45000
	In both Edir and ekub	137	19881.02	16226.59	1500	90000
	Total	343				

Source: Own computation from survey data, 2018

Empirical Analysis

Estimation Methods: Maximum Likelihood Estimators: In table 6 all three models support that there is technical inefficiency in our model. The value of lamda (λ) is also greater than 1 the three cases which consolidate the significance of inefficiency. The value of gamma (γ) also shows that a 95.6% variation in output is because of technical inefficiency. This validates that output among enterprises in the sample might vary because of technical inefficiency. Thus, we use Maximum Likelihood Estimates (MLE) because it provides appropriate results. Table 6 indicates that explanatory variables of production function are all together highly significant which is confirmed by the generalized likelihood ratio test. The null hypothesis: η1=η2=η3=0 is rejected at 1% level of significance.

Table 6: Maximum Likelihood Estimates of the Cobb Douglas Stochastic Production Frontier Function with the Various Distribution of Inefficiency Term

Half Normal Distribution			**Exponential Distribution**		**Truncated Normal Distribution**		
Variables					**Variables**		
lnVOA	Coef.	Std. Err.	Coef.	Std. Err.	lnVOA	Coef.	Std. Err.
lnKI	.34	.05***	.32	.05***	lnKI	.31	.05***
lncurrentemplo	-.17	.10*	-.17	.10*	lncurrentemplo	-.16	.10*
lnRM	.23	.05***	.24	.04***	lnRM	.24	.04***
_cons	4.22	.56***	4.28	.57***	_cons	4.32	.55***
/lnsig2v	-1.56	.20***	-1.56	.20***	/mu	-5.97	10.09
/lnsig2u	-.13	.17	-1.04	.22***	/lnsigma2	1.54	1.30
sigma_v	.46	.04	.46	.05	/ilgtgamma	3.1	1.36**
sigma_u	.94	.08	.6	.07	sigma2	4.69	6.09
sigma2	1.1	.13	.56	.06	gamma	.96	.06
					sigma_u2	4.48	6.08
lambda	2.1	.11	1.30	.10	sigma_v2	.20	.04
	Number of obs. =343		Number of obs. =343			Number of obs. = 343	
	Wald chi2(3) =120.2		Wald chi2(6) =119.75			Wald chi2(6) = 120.63	
	Log likelihood= -37.		Log likelihood = -368.66			Log likelihood = -368.33	
	Prob> chi2 = 0.0		Prob> chi2 = 0.00			Prob> chi2 = 0.00	
	Likelihood-ratio test of sigma_u=0: chibar2(01) = 15.75		Likelihood-ratio test of sigma_u=0 : chibar2(01) = 20.67			H0: No inefficiency component: z = -3.550	
	Prob>=chibar2 = 0.0		Prob>=chibar2 = 0.00			Prob<=z = 0.000	

***, ** and * = significant at 1%, 5% and 10% respectively

The impact of only labor input on VOA is opposite to what was expected and significant at 10%. On average as capital input and raw materials increases by 1% output value-added increases by about 0.3% and 0.2% respectively, other things remaining constant. On the other hand, as labor input increases by 1% output value-added decreased by about 0.2% on average, other things remaining constant. The coefficients of the input variables suggest that MSMEs experienced decreasing returns to scale. The sum of the coefficients of the inputs is 0.4. In this study, we used a single-stage maximum likelihood model because of its advantages (i.e. it does not violate the distributional assumption of the error terms).

Table 7: Maximum Likelihood Estimates of the Stochastic Production Frontier and Inefficiency Effect Models with Various Distribution of Inefficiency Term

Half Normal Distribution			**Exponential Distribution**		**Truncated Normal Distribution**		
Variables					**Variables**		
lnOVA	Coef.	Std. Err.	Coef.	Std. Err.	lnVOA	Coef.	Std. Err.
lnKI	.27	.04***	.25	.04***	lnKI	.24	.04***
lncurrentemplo	-.18	.10*	-.14	.10	lncurrentemplo	-.10	.09
lnRM	.22	.04***	.24	.04***	lnRM	.25	.04***
_cons	5.13	.51***	5.01	.5***	_cons	5.0	.51***
lnsig2v							
_cons	-1.7	.16***	-1.72	.15	mu		
lnsig2u					SexO		
					male	.19	.32
SexO							
Male	.29	.24	.36	.32	Entreage	.01	.03
Entreage	.01	.02	.02	.03	FSizeo	-.07	.14
FSizeo	-.11	.10	-.14	.13	EduO	-.01	.06
EduO	-.02	.04	-.00	.06	Busiage	.03	.07
Busiage	.09	.06	.10	.08	ownership		
					sole proprietor	.37	.47
Ownership					SorInInvest		
sole proprietor	.07	.31	.06	.43	own self	-.17	.35
SorInInvest							
own self	-.01	.25	-.05	.35	InitInvest	-.00	9.e-06***
InitInvest	-.0015	2.9e-06***	-.0015	4.03e-06***	Land		
					government	-1.67	.69**
Land					Availinfra		
government	-.97	.29***	-1.29	.39***	easily access to electricity and water	.48	.64
Availinfra					Busplan		
easily access to electricity and water	.13	.43	.27	.59	yes	-.38	.57
Busplan					Crdt		
Yes	-.56	.2	-.51	.56	yes	.52	.47
Crdt					Locaenter		
Yes	.1258	.31	.21	.42	main road	-.19	.40
Locaenter					Improve		
main road	-.23	.28	-.29	.39	yes	-1.41	1.34
Improve					Competition		
Yes	-.63	1.20	-1.14	1.65	yes	.09	.33
Competition					Seasonoper		
Yes	.33	.23	.36	.32	yes	.69	.39*
Seasonoper					SocNet		
Yes	.29	.24*	.44	.32*	ekub	-.55	.54
					edir	-.36	.71
					ekub&edir	-.87	.57
SocNet					Training	.08	.09
ekub	-.83	.41**	-.99	-55*			

edir	-.28	.50	-.44	.68			
ekub&edir	-.92	.41**	-1.14	.55**			
Training	.04	.07	.055	.0927	_cons	1.65	1.71
_cons	1.66	1.42	1.15	1.953	/lnsigma2	.29	.33
					/ilgtgamma	1.9	.45***
sigma_v	.42	.03	.42	.031	sigma2	1.34	.44
					gamma	.87	.05
					sigma_u2	1.16	.45
					sigma_v2	.17	.03
Number of obs =343			Number of obs =343		Number of obs =343		
Wald chi2(3) = 102.13			Wald chi2(3) = 1132.73		Wald chi2(3) = 107.9		
Log likelihood=-334.08			Log likelihood =-336.02		Log likelihood =-332.4		
Prob> chi2 = 0.00			Prob> chi2 = 0.00		Prob> chi2 = 0.0		

*, ** and *** = significant at 10%, 5% and 1% level of significance respectively

Table 8 indicates the result from the combined estimation of stochastic production function and technical inefficiency effects in all three models. The value of the generalized log-likelihood test indicates that all variables are jointly significant that is:
H_o: η1=η2=η3=0 in the case of stochastic production frontier and
H_o: η1=η2=η3=η4=η5=η6=η8=η9=η10=η11=η12=η13=η14=η15=η16=η17=η18=η19=η20=η21=0 in the case of inefficiency effect model, is rejected at 1% level of significance. One can understand from table 8 that capital input and raw material are significant in all three types of distribution while labor input has no impact on value added output in case of exponential and truncated distribution when stochastic frontier and inefficiency effects are estimated in combination, other things being constant. This indicates that there is a room to increase output value-added (estimated as monthly sales value) by increasing the amount of capital input and raw material, but not labor input. From the independent variables included in technical efficiency model only five variables (i.e. InitInvest, government Land, Seasonoper, Ekub, both Ekub and Edir) are found statistically significant in both half normal and exponential.

While only three variables (InitInvest, government land and seasonal demand for product) are statistically significant in case of truncated normal distribution. Other things being constant, on average as money available for initial investment expense increases by one percent, the technical inefficiency of enterprises decreases by about 0.0015% and it is statistically highly significant at 1% level significance. This is because the larger the money available to finance the expenses of enterprises, the easier to run enterprises smoothly. The enterprises can purchase their raw materials without difficulty and run their business more efficiently, citrus paribus. Other things being constant, the technical inefficiency of those enterprises which received land from government decreases by 0.97 as compared to the enterprises which received land from other bodies (rented/own land) and it is statistically highly significant at 1% level significance. This might be an incentive to produce efficiently as others are discouraged by rent expenses paid (if the land is rented from other) or imputed income lost from their own land used for enterprise operation. As compared to those enterprises which do participate neither in "Ekub" nor "Edir", the technical inefficiency of those enterprises which participate in Ekub decreases by 0.83 on average and it is statistically significant at 5% level significance, citrus paribus. This might be because of developing social capital and sharing information and knowledge when they meet each other.

Furthermore, they might be encouraged to produce efficiently so that they can cover their commitment to the group and save more to ease financial difficulties. It is also found that the technical inefficiency of those who participate in both "Ekub" and "Edir" decreases on average by 0.92 as compared to those enterprises which do participate in neither "Ekub" nor "Edir" and it is statistically significant at 5% level significance. This might be because of the reason similar to "Ekub", but wider than it. It means that those enterprises which participate in both "Ekub" and "Edir" are exposed to larger group and commitment so that they are more efficient. The technical inefficiency of enterprises of which the demand for their product changes seasonally increases by 0.3 as compared to those enterprises of which the demand for their product does not change seasonally and it is statistically significant at 5% level significance. This might be because they are discouraged by the market they lost during the low season. Table 8 presents the estimate of mean efficiency

of sampled enterprises which is about 54.8% with a minimum 5% and a maximum 89.99%. This shows that enterprises are not producing the possible maximum output from their inputs with presently applied technology. One can understand that there is a great gap (45.2%) to raise their output without raising their input on average. The inefficiency score (45.2%) shows sampled enterprises are not using their inputs efficiently.

Table 8: Estimate of Technical Efficiency

	Obs.	Mean	Std. Err.	Min.	Max.
Technical Efficiency	343	.548	.1813597	.0514058	.8998769

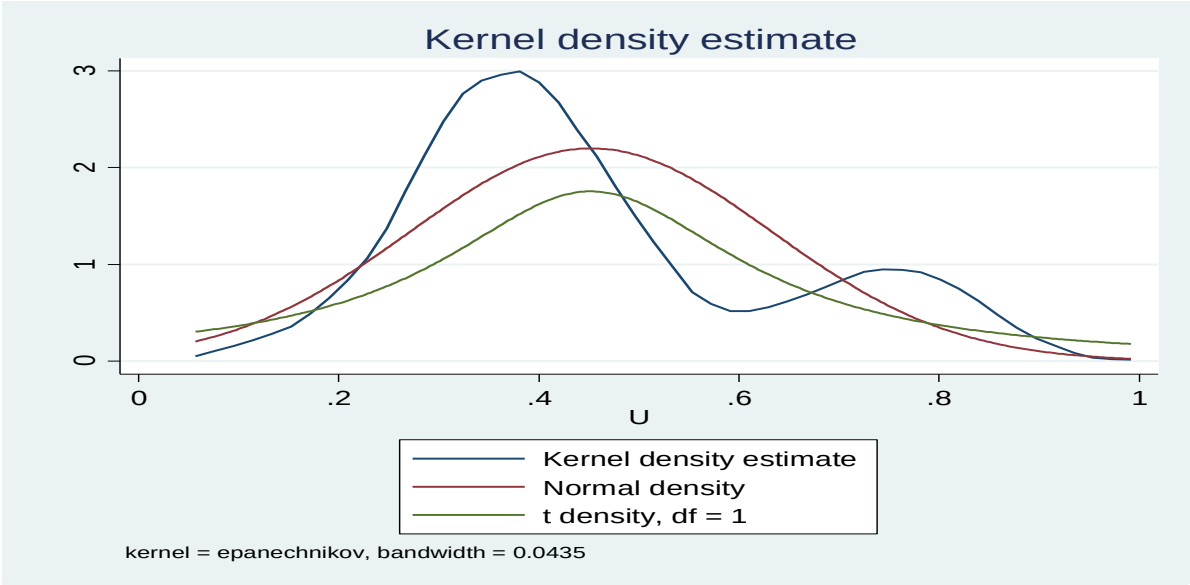
One can see from table 9 that none of the sampled enterprises achieved greater than 90% efficiency score and one sampled enterprises achieved less than 10% of efficiency score.

Table 9: Frequency Distribution of Technical Efficiency for Individual Enterprises

Efficiency Interval	Frequency	Cumulative Frequency	Percentage	Cumulative Percentage
TE < 0.1	1	1	0.3	0.3
0.1 < TE < 0.2	18	19	5.2	5.5
0.2 < TE < 0.3	37	56	10.78	16.28
0.3 < TE < 0.4	19	75	5.54	21.82
0.4 < TE < 0.5	19	94	5.54	27.36
0.5 < TE < 0.6	81	175	23.62	50.98
0.6< TE < 0.7	109	284	31.78	82.76
0.7< TE < 0.8	46	330	13.41	96.17
0.8 < TE < 0.9	13	343	3.8	100
0.9 < TE < 1	0	343	0	100

Kernel Density Estimation for the Half-Normal Distributional Assumption: To separate error component (stochastic) and inefficiency effects in the model, a distributional assumption has to be made for u_i, *Coelli* (1996). Among many empirical works on technical efficiency study, some of them like Battese and Coelli (1996); Coelli (1996); Aigner et al. (1977) show us that technical efficiency can only be estimated if inefficiency effects error term, are stochastic and has a non-negative truncation with truncated normal distributional specification. Accordingly, to check, a kernel density function is drawn in the stata version 13 in Figure 2.

Figure 2: kernel Density



5. Conclusion and Recommendations

Conclusion: In recent decade Ethiopian government set an objective to the rapid structural transformation of the economy (i.e. from Agriculture led economy to industry-led economy). To achieve this objective various policy programs were formulated specifically focusing on Micro and Small-Scale Enterprises so that they are the base for industrial development. However, the rate by which Micro and small-scale manufacturing enterprises have been growing is slower than that of large and medium scale manufacturing industries over the last decade. Besides, previous studies show that the greatest number of Micro and Small-Scale Enterprises are unable to grow and are survival type which cannot provide new employment opportunities. Thus, the researchers are motivated to find out factors that change the level of technical efficiency of Micro and Small-scale Manufacturing Enterprises and recommend appropriate policy action based on finding. The finding from stochastic production frontier shows that output value-added is positively affected by capital input and raw material, but negatively affected by labor inputs used in production.

The finding from the inefficiency model shows that technical inefficiency: is negatively affected by the amount of finance used for initial investment expense; lower for enterprises which received land from the government, participate only in "Ekub", participate in both "Ekub" and "Edir". However, seasonal change in demand for the product is found to make technical inefficiency of enterprises higher. Furthermore, the result from the inefficiency model indicates that the sampled enterprises can increase output value-added by simply improving their technical efficiency. Since the mean of technical efficiency of sampled enterprises is 54.8% substantial increment in output value-added can be made regardless of increment in current amount of resources and improvement in technology used. To test the specification of the model and reliability of results, some tests were conducted. The non-stochastic inefficiency hypothesis with a null hypothesis that the standard deviation of u equals zero is strongly rejected at 1% level of significance in all models (i.e. half-normal distribution, exponential distribution and truncated distribution models). The null hypothesis of no skewness is also rejected at 1% level of significance which supports for a left-skewed error distribution.

Recommendations: The finding of the study identified major factors influencing technical efficiency of Micro and Small-scale Manufacturing Enterprises in selected towns of Jimma zone. Based on the finding of the study the following recommendations are forwarded:

- ✓ It is found in the study that technical inefficiency is lower for enterprises that get land from the government during their startup. Thus, the concerned officials should encourage MSEs by providing land used for the operation of enterprises.
- ✓ The study also found that seasonal change in demand for the product makes technical inefficiency of enterprises higher. Thus, Food Security and Job creation office as well as Trade and Industry office should facilitate market accessibility for the MSEs by linking them with potential demanders of their product/s.
- ✓ It is also found in the study that higher startup capital leads to the higher efficiency of MSEs. Thus, the concerned office should facilitate access of MSEs to sufficient startup capital.
- ✓ Finally, we recommend that MSEs should strength their social capital by participating in "Ekub" and/or "Edir" since it is found in the study that technical efficiency is higher for those who participate in "Ekub", both "Ekub" and "Edir".

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Strategy of Strengthening Food and Beverage Industry in Indonesia

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Abstract: The food and beverage industry has an important role to play in the Indonesian economy. This industry's contribution to the GDP of the non-oil and gas industry reaches almost 34 percent and absorbs a lot of labor. The purpose of this paper is to analyze the strategy of strengthening the food and beverage industry which can improve the performance and competitiveness of Indonesia's food and beverage industry sector. The approach used is a descriptive approach. The results of the analysis show that for some food commodities have a low competitiveness, while the beverage industry which is dominated by soft drinks and alcoholic beverages, Spirits drinks and Beer has an increasing trend. To improve the competitiveness and performance of Indonesian food and beverage products, the government has carried out several policies, but not yet optimal. The strengthening effort that must be made by the Government is to increase exports to non-optimal markets (Untapped Market Countries). In addition, for the development of small and medium industries, the industrial sector also needs fiscal incentives as well as increased industrial technology capabilities.

Keywords: *Strengthening the food beverage industry, Competitiveness, Export performance.*

1. Introduction

The food and beverage industry currently has a significant contribution to the Indonesian economy. In recent years the growth and investment value of this sector has continued to increase. The contribution of food and beverage to the Gross Domestic Product (GDP) of non-oil and gas industry reached 33.6 percent in the third quarter of 2016. In 2016 the food industry experienced growth of 6.95 percent, and contributed, 4.73 percent to GDP. This industry also contributed to exports of USD 456.6 million, absorbing a workforce of more than 4 million people. In fact, the Indonesian food and beverage industry has the opportunity to win competition in the Asean Economic Community (AEC) region through cooperation between the Government and industry to improve competitiveness (Ministry of Industry, 2017). The growth of the food and beverage industry was largely due to the realization of new investments, an increase in people's purchasing power, and the growth of Indonesia's population with an average of 1.49 percent per year in the last 10 years (Statistics Indonesia, 2018). Indonesia, as the world's fourth most populous country and growing middle class, has increasingly attracted the food and beverage market. However, going forward, the challenges and obstacles of the Indonesian food and beverage industry will continue to increase. At present, with the entry into force of the free market of the Asean Economic Community (AEC), the competition of the food and beverage industry among ASEAN countries has become tighter. Therefore, Indonesia's food and beverage industry needs to strengthen competitiveness so as to create a healthy business climate.

Besides that, mutual cooperation between ASEAN countries is needed as well by striving to create a conducive, business climate. Global Competitiveness Report Index Data 2016-2017 Ranking, Indonesia's competitiveness is ranked 41 out of 138 countries. This ranking is below Singapore which is in position 2, Malaysia position 25, and Thailand is in position 34. In the food and beverage industry, among ASEAN countries, the main competitors are Thailand and Malaysia (WEF, 2017). The food and beverage industry sectors of the two countries are well integrated, starting from raw materials to post-production. Thailand, currently has implemented facilities and infrastructure of its food and beverage industry by making industrial clusters so that the economies of scale of Thai products become larger. The growth of the food and beverage industry in this country is very rapid this is due to the habits of the Thai people who prioritize the consumption of food products and beverages that are more natural, varied, and hygienic. The performance of the food and beverage industry in Indonesia continues to increase at this time, but there are several major problems in this sector. Among others, investment opportunities that have not been optimal, have not been integrated between the upstream and downstream sectors of the food and beverage sector, tighter competition among ASEAN countries and opportunities for the fulfillment have not been met; fulfill domestic

and foreign food and beverage demand. Therefore, it is necessary to conduct a study to find out the strategy of strengthening the Indonesian food and beverage industry among ASEAN countries.

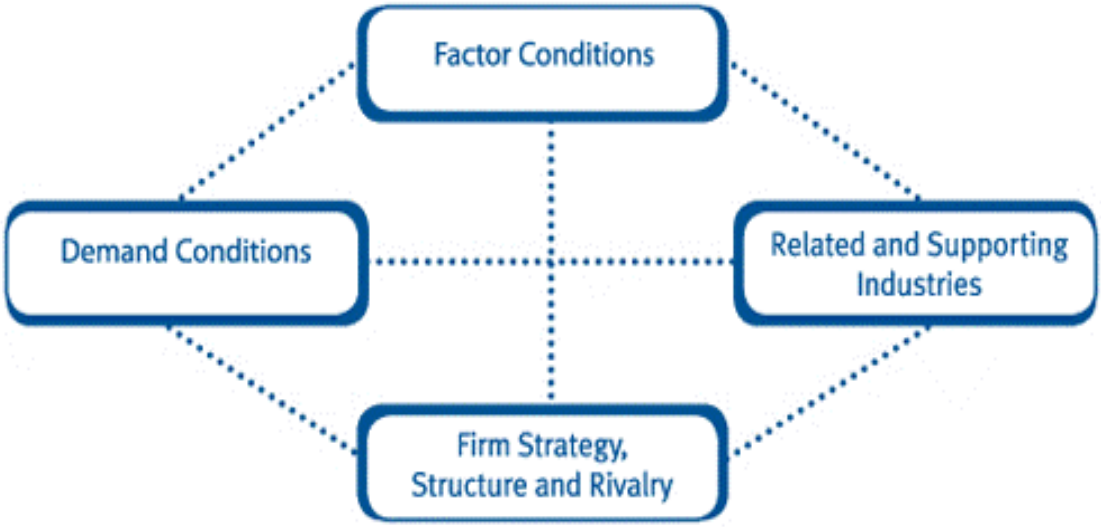
2. Literature Review

Basically the food and beverage industry is divided into the food industry and beverage industry. The food industry is currently growing but not as fast as the growth of the beverage industry. The prospect of the beverage industry currently still has challenges and opportunities, especially in the Southeast Asian markets (Perumal, 2017). In addition to competition between manufacturers, competition also seizes markets or consumers. As stated by Richard Haffner. According to him, based on consumer habits of consuming soft drinks, it is divided into several consumer groups, including:

- The growth of consumption of soft drinks is currently saturated, especially in the markets of developed countries such as North America, Western Europe and Australia.
- Growth in consumption of soft drinks in developing countries (Developing Market Countries) such as East Europe and Latin America which have reached 70 percent of the level of consumption in the Developed Market Countries.
- Growth in consumption of soft drinks in countries that have not been utilized optimally (Untapped Market Countries) such as countries in the Asia Pacific, Africa and countries in the Middle East region which currently have relatively large potential because only 10 percent of all drink needs.

If you see the amount of consumption per capita per year in the three soft drink product market areas, it can be seen that for untapped soft drinks, the potential for market penetration is still large, because it is only around 10 percent. This area is still dominated by tap water and branded bottled water. For milk / dairy drinks, it is still relatively small. Likewise hot drinks. For the market area of developing markets countries, tap water and branded still dominate, soft drinks also continue to increase including milk / dairy drinks and hot drinks. As for the developed market countries, the soft drinks market has reached a saturation point, as well as tap water and branded, milk (dairy drinks) and hot drinks. The concept of competitiveness is widely used to measure the superiority of a country's products against competitors. A country is said to have competitiveness or competitive advantage over its countries if the country has a greater market share than its competitors (Wibowo, 2010). Competitiveness can be interpreted from the demand and supply side. The demand side means that the product being marketed must have attributes that are in accordance with the demands and desires of consumers. While from the supply side is the ability to compete by responding to changes in product attributes that are demanded or desired by consumers. The concept of competitive advantage was developed by Porter (2008), starting from the reality of national trade. According to Porter, there are 4 main factors that determine competitiveness, namely the first condition factor. In addition, demand factors are related to competitive supporting industries, as well as structural conditions, competition and industry strategies. There are two factors that influence the interaction between the four factors, namely opportunity and government factors. The relationship of these factors together form a system in increasing competitive advantage called Porter's Diamond Theory. This system can be seen in Figure 1.

Figure 1: Porter's Diamond Theory



Source: Porter's Diamond Model, https://kfknowledgebank.kaplan.co.uk/porters-diamond-model-

In the factor conditions, a nation's resources are a very important production factor in order to win the competition. Demand conditions greatly affect the determination of competitiveness and quality of demand. While the existence of related and supporting industries affects global competitiveness. In order to maintain and maintain competitive advantage, it is necessary to maintain and always coordinate with suppliers to maintain the value chain. In the factor of firm strategy, structure and rivalry, the existence of reliable local competitors is the driving force to put pressure on increasing competitiveness. Likewise, strategies that can strengthen competitiveness in order to improve the performance of the Indonesian food and beverage industry must also be sought. The structure of the company and industry will determine competitiveness by making improvements and innovations.

3. Research Method

In this study a qualitative descriptive approach is used, which emphasizes more on the discussion by means of strategies for strengthening the Indonesian food and beverage industry. This approach aims to explore and illustrate the performance and strategies that can be taken to strengthen the competitiveness of the Indonesian food and beverage industry in the international market. Sources of data and information used are data from Statistics Indonesia (Central Statistics Agency), the Ministry of Industry, the Ministry of Trade, Food and Beverage Association and various relevant data sources.

4. Results and Discussion

Indonesian Food and Beverage Industry Performance: Several industrial sectors in Indonesia experienced quite high growth, one of which was the food and beverage industry sector. This industry opportunity is huge. In the future, this industry will become a mainstay for increasing aggregate economic growth in Indonesia. This can be seen from the trend of the contribution of the food and beverage industry to the national GDP. The highest growth in the non-oil and gas industry sector in 2015 was achieved by the Metal, Computer, Electronic, Optical and Electrical Equipment sectors with a growth of 7.83 percent. Then followed by the Food and Beverage sector with a growth of 7.54 percent. While the Machinery and Equipment Industry sector grew by 7.49 percent, as well as the Chemical, Pharmaceutical and Traditional Medicine sectors, which grew by 7.36 percent (Statistics Indonesia, 2018). The food and beverage industry sector currently has an important contribution to the Gross Domestic Product, especially the non-oil and gas industry sector. The contribution of the pharmaceutical industry (including the tobacco processing industry) to the GDP of the non-oil and gas industry in the third quarter of 2015 was 31 percent. While the growth rate

of the food and beverage industry in the third quarter of 2015 reached 6.95 percent or higher than the growth of the non-oil and gas industry by 5.21 percent and GDP growth of 4.73 percent. The food and beverage industry in 2016 also experienced growth of between 7.4 - 7.8 percent. The business opportunities for the food and beverage industry are still quite large. From the data on the achievement of the following types of food there are several items that have high prospects. For the top five food products in the Asia Pacific region, many are dominated by Grain Mill Products, such as bread made from wheat.

Then the second, is vegetable and animal oil (vegetable and animal oil and fats). Third, is meat and meat products. Whereas number four and five are coffee, tea, spices and ready-to-eat food (coffee, tea, spices, and ready meals) and pet food (Pet food and animal feeds). In addition to the above products, judging from the development and achievement of food products in the Asia Pacific, fish and fish products. This opportunity for Indonesia is very large because of many factors. Aside from Indonesia, it has a vast sea resources and also a large potential source of terrestrial fish. Besides many biological sources that are currently not widely exploited. Especially for capture fisheries the potential of fisheries in Indonesia is very abundant which is expected in the future to be the leading sector of the national economy. For that potential must be utilized optimally and sustainably. Opportunities for development of the Indonesian fisheries business have very high prospects. Potential marine and fishery resources that can utilized is estimated to reach more than USD 82 billion per year. (D.S. Maradong, 2016) Not including the potential of products from fish and products from fisheries and marine resources such as seaweed. Other achievements of the Asia Pacific food industry are vegetable products, potatoes and fruits. The potential of food products such as fruits in Indonesia is also very high. Research shows that Indonesian fruit commodities tend to have competitiveness for products based on low technology and based on natural resources. The results of this study found that Indonesia has a low level of competitiveness in the export of five fruit commodities, namely pineapple, papaya, banana, mango, and orange, indicated by the total Revealed Comparative Advantage (RCA) which is still below one.

Indonesia has an average RCA for exports of the five lowest fruit commodities compared to Malaysia, the Philippines and Thailand (Hanani et al, 2009)**.** The beverage industry for the Asia Pacific region for the years 2015-2016 is dominated by soft drinks and alcoholic drinks, which value reaches more than 200 billion US dollars. Third, Spirits drinks while Beer ranks fourth. The population of Indonesia, which amounts to more than 250 million people at present, turns out that the level of Indonesia's soft drink consumption is the lowest compared to ASEAN countries. For carbonated drinks, 33 liters per capita per year, while bottled water is 53 liters per capita per year, and other drinks are lower. This makes a big opportunity for the beverage industry because of the low consumption of soft drinks in Indonesia. Compare Thailand with 89 liters per capita per year, Singapore 141 liters per capita per year, Philippines 122 liters per capita per year. In 2016 Indonesia set a target of 100 liters per capita per year for the average soft drink. If Indonesia's population growth in 2016 reaches more than 250 million people, the target of the soft drink industry is to consume 25,250 million liters per year (Ministry of Industry, 2016)**.** One of the industrial sectors that can be a mainstay of Indonesia in the future and still has the prospect of being developed is the food and beverage industry. Enforcement of the Asean Economic Community (AEC), Indonesia is required to have a domestic competitive food and beverage industry so as not to become a market for neighboring countries.

This is because it is supported by abundant and quite potential natural resources from the agriculture, fisheries, marine, livestock, plantation and forestry sectors. For this reason, a strong commitment from all stakeholders is needed in supporting these strategic steps, such as increasing product standards through the application of SNI, improving the quality of human resources through the application of the Indonesian National Work Competency Standards, accelerating infrastructure development, and developing research and development (R&D). It also needs to increase the use of domestic products, harmonize central and regional policies, and simplify the licensing and investment bureaucracy. There needs to be closer cooperation in increasing the competitiveness of the domestic industry. To increase the competitiveness of the food and beverage industry it can be formed from quality products and a business climate that favors growth. Development of the food and beverage industry is very meaningful for the community, because it is not only useful to meet the needs of processed foods and beverages in the country, but also plays an important role in increasing the added value of primary agricultural products. Therefore, the food and beverage industry will also be able to become the main driver of the economy in various regions in Indonesia and encourage the growth of related industries. Also important is the conducive investment climate needed to encourage the

food and beverage industry sector in Indonesia. At present there are several multinational companies that invest in the food and beverage industry sector in Indonesia. One of them is investors from European countries who invest specifically in food beverages in Indonesia, which include:

Table 1: Investors in European Food Beverages in Indonesia

No	Country	Company	Procuct/Business
1	France	GroupeDanone, Mane	Food products and flavored products
2	Ireland	Kerry Group	International supplier of good ingredients and flavour
3	Italy	Perfetti Van Melle	Biscuit product (*Confectionery manufacturer*)
4	Netherlands	Unilever, Friesland Campina, Kievit, DSM,	Multinational consumer goods company, Dutch milk cooperative (*dairy cooperative*),food ingredients, multinational life sciences and materials sciences-based company, his global end markets include food and dietary supplements, personal care, feed, pharmaceuticals, medical devices, automotive, paints, electrical and electronics, life protection, alternative energy and bio-based materials.
5	Sweden	Tetra Pak	Multinational food packaging and processing company
6	German	BASF	Food products (*food ingredients*)
7	Denmark	DuPont Danisco A/S	Food products, enzymes, and bioproducts
8	Switzerland	Firmenich	Flavoring products

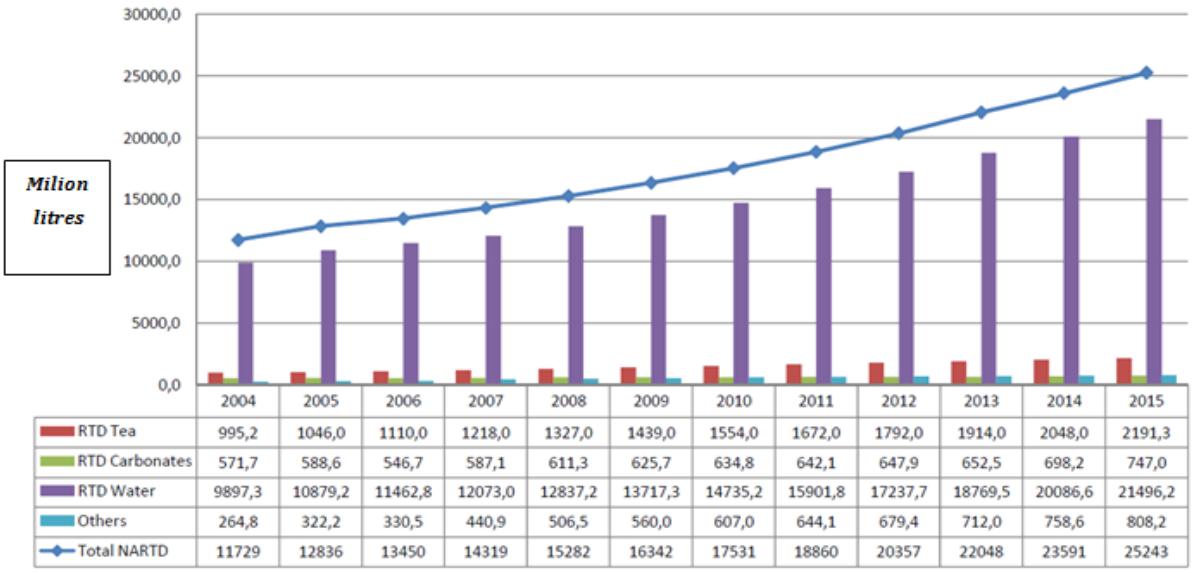
Source: Richard Haffner, Euromonitor, 2010

Investments from companies above only produce food and beverages that already have international brands. But local companies have not been able to enter the international market. Therefore, the challenges and opportunities are besides increasing investment in the food and beverage sector in Indonesia, as well as strengthening the competitiveness of the food and beverage industry in Indonesia. The results and findings can be seen that the competitiveness of Indonesian food and beverage products still needs to be improved in order to win competition in the current era of globalization. One of them is an increase in efficiency and quality which still needs serious attention (Adji Ardi, 2012). The government has basically tried to take steps and strategies to increase the competitiveness of the food and beverage industry. There are 10 strategic programs, among others, namely: (1) Ensuring the availability of quality raw materials, quantity and continuity through coordination with relevant agencies and partnerships and integration from the upstream and downstream sides supported by adequate infrastructure; (2) Preparing skilled and competent human resources in the food and beverage industry through industrial training and mentoring; (3) Enhancing the mastery and development of food industry technology innovation through integrated research and development. Furthermore, (4) Increasing the efficiency of processing and product quality assurance through the application of Good Hygiene Practices (GHP), Good Manufacturing Practices (GMP) and Hazard Analysis and Critical Control Points (HACCP), certification of Indonesian National Standards (SNI) and halal, certification other qualities, as well as assistance in processing food and beverage products / machinery; (5) Coordinating the development of logistics systems to improve.

The efficiency of production and distribution of food and beverage products; (6) Facilitating the release of Value Added Tax (VAT) on the processing of food and beverages with small added value. Seventh (7), Facilitating access to competitive financing for small and medium scale food and beverage industries; Eighth (8) Increasing international industrial cooperation for technology transfer, increasing investment and mastering export markets; Ninth (9) Promote and expand the market for food and beverage industry products at home and abroad; and Tenth (10) Facilitating Small and Medium Enterprises (SMEs) in the framework of implementing halal labels. Next to the program, the food and beverage industry still has challenges to be faced, especially for food and beverage businesses. On the side of raw materials, the supply of

sugar and salt is needed a long-term solution so that business people get the certainty of the supply of sugar and salt, considering that the two ingredients are still partially imported which will increase production costs. On the other hand, in the future we will continue to strive to reduce logistics costs which have so far been inefficient. Some of the proposals for the establishment of the Bonded Logistics Center will soon be realized to help the mamin industry fulfill its raw material needs by purchasing vendors' raw materials or rescuers in the Bonded Logistics Center. At present in Indonesia, the performance of some soft drinks includes (1) bottled drinking water drinks that have a market share of 84 percent, (2) carbonated soft drinks, have a tendency to stagnate, both because of many other beverage choices, and because of issues health problems due to consuming carbonated drinks, the market share is 3.6 percent. If you see the growth trend of fast food soft drinks in Indonesia in the form of RTD (Ready to drink) Tea, RTD Carbonates, RTD water, and others (Others) can be seen in Graph 1 as follows.

Graph 1: Fast Food Soft Drink Growth



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
RTD Tea	995,2	1046,0	1110,0	1218,0	1327,0	1439,0	1554,0	1672,0	1792,0	1914,0	2048,0	2191,3
RTD Carbonates	571,7	588,6	546,7	587,1	611,3	625,7	634,8	642,1	647,9	652,5	698,2	747,0
RTD Water	9897,3	10879,2	11462,8	12073,0	12837,2	13717,3	14735,2	15901,8	17237,7	18769,5	20086,6	21496,2
Others	264,8	322,2	330,5	440,9	506,5	560,0	607,0	644,1	679,4	712,0	758,6	808,2
Total NARTD	11729	12836	13450	14319	15282	16342	17531	18860	20357	22048	23591	25243

Source: Euromonitor is processed by ASRIM (Soft Drink Industry Association), 2016

The assumption of a minimum growth rate without considering the level of innovation both in type, packaging, brand and price. When the beverage industry is categorized into 4 major groups, namely RTD (ready to drink) tea, RTD Carbonates, RTD Water and other beverages, the growth of this industry has an increasing trend. Until 2015 the total RTD was 25,243 million liters. When compared to Indonesia's population of 250 million, Indonesia's per capita RTD reaches 100 liters per capita per year (Poeradisastra, 2012).

Efforts to Strengthen the Food and Beverage Industry in Indonesia: The optimism of the export performance of Indonesia's food and beverage industry will continue to improve. This belief was driven by projections of improvement in the global economy and the Asean region which made the food and beverage manufacturing industry move positively as well as increasing domestic production. Some efforts that can improve the performance of national food and beverage include the following:

- The need for small and medium industry development programs including the food and beverage industry. The efforts in this program are in line with policies and programs for Empowering Cooperatives and Micro, Small and Medium Enterprises. The related programs are mainly the Entrepreneurship Development Program and SME Competitive Advantages. The purpose of this program is to make small and medium industries as the national industrial base.

- The need for programs to improve the technology capabilities of the food and beverage industry. The purpose of this program is to improve the ability of the industry to create, develop, and apply knowledge both in the commercialization of R & D results, the design of new products, and the production process in the food and beverage sector. In order to encourage the food and beverage industry, it requires the development and application of process technology, product and design technologies, the main activities of the government in the future include: 1. Increasing the support of industrial technology discovery and development activities in the form of tax incentives, technology insurance especially for small businesses , middle, and cooperative; 2. Encouraging the development and utilization of production management that takes into account the balance and carrying capacity of the environment, as well as environmentally friendly production techniques (clean production); 3. Expansion of the application of manufacturing industry product standards that is in compliance with international standards 4. Increasing the capacity of the institutional network for measurement, standardization, testing, and quality (MSTQ / measurement, standardization, testing, and quality) 5. Development of technology-based industrial clusters and 6 Revitalizing R & D policies and institutions in the production sector to be able to accelerate the effectiveness of partnerships between industrial R & D and government R & D institutions; and optimize the utilization of national technology resources spread across various government R & D, universities, private institutions, and individual experts.
- The need for a structuring program for the structure of the food and beverage industry. The aim is to improve the structure of the national food and beverage industry both in terms of market control concentration, and a network of suppliers of raw materials and supporting materials, components, and intermediate goods for downstream industries. In the initial stages of national industrial development, industrial resources and industrial entrepreneurship are still very scarce, so national policies really need to improve monopolistic practices.
- The need to increase the infrastructure capacity of the food and beverage industry. This is done in order to anticipate increased capacity utilization, growth of new investment, the spread of food and beverage industry activities both in Java and outside Java, and to increase the production base of this sector usually in rural areas, so that the acceleration of infrastructure development becomes very important.
- To strengthen the structure in facilitating the establishment of a network of downstream industry suppliers, the government immediately implements key activities which include: 1. Development of production potential information systems from supporting industries and the pharmaceutical industry; 2. Encouraging the establishment of supporting industry partnerships with the food and beverage industry; 6) Continuing to develop supporting industries in the food and beverage industry; 4. The need for institutional capacity strengthening of skilled industrial labor providers, especially in accordance with the needs in the food and beverage industry; 5. Facilitating the development of food and beverage industry cluster infrastructure, especially the food and beverage industry technology infrastructure, and 6. Facilitating and coordinating the development of food and beverage industry cluster growth centers outside Java, such as the Eastern Indonesia Region.
- The implementation of administrative optimization and tax incentives. Efforts to stimulate an increase in the production base, productivity and investment in the food and beverage industry sector are highly dependent on the government's commitment to facilitate business efficiency. Especially related to the role of facilities and public service providers, especially efficient taxation. Development program programs that have close links with increasing State Finance Receipts include organizing tax reforms and customs reforms, as well as the Financial Institutional Development Program which has steps to provide support for increasing SME lending in the food and beverage industry and sectors. other supporting sectors.
- To encourage an increase in the performance of Indonesian food and beverages, one of them is to provide market access to the food and beverage manufacturing industry to non-traditional markets. The market in question is potential country markets such as markets in Developing Market Countries like Latin America and Eastern Europe. These countries still need food and beverage manufacturing products. Besides the markets in countries that have not been utilized for the marketing of food and beverage manufacturers (Untapped Market Countries) such as countries in the Asia Pacific, Africa, countries in the Middle East region have great potential due to the volume of soft drinks when this is

only 10 percent of the total beverage needs. Especially for the non-traditional Middle Eastern market, market opportunities to enter this area include quality products and have obtained a "halal" label.

- Other support is the provision of investment incentives (tax holiday, tax allowance), raw material supply facilities, and infrastructure development in supporting connectivity to improve the effectiveness and efficiency of distribution of raw materials and manufactured products. Some things need to be addressed include logistical infrastructure, port capacity, logistics cost policies, national energy policies such as fuel oil, gas, basic electricity tariffs, and others.
- Re-synchronizing regulations related to the overlapping food and beverage industry. Likewise, regulations that are in the process of change also consume a lot of time and energy. Such regulations regarding Draft Government Regulation on Waste Management, Hazardous and Toxic Waste, Halal Product Guarantee Bill, Draft Bill on Pharmaceutical Supply Control, Medical Devices, Household Health Supplies and Processed Food (Food has been issued), and discourse on imposition of excise on carbonated beverages.
- Realizing the ASEAN countries' agreement with China, forming the ASEAN-China Food Industry Cooperation Committee in the food and beverage industry sector which was agreed in Kunming China on June 6, 2014 which was held by the 5th ASEAN-China Industry Cooperation Kunming Conference including the establishment of the China ASEAN Business Association (CABA) which aims to facilitate the business world, as well as provide consultation and complete information about food and beverages.

5. Conclusion and Recommendations

Opportunities for the performance of the food and beverage industry have the potential to continue to improve. The growth of other drinks that tend to go up is Isotonic Drinks, Fruit Juice Drinks and other drinks with fruit flavor (Kemenperin, 2012). This belief is driven by projections of an improving global economy that makes the food and beverage manufacturing industry move positively and increase domestic production to be able to compete with fellow Asean countries. To improve the export performance of Indonesian food and beverage products, it still has market opportunities. These markets include markets in countries that have not been utilized for marketing of food and beverage manufacturers such as developing countries, countries in the Asia Pacific, Africa, countries in the Middle East that have great potential. because the volume of soft drinks (ready-to-eat) currently only reaches 10 percent of the total beverage needs. Especially for the non-traditional Middle Eastern market, the market opportunity to be able to enter this area is in addition.

To the need for quality products as well as food and beverage products labeled "halal". To realize the strengthening of the competitiveness of food and beverage products while increasing the performance of the Indonesian food and beverage industry, it turns out that the government has carried out many policy steps, but in its implementation it has not been optimal. Some steps and efforts made include the development of small and medium industries in the food and beverage industry sector through increasing the technological capabilities of the food and beverage industry. Another step is to improve the structure of the food and beverage industry both from upstream to downstream, including in terms of concentration of market control and supplier network of raw materials, supporting materials, components, and semi-finished goods. In addition, continued administration optimization, investment and tax incentives in the food and beverage industry such as tax holiday, tax allowance, also synchronized various regulations related to the food and beverage industry sector.

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