



Full length article

A Comparative Analysis of the Conditions Necessary for Derivatives Markets in Botswana and Zimbabwe

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ABSTRACT

The study investigates the conditions necessary for derivative markets in Botswana and Zimbabwe. The study employed mixed method research based on convergence design. 762 respondents from the financial markets of both countries took part in the study. Stratified sampling and purposive sampling were used in selecting participants and respondents to the study. The study involved hypothesis testing using AMOS to run Structural Equation Modelling. A model was invented that fits the data provided in the study. The qualitative part of the study revealed liquidity requirements, existence of foreign subsidiary, foreign trade, financial distress, leverage, derivatives regulations and financial development as the conditions necessary for derivatives market to flourish in Botswana and Zimbabwe. The study further uncovered that the main forms of derivatives used in both countries were employee stock options, futures, simple forward contracts, currency swaps and options. In addition, lack of liquidity, profitability concerns and derivative aggravated risks were observed as challenges to the institutionalization of derivatives markets in both countries. The model invented for the study displayed that derivative markets are significantly and positively correlated with investors' financial awareness and the level of financial regulations. In addition, the new model created manifested that derivative markets are significantly and negatively correlated with firm specific performance as measured by financial performance. Therefore, market makers are encouraged to develop derivative markets in line with the global derivative markets regulatory reforms and focus more on providing a wholesale variety of derivative products that are appealing to the local markets. This paper helps policy makers in guiding strategic actions towards global integration of derivatives markets and implementation of rigorous derivatives regulations reforms.

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1. INTRODUCTION

The study explored the conditions necessary for derivative markets in Botswana and Zimbabwe. Derivative market consists of regulated exchanges as well as over the counter markets. Regulated markets for derivatives

are those where standardized products are traded on a physical derivative marketplace whilst over the counter derivatives markets are where unregulated derivatives are traded in the financial markets.

The common derivative products that are traded globally are forward contracts, futures contracts, options and swaps. Derivatives are useful for hedging against losses resulting from price volatilities in the markets.

Derivative dealings in Botswana predominantly takes place over the counter involving commercial banks, non-banking financial institutions and companies that are listed on the Botswana Stock Exchange (BSE). Some companies listed on the BSE trade employee stock options and others do not. Most commercial banks in Botswana use credit default swaps (CDS), currency swaps, currency options, simple forward contracts and futures contract.

In Zimbabwe trading of derivatives takes place both on over-the-counter market and on a trading platform for derivatives institutionalized by Financial Securities Exchange (FINSEC). Derivative contracts such as employee stock options, simple forward contracts and currency swaps take place on the over-the-counter market whilst most complex derivative dealings occur on FINSEC's derivative trading platform. In Zimbabwe the participants in derivative trading are mostly commercial banks and companies listed on the Zimbabwe Securities Exchange Commission (ZSEC).

Conditions necessary for derivatives markets

IOSCO (1994) identified ten factors that are important in promoting the development of derivatives markets that included the presence of appropriate: clearing and settlement system, market infrastructure, economic conditions, financial infrastructure, timing of market development, knowledge of derivatives, legal and regulatory framework, international participation, skilled personnel and financial integrity.

International Swaps and Derivatives Association (ISDA)(2022) proposed that emerging countries must adopt the G20 derivatives reforms that were developed in response to the 2007/2008 global financial crisis to protect the financial markets from impairment and contagion risk. The G20 global derivatives reforms proposed five major commitments to emerging countries that included: mandatory margin requirements for non-cleared derivatives; clearing of standardized OTC derivatives through central counterparties (CCPs); trading of cleared, standardized derivatives on electronic platforms, where appropriate; mandatory reporting of derivatives trade information to regulators; and higher capital requirements for non-cleared derivatives.

Financial Conduct Authority (FCA) (2025) asserted that to operate in an effective way, the rules that apply to commodity derivatives markets must be proportionate to the risk they intend to mitigate. It further proposed a simplification of the regime by applying position limits and related requirements to a narrow set of critical contracts for which disorderly trading would have the largest impact on the users of markets. The effect of the proposal would result in excluding most commodity derivatives from position limits thereby curtailing unnecessary costs to firms and align with the best international practices.

Problem statement

The global financial crisis of 2007–2008 caused systemic risk to spread, affecting all financial markets globally. The use of unregulated derivatives products by large financial institutions caused systemic risk resulting in the disruption and impairment of the global financial system. The global financial crisis forced the implementation of global derivative financial reforms, which are presently being carried out by most countries in the world (Menon, 2018). Nonetheless, Botswana and Zimbabwe have not yet fully implemented these reforms and continue to utilize unregulated derivatives including forward contracts, currency swaps, interest rate, and credit default swaps. Recently Zimbabwe institutionalized a derivative trading platform, but derivative trading has not flourished in the country. In comparison Botswana has not yet established a regulated derivatives markets and traders continue to use over the counter derivatives products. The heavy reliance on over-the-counter derivatives in Zimbabwe caused some banking institutions to collapse (Chikoko, 2004). Thus, Botswana and Zimbabwe's non-compliance with the global OTC derivative market reforms could lead to the disruption and significant impairment to the financial systems in either nation or beyond the region. Therefore, the main objective of the study is to determine the conditions necessary for the derivatives market in Botswana and Zimbabwe to flourish.

Research questions

The research questions for the study were:

1. what are the necessary conditions for derivative markets in Zimbabwe and Botswana to flourish?
2. what are the forms of derivatives available in Zimbabwe and Botswana?
3. What are the challenges of adopting derivatives trading in Botswana and Zimbabwe?
4. What are the market factors influencing the adoption of derivatives in Zimbabwe and Botswana?
5. What are the investors' specific factors affecting the adoption of derivatives trading in Zimbabwe and Botswana.

Research hypothesis

The research hypothesis for the study consists of three null hypotheses and three alternative hypotheses as follows:

1. H0a: Derivative market is not positively and significantly correlated with investors characteristics in Botswana or Zimbabwe:
2. H0b: Derivative market is not positively and significantly correlated with market factors in Botswana or Zimbabwe:
3. H0c: Derivative market is not positively and significantly correlated with firm specific factors in Botswana or Zimbabwe.

Significance of the study

The research intends to inform investors, both individual and institutional, and other critical stakeholders in the financial markets, about the conditions necessary for derivatives markets to flourish in Botswana and Zimbabwe. In addition, the study's significance lies in its exploration of the types of derivatives utilized by investors in Botswana and Zimbabwe. The research is essential because it will promote Botswana and Zimbabwe's derivative

markets to flourish and nurture global financial markets derivatives integration. Financial markets and derivatives markets policymakers, derivatives self-regulation groups, and other relevant parties who are actively trading in the financial markets of both countries would immensely benefit from the study in promoting sustainability, liquidity and credit maturity transformation in the markets.

This research contributes significantly to the scant derivatives literature review prevailing in Zimbabwe and Botswana concerning the necessary conditions for derivative markets to flourish. The study will inevitably evoke the allocation of resources by policy makers towards derivatives capital market development. The channelling of resources towards the institutionalisation of derivatives trading would ensure the completeness of the financial markets and the ultimate protection of the individual investors and the financial markets from financial impairment and systemic risk build ups.

Scope of the study

Exploring the conditions necessary for derivatives markets to flourish in Zimbabwe and Botswana was the primary goal of the study. This included exploring the market characteristics and investors' specific characteristics that affected the adoption of derivative trading. The challenges that investors in the two nations face were examined in the study. Forms of derivatives traded in both countries were investigated. The sampling frame of the study was based on policymakers, individual investors, accountants, chief financial risk officers of financial and non-financial firms, banks, stockbrokers, asset management firms, insurers, pension funds, and financing companies operating in the Zimbabwe and Botswana markets. The research's conceptual framework was based on a functional perspective centered on the roles that derivative markets play in the country (Merton & bodie, 1995). The study was not based on the institutional perspective but rather on functional perspective of providing risk management functions through the institutionalization of derivative markets in the two countries. In summary, the institutions that make up the financial markets in both countries were not as important as the functions of derivative markets (Merton & Bodie, 1995). The methodological scope of the research was based on mixed method research and pragmatist research paradigm.

Research aims/objectives

1. To ascertain the conditions necessary for derivative markets in Botswana and Zimbabwe to flourish:
2. To investigate the forms of derivatives that are available in Botswana and Zimbabwe.
3. To examine the challenges of adopting derivatives trading in Botswana and Zimbabwe.
4. To determine the market factors influencing the adoption of derivatives trading in Zimbabwe and Botswana.
5. To explore the investors' specific factors affecting the adoption of derivatives trading in Zimbabwe and Botswana.

2. LITERATURE REVIEW

2.1. Conditions necessary for derivative markets.

Politics and regulation, according to Samarakoon (2023), are major factors in encouraging the expansion of the derivatives markets. It was demonstrated that the main variables influencing the expansion of the derivatives

market were liquidity, volatility, and the size of the underlying market. The study concluded that policy uncertainty, interest rate spreads, ease of doing business, and inflation were the main factors affecting the growth of derivatives markets. The survey covered the Middle East, Europe, Africa, and America. Pooled regression analyses using logit and panel data comprised the empirical review that formed the basis of the work.

Stelmakh and Prykaziuk (2022) acclaimed that the primary barriers impeding the growth of the derivatives market in Ukraine were speculative market conditions, a deficiency of exchange infrastructure, insufficient legal and regulatory backing, and unstable political situations. The necessity for Ukraine's financial sector to change was also emphasized in order for derivatives to grow and meet EU regulations.

Al Janabi (2021) noted that most developing nations rushed the construction of derivatives markets despite their inadequate infrastructure purely to compete with their neighbors. It is also emphasized that incompetent policymakers and a lack of knowledge have aided in the premature development of opaque and ineffective derivative markets, which would eventually give rise to abusive practices and other forms of market misconduct (ibid).

Prokhorova (2020) proclaimed that one of the requirements for derivatives markets is financial and economic stability, which can only be ensured by stronger legislative support. Furthermore, it is emphasized once more that stock consolidation is a necessary condition for the development of derivatives markets, which is accomplished by integrating domestic and international stock markets (ibid). An analytical market review as well as an empirical review were used in the study.

Gandr 1et al. (2020) postulated that banks in the US moved 70% of over the counter (OTC) derivatives trading volumes overseas once the derivatives reform was enacted early on, particularly to less regulated countries. The requirement for central clearance of all OTC derivatives, which proved to be extremely expensive for banks, was what ultimately prompted the move (ibid).

A commodity exchange cannot continue to operate in the wake of a hostile government, as stated in the guidebook on African commodities and derivatives exchanges. Governments should be involved in commodity initiatives as minority shareholders rather than as the exchange's principal creator or promoter. The government should not decide on the products that should be exchanged on the exchange, it is further emphasized (Mezui et al., 2013).

A survey of a sample of 39 investment firms in Kenya identified consumer protection legislation (45%), legal and regulatory frameworks (46%), regional integration of financial markets (65%), financial innovation (82%) and risk management (78%) contributed to the growth of derivatives in Kenya. Open-ended and closed-ended questionnaires were the primary data collection instruments employed in the research (Bowen et al., 2017).

2.2. Forms of derivatives

Options, forwards, futures, and swaps are the four categories of derivatives transactions that players in the derivative market typically refer to, according to Cleartax (2022). A put and call option were the two classifications for an option contract given by the Chicago Mercantile Exchange (CME) (n.d.). As per CME (n.d.), a call option is characterised as the entitlement to purchase an underlying product at a fixed price, whereas a put

option is considered as the right to sell an underlying product at a predetermined price. CME (n.d.) emphasized even more how important it is to properly match the contract's terms to the intended financial strategy and objectives before beginning to trade options.

A forward contract, according to Nasdaq (n.d.), is a contract that details the amount and price of an asset to be delivered later. Furthermore, according to Nasdaq (n.d.), forward contracts are not standardized and are not exchanged on formal exchanges.

A futures contract is a legally binding agreement to buy or sell a standardized asset on a specific date or during a specific month, according to CME (n.d.). Moreover, a futures transaction is facilitated through a futures exchange. These two factors are what set a futures contract apart from a forward contract. Furthermore, because futures contracts are exchange traded and standardized, CME (n.d.) considered them to be essential for dealers, investors, consumers, and producers of commodities. A swap contract, according to CME (n.d.), is an arrangement between parties to exchange cash flows over time.

The use of derivatives in 692 non-financial firms listed in 20 African countries was examined by Holman et al. (2013). According to the findings, only 201 businesses in Africa use derivatives, and 166 of those businesses are located in South Africa. OTC options and futures (4.9%), Exchanges (25.6%), and OTC futures (55.2%) are the most commonly used. According to the survey, African businesses would rather hedge their commodity price risk with options than futures. The industrial sector is recognized as the largest user of derivatives (41%), followed by the service sector (34%), and the primary sector (25%). In every industry, over-the-counter futures contracts are regarded as the primary derivative instrument (ibid).

Upper and Valli (2016) claimed that the derivatives markets in emerging nations are limited to a small set of instruments and that a disproportionate share of trading takes place over the counter. Additionally, it is stressed that hedging an investor's risk is more costly and challenging for investors from developing market countries than it is for those from industrialized nations. Furthermore, as the regression results demonstrate, a number of factors may be influencing emerging market economies' lower turnover, such as a poorer degree of economic development shown by the size of the local bond market and a weaker interaction with the global economy. based on how big the global economy is. reduced debt and income per person. Finally, the weaker result suggests that residents use their external funds to manage currency risk instead of using derivatives.

In Zimbabwe FINSEC exchange derivative market offers European style stock options which can only be exercised at the expiry date. In Botswana only simple currency options exist on the OTC derivative market. There is a considerably gap to be filled considering that both countries are offering limited forms of derivatives by the introduction of a variety of derivatives products including swaps on index funds, options on futures and swaptions. CME (n.d.) regarded options on futures as a right to buy or sell futures contracts at a predetermined price on or before a specified date.

Bayar et al. (2020) revealed that age, income level, gender, education level, and finance education all had a substantial impact on investors' views of financial risk. Multinomial regression analysis was utilized in the study, which focused on data from university personnel. Bansal (2021), a variety of factors, such as age, gender, work

experience, place of employment, educational background, and type of employment, influence how investors behave on the Indian derivatives exchange.

2.3. Challenges of adopting derivatives trading

Emm et al. (2022) found lower corresponding interest rate growth and volume growth in options and futures in different geographies during the COVID'19 pandemic. In addition, increased correlations were observed in derivatives trading during the pandemic. In addition, a historic increase in client assets held to meet margin requirements was also observed during the pandemic. Moreover, research carried out after the COVID-19 pandemic has demonstrated modifications in the composition of open interest on US exchanges, encompassing a noteworthy decline in non-commercial traders at the beginning of 2020. The study employed an event research methodology grounded in the quantities of global futures and options trading. March 2020 - January for three months. North America, Europe, Asia, and Latin America were all included in the study. Limited extant literature is focused in discussing the challenges faced in adopting derivatives in developed, Latin America, Asian countries and without a focus on Sub Saharan countries. This research explored on a comparative analysis of the conditions necessary for derivative markets in Zimbabwe and Botswana.

Schöler-Iordanašvili (2020) demonstrated that that derivatives' impact on financial stability is bidirectional and contingent upon the features of the nation's financial system. The study carried out in Russia, Brazil, and Argentina's developing economies demonstrated that derivatives had detrimental effects on the financial system.

Jukonis et al. (2024) observed that the demand for liquid collateral has increased as a result of stricter margin requirements on derivatives markets. However it had been noted that euro asset investments funds had reduced their liquid collateral against derivatives and this could lead to amplified stresses in the financial markets. It can be propounded that higher collateral requirements can be regarded as a major factor contributing towards the decision for non-use of derivatives for genuine risk management in the financial markets by increasing overall systemic vulnerability through stress scenarios in the financial markets.

Vu et al. (2020) observed the decision for non-use of derivative financial instruments as lack of instructions by the state derivatives financial instruments resulting in investors, businesses and suppliers being very much concerned in the effectiveness of the financial derivatives. The Hanoi Stock Exchange in Vietnam was the subject of the study, which was carried out using a sample of 356 listed businesses. The regression analysis was used in the investigation.

Raisler (1997) listed seven risks associated with derivatives: systemic risk, reputation risk, operational risk, liquidity risk, market risk, credit risk, and legal risk. It was further stressed that the risks of derivatives are essentially not different from the risks associated with traditional instruments such as deposits, loans and securities.

Gandré1et al. (2020) discovered that following the early implementation of the derivatives reform banks in the US transferred 70% of their Over the Counter (OTC) derivatives trading volumes abroad, especially in less regulated jurisdictions. The shift was caused by the mandatory requirement for central clearance of all OTC derivatives that proved to be very costly for banks(ibid).

The main risks connected to derivatives traders and contracts include, as conceptualized by Martinkutė-Kaulienė (2015), transaction risk, legal risk, credit and counterparty risk, liquidity risk, and market risk. Price and systemic risk were both regarded as significant factors. In relation to the study, of all the hazards related to derivatives, market risk was the most significant. Greenberger (2010), credit default swaps, or CDS, are widely accepted to have played a major part in the 2008 global financial system collapse. He also highlights how the unregulated, multibillion dollar Over the Counter Credit Default market contributed to the subprime mortgage crisis, the credit crisis, and ultimately the systemic financial catastrophe. Moreover, it is believed that the financial crisis was mostly caused by the unregulated over the counter (OTC) derivatives markets, as bonds rendered significant financial institutions insolvent and stopped subsequent financial market meltdowns. The call to save the massive banking institutions that precipitated the 2008 global financial crisis came from American taxpayers (ibid).

Both the parties dealing derivatives, and the financial system viewed them as ticking time bombs. The stacking effect and chain risk that derivatives provide, akin to that of insurance companies or reinsurers who sell off a large portion of their business to third parties, was another issue with the usage of derivatives (Buffet, 2002). The following significant variables influencing the usage of derivatives in Africa were observed during the United Nations Conference held on Trade and Development (UNCTD) in Nairobi, Kenya: market participants were unsure of the rules and regulations, and the following difficulties were also mentioned; government oversight of trading and prices, the cost-effectiveness or technological viability of using derivatives, a lack of market infrastructure, a lack of product knowledge, the underdevelopment of commodity markets, and political stability, inadequate speculators, and governance (Government of Kenya, 2016).

A survey of a sample of 39 investment firms in Kenya identified consumer protection legislation (45%), legal and regulatory frameworks (46%), regional integration of financial markets (65%), financial innovation (82%) and risk management (78%) contributed to the growth of derivatives in Kenya. Open-ended and closed-ended questionnaires were the primary data collection instruments employed in the research (Bowen et al., 2017). Gogoncea and Paul's (2013) viewed derivatives as duplicate assets since their value is determined by cloning a portfolio. It is stressed that this will be feasible as long as there is no friction in the markets. This presumption has been validated in numerous operations, which frequently trade for long enough periods of time at low enough costs to successfully replicate certain derivative portfolios, aided by extremely liquid markets. They added that since using derivatives to hedge is costly and need knowledge, investors and non-financial businesses would rather pay a specialized firm to handle the hedging on their behalf, incurring additional expenses (ibid).

Sundaram (2012) identified three factors notably leverage, volatility, and liquidity as responsible for some of the possible dangers associated with derivatives such as when the market is adverse, there is a chance of losing a lot of money. Derivatives are thought of as highly leveraged instruments that increases market instability. It is further stressed that when underlying earnings volatility and unexpectedly large price changes occur in derivatives markets, leverage is enhanced, leading to potentially large losses. Furthermore, there is more risk associated with derivative positions during times of market volatility since liquidity selectively declines and makes it harder to abandon unsuccessful trades (ibid). It is further emphasized that the combination of these three described factors led to the collapse of several derivatives companies in 1995, Barings Bank, Metallgesellschaft declared bankrupt in late 1993, Amarath ceased operations in early 2006, and American Insurance Group (AIG) collapsed in 2009. to name a few global cases (ibid).

The above anecdote literature review is abundant with Asian and Western examples (Samarakoon, 2023; Stelmakh & Prykaziuk, 2022; Al janabi, 2021; Prokhorova, 2022; Mezui et al., 2011; Emm et al., 2022; Schöler-Iordanašvili, 2020; Vu et al., 2020; Gandré1et al., 2020) on the conditions necessary for derivatives market growth, forms of derivatives and on the challenges of the institutionalisation of the derivatives markets, but it significantly lacks evidence from Sub Saharan Africa notably for derivatives markets growth in Zimbabwe and Botswana. Hence this study filled that gap through a comparative analysis of the conditions necessary for derivatives markets to flourish in both Zimbabwe and Botswana.

3. METHOD OF THE RESEARCH

The methodology of the study was based on Mixed Method Research (MMR). Bryman (2006) proclaimed that Mixed Method Research enables triangulation which improves the validity of the study, and a range of instruments can be deployed in MMR to meet the goals and objectives of the study. Further the MMR design used for the study is the convergence triangulation design (refer to Figure 1 below). Creswell (1999) elucidated that convergence triangulation design involved the independent collection of qualitative and quantitative data and then applying convergence triangulation at the interpretation stage to validate the results of the qualitative study with the findings of the quantitative study.

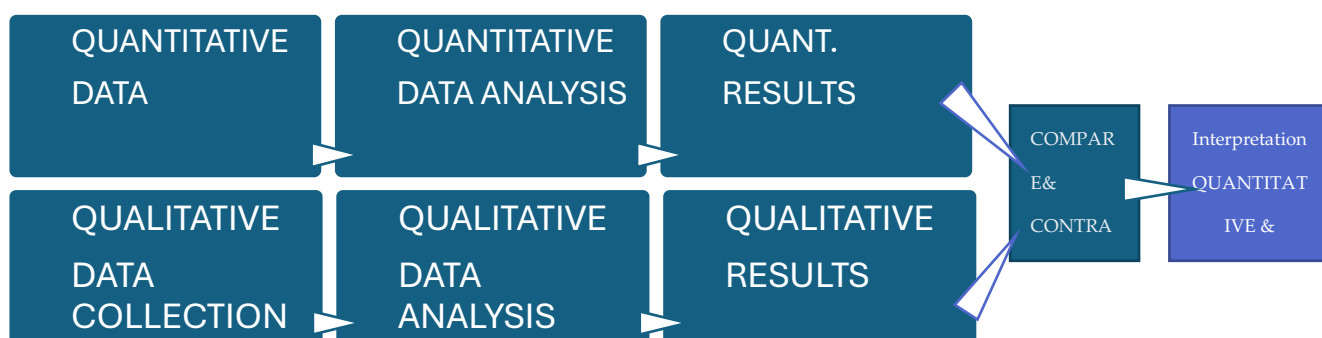


Figure 1. Convergence Triangulation Design (Adopted from Creswell, 2006)

In addition, the study used Analysis of Moments Structures (AMOS) to run Structural Equation Modelling (SEM) to test the following three hypothesis. Hair et al. (2021) affirmed that SEM partial least square Structural equation modeling is useful for estimation of models and confirming measurement models that are useful for predicting causal relationships. Hence the present study used SEM in testing the following hypotheses.

The conceptual hypotheses of this study tested whether:

1. H1a: Derivative market is positively and significantly related to investors characteristics in Botswana or Zimbabwe.
2. H1b: Derivative market is positively and significantly related to market factors in Botswana or Zimbabwe.
3. H1c: Derivative market is positively and significantly related to firm specific factors in Botswana or Zimbabwe.

Concept Models were inverted. The Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), Tucker’s Lewis Index (TLI), Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA) and Chi-Square were used to evaluate the fitness of the concept models. Hu and Bentler (1999) evaluated CFI values ≥ 0.95 to indicate satisfactory fit, and they proposed that a value larger than 0.90 is required to guarantee that mis-specified models are not accepted.

4. RESULTS

4.1. Demographic analysis

A total of 762 respondents were involved in the study comprising of 502 females and 260 males. A total of 382 respondents were taken from Harare in Zimbabwe and 380 respondents were from Gaborone in Botswana. 25 Chief Financial Risk officers took part in the study and 737 others holding different designations. 318 respondents out of the 762 were using derivatives products in both markets and the rest were not.

4.2. Conditions necessary for derivatives markets in Zimbabwe and Botswana

The qualitative part of the research deployed N-VIVO to run thematic and pattern analysis to address the research questions of the study. The following word clouds were obtained in running thematic analysis of the qualitative part of the research as shown in Figure 2 to 5 below.

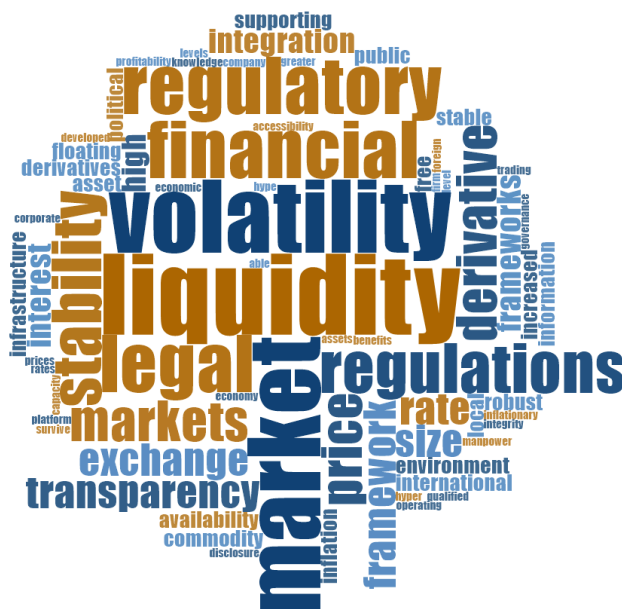


Figure 2. Word cloud of the conditions necessary for derivatives markets to flourish in Zimbabwe and Botswana.

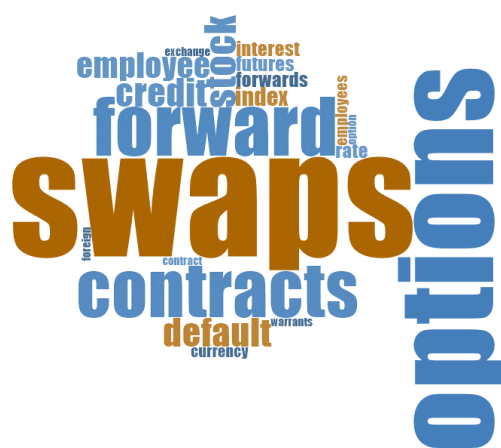


Figure 3. Word cloud for the forms of derivatives in Zimbabwe and Botswana



Figure 4. The challenges of adopting derivatives trading in Zimbabwe & Botswana



Figure 5. The market factors considered in the institutionalization of derivatives markets in Zimbabwe and Botswana

The data items of the quantitative part of the study were subjected to reliability analysis that included the computation of Cronbach's Alpha. All the data measuring the conditions necessary for derivatives markets achieved Cronbach's Alpha of 0.846 as shown in table 1 below. Further, The results of the test of normality are reflected in Table1 below.

Subsequently all the quantitative data items were exposed to three confirmatory factor analysis (CFA) that involved running a Kaiser Meyers Olkins (KMO) test and Bartlett's test. A KMO score of 0.911 was obtained for all the variables of the study measuring the conditions necessary for derivatives markets in Zimbabwe and Botswana as shown in Table 3 below. Further a Bartlett's test score of 4069 and a probability of 0.001 was obtained for all the variables of the study as reflected in Table 3 below. Further CFA was subjected to the variables measuring investors' specific characteristics, firms' specific characteristics, conditions necessary and the benefits of adopting derivatives as shown in Table 4 to Table 5 below. The variables that had low factor loadings of less than 0.7 were cleaned out and removed from the study in three independent runs of confirmatory factor analysis as displayed in Table 4, 5, 6 and 7 below.

The conceptual model path diagram A for all the variables of the study is shown in Figure 6 after the first round of the removal of variables with low factor loadings of below 0.5. Table 4 below is a summary of the result of the first cleaning. After the initial cleaning of the data AMOS structural equation modelling was run on the quantitative data and unaltered conceptual diagram B was designed as shown in Figure 7. Altered conceptual diagram C shown in Figure 8 was designed after the second round of cleaning and the final conceptual models C was designed and inverted after third round of cleaning as shown in Figures 9 below. Summaries of statistical significance, model fit indices were produced to gauge the fitness of the unaltered and altered models as shown in Table 5, 6, 7, 8, 10, and Table 11 below. The unaltered model inverted yielded the fit indices shown in Table 8 below. There was a need to improve on the fit indices of the unaltered model and data items with low communalities were removed resulting in an altered model C with improved fit indices as shown in Table 10 below.

Table 1. Results of normality tests showing descriptive statistics for skewness and kurtosis for all the data items of the study.

Data item description (Item code)	Skewness statistic	Kurtosis statistic	Further Cleaning
Hedging Foreign exchange risk (B3)	-2.422	4.362	Removed
Hedging interest rate risk (B4)	-2.535	4.987	Removed
Hedging commodity price risk (B5)	-0.787	-1.023	Acceptable
Hedging equity price risk (B6)	-0.886	-0.560	Acceptable
Price discovery (B7)	-0.788	-1.092	Acceptable
Speculation (B8)	0.875	3.044	Removed
Arbitrage (B9)	-0.238	-0.024	Acceptable
Capital market development (B10)	-1.297	0.107	Acceptable
Deepening of cash markets (B11)	-3.427	10.535	Removed
Firm size (B14)	1.261	1.963	Acceptable
Financial distress (B15)	-0.262	-1.285	Acceptable

Liquidity (B16)	-11.772	140.879	Removed
Leverage (B17)	-0.652	-1.109	Acceptable
Foreign subsidiary (B18)	-4.507	25.200	Removed
Growth opportunities (B19)	2.612	5.907	Removed
Profitability (B20)	-0.595	-1.423	Acceptable
Foreign trade (B21)	-4.050	22.047	Removed
Dividend payout (B22)	17.833	318.000	Removed
Financial efficiency (B23)	-1.532	1.342	Acceptable
Financial stability (B24)	7.832	-1.102	Removed
Financial development (B25)	7.832	-0.686	Acceptable
Age (B26)	-1.837	59.567	Removed
Gross Domestic Product (B27)	-1.540	59.567	Removed
Derivatives regulations (B28)	-1.403	2.712	Removed
Investors' needs, goal and return expectations (B31)	-0.866	0.697	Acceptable
Investors knowledge of financial markets (B32)	-1.284	2.003	Acceptable
Familiarity with different asset classes (B33)	-1.1612	3.117	Removed
Familiarity with derivatives instruments (B34)	1.165	3.353	Removed
Investor's level of wealth (B35)	-1.285	3.889	Removed
Investor's level of risk tolerance (B36)	-1.202	2.289	Removed
Investors perception about derivatives (B37)	-1.186	3.563	Removed
Level of volatility in the markets (B41)	-1.314	1.699	Acceptable
Level of regulations in the markets (B42)	-17.833	.555	Removed
Level of information available in the markets (B43)	-0.860	-0.276	Acceptable
Taxes (B44)	-08.60	318.000	Removed
Brokerage costs (B45)	-0.773	0.845	Acceptable
Product availability (B46)	-0.773	1.147	Acceptable
Level of standardization in the market (B47)	1.265	10.307	Removed

Table 2. Reliability analysis for all data items measuring the conditions necessary for derivatives markets to flourish in Botswana and Zimbabwe

Reliability Statistics			
Measure	Required	Actual	Actual for standardized items
Cronbach's alpha	≥ 0.700	0.846	0.773

Table 3. Confirmatory factor analysis for all the variables measuring the conditions necessary for derivatives markets to flourish in Botswana and Zimbabwe-after cleaning process

Test	All items
KMO	0.911
Bartlett's test	4069
Df	28
P	<0.000

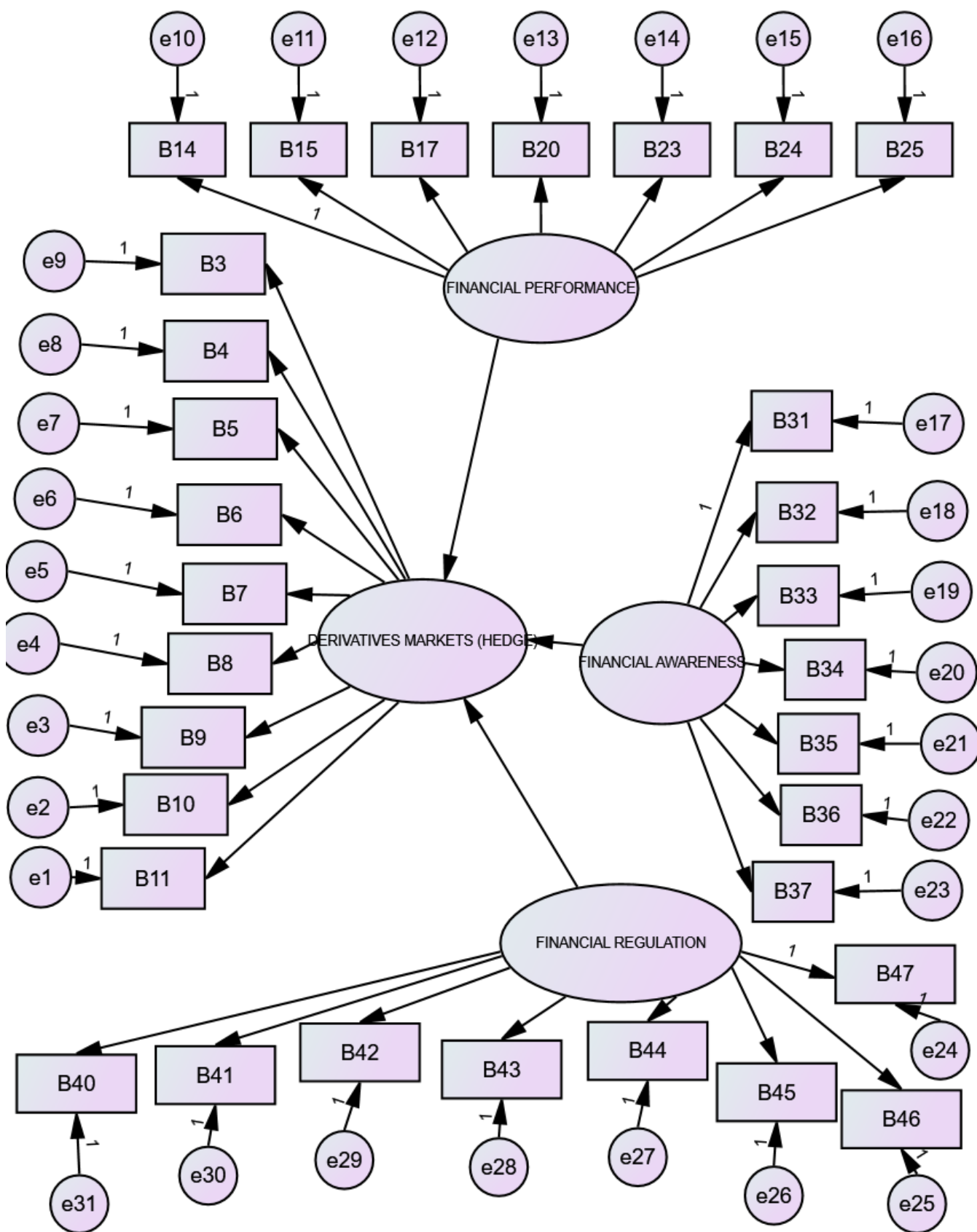


Figure 6. Proposed Structural equation path modelling concept diagram A -Measurement model specification after the firstst round of cleaning

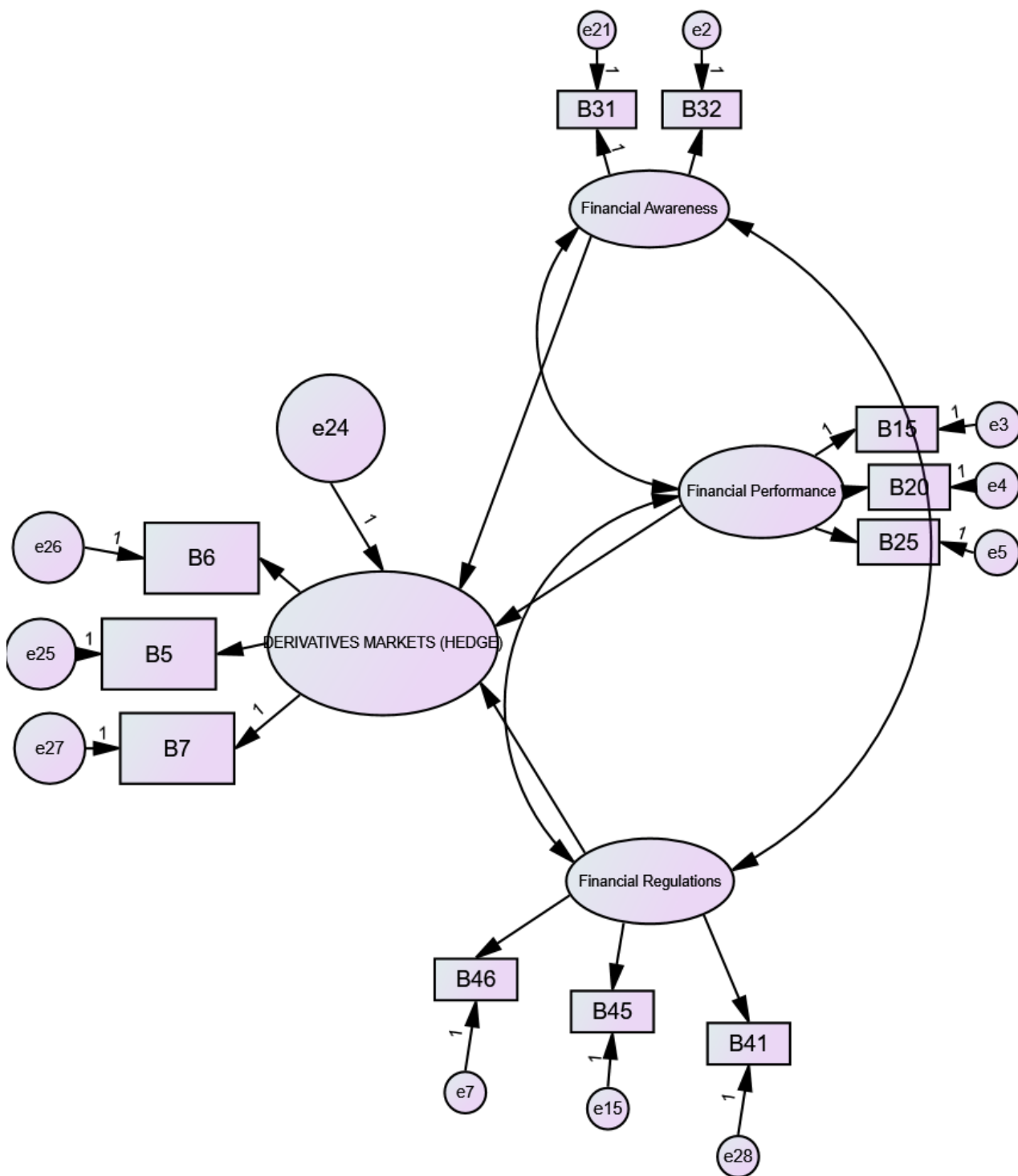


Figure 6. Proposed structural equation path modelling concept diagram-Measurement model specification of unaltered model B

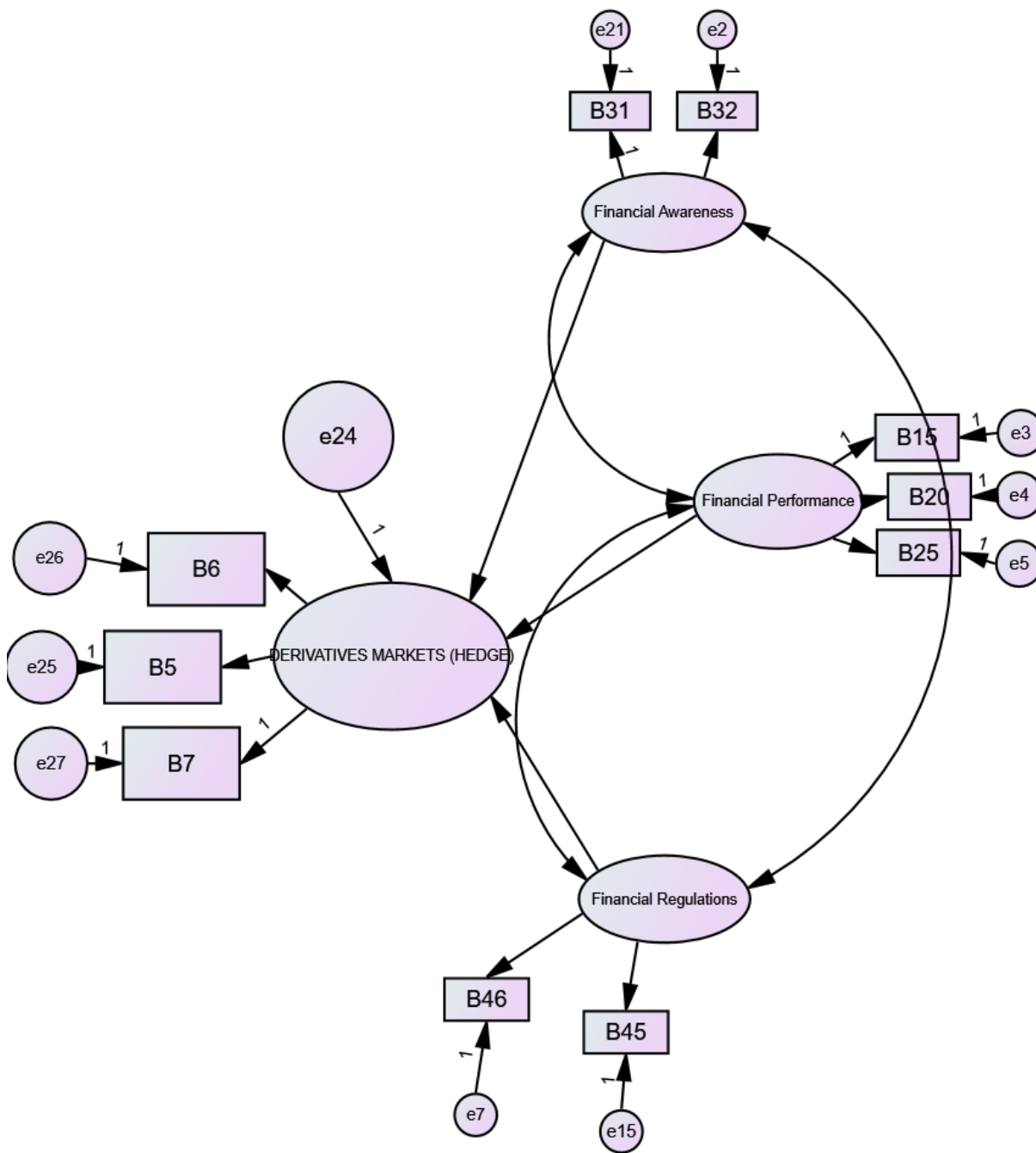


Figure 7. Proposed Structural equation path concept diagram-Measurement model specification of altered model C

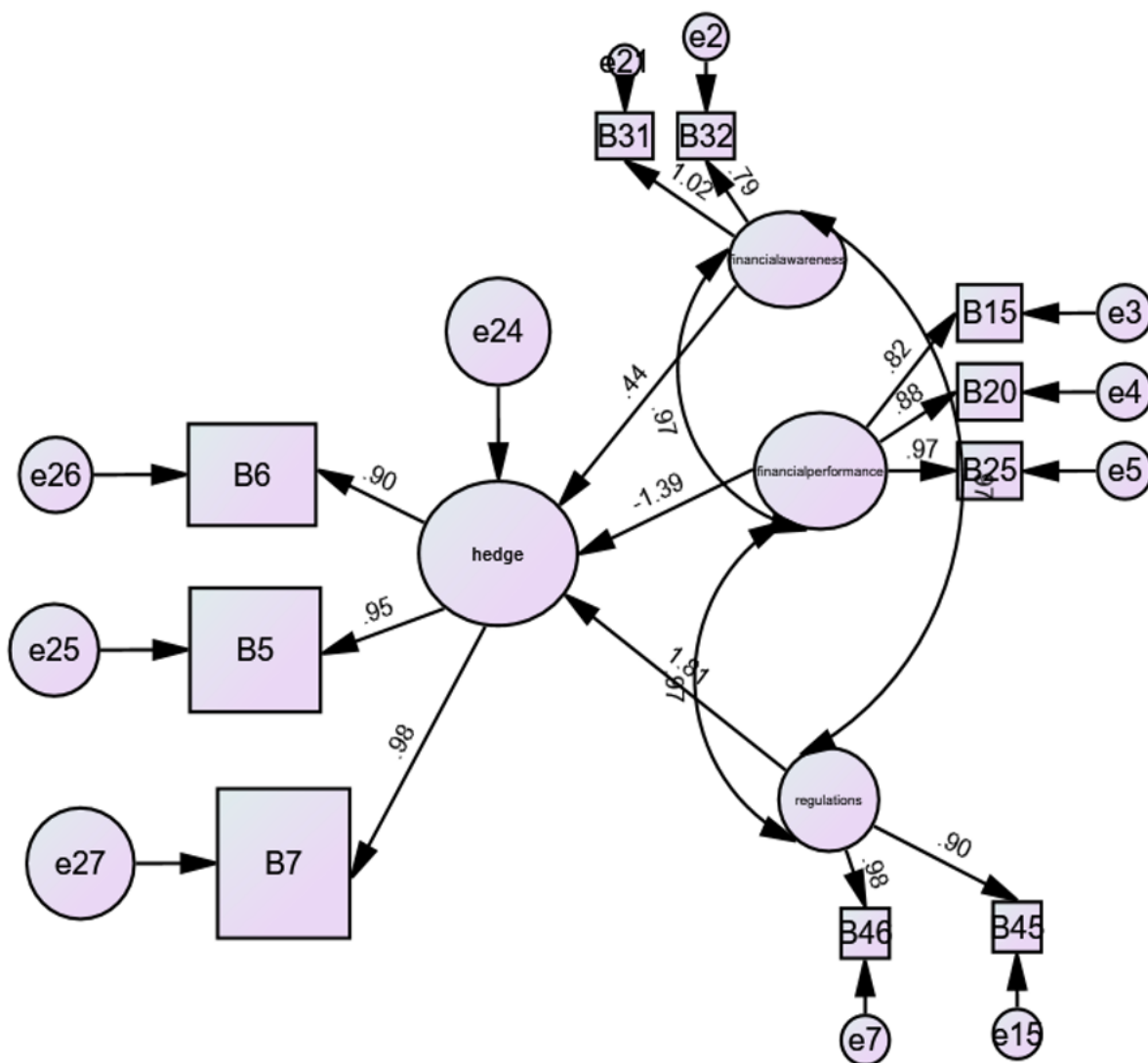


Figure 8. Structural equation model C for the altered model of the study (After final cleaning)

Table 4. Communalities for all variables of the study after the first round of cleaning

Item code	Communalities (Factor Loading) after initial cleaning	Factor loading after second cleaning
B3	0.645	Removed
B4	0.622	Removed
B5	0.879	0.899
B6	0.854	0.885
B7	0.941	0.958
B8	0.673	Removed
B9	0.615	Removed
B10	0.614	Removed

B11	0.435	Removed
B14	0.684	Removed
B15	0.851	0.876
B16	Removed	Removed
B17	0.606	Removed
B18	Removed	Removed
B19	Removed	Removed
B20	0.912	0.909
B21	Removed	Removed
B22	Removed	Removed
B23	0.608	Removed
B24	0.655	Removed
B25	0.675	Removed
B26	Removed	Removed
B27	Removed	Removed
B28	Removed	Removed
B31	0.804	0.877
B32	0.918	0.957
B33	0.635	Removed
B34	0.678	Removed
B35	0.608	Removed
B36	0.684	Removed
B37	0.671	Removed
B40	0.608	Removed
B41	0.666	Removed
B42	0.645	Removed
B43	0.642	Removed
B44	0.653	Removed
B45	0.947	0.978
B46	0.942	0.953
B47	0.637	Removed

Table 5. Communalities for variables of the firms' characteristics affecting derivatives markets.

Variable item code	Second round cleaning	Final cleaning
B14	Removed	Removed
B15	0.851	0.876
B16	Removed	Removed
B17	Removed	Removed
B18	Removed	Removed
B19	Removed	Removed

B20	0.912	0.909
B21	Removed	Removed
B22	Removed	Removed
B23	Removed	Removed
B24	Removed	Removed
B25	0.975	0.967
B26	Removed	Removed
B27	Removed	Removed
B28	Removed	Removed

Source: Author, 2025

Table 6. Communalities for investors’ specific characteristics affecting derivatives markets

Variable item code	Second round cleaning	Final cleaning
B31	0.804	0.877
B32	0.918	0.957
B33	0.635	Removed
B34	0.678	Removed
B35	0.608	Removed
B36	0.684	Removed
B37	0.671	Removed

Table 7. Communalities for market characteristics affecting derivatives markets

Variable item code	First cleaning	Second round cleaning	Final cleaning
B40	0.608	Removed	Removed
B41	0.666	Removed	Removed
B42	0.645	Removed	Removed
B43	0.642	Removed	Removed
B44	0.653	Removed	Removed
B45	0.947	0.974	0.978
B46	0.942	0.963	0.953
B47	0.737	Removed	Removed

Table 8. Communalities for the benefits of adopting derivatives markets

Variable item code	Second cleaning	Final cleaning
B3	0.645	Removed
B4	0.622	Removed
B5	0.899	0.864
B6	0.885	0.885
B7	0.958	0.858
B8	0.673	Removed
B9	0.615	Removed
B10	0.614	Removed
B11	0.435	Removed

Table 9: Statistical significance between the constructs (***)denote statistical significance)

Variable		Construct	Estimate	S.E.	C.R.	P
Hedge	<---	Regulations	4.509	.999	4.512	***
Hedge	<---	Financial awareness	.388	.165	2.346	***
Hedge	<---	Financial performance	-2.408	.681	-3.535	***
B31	<---	Financial awareness	1.000			
B32	<---	Financial awareness	.477	.020	23.488	***
B15	<---	Financial performance	1.000			
B20	<---	Financial performance	.650	.031	20.691	***
B25	<---	Financial performance	1.827	.075	24.482	***
B46	<---	Regulations	1.008	.030	33.787	***
B45	<---	Regulations	1.000			
B5	<---	Hedge	.948	.022	44.003	***
B6	<---	Hedge	.563	.017	33.782	***
B7	<---	Hedge	1.000			

Table 10. Model fit summary for the unaltered model

Model Fit Index	Required Result	Actual Result
NFI	≥ 0.900	0.897
RFI	0-1	0.782
IFI	≥ 0.900	0.901
TLI	≥ 0.900	0.789
CFI	≥ 0.900	0.900
RMSEA	<0.080	0.184
CMIN/DF	<3	25

Table 11. Model fit summary for the altered model

Model Fit Index	Required Result	Actual Result
NFI	≥ 0.900	0.903
RFI	0-1	0.754
IFI	≥ 0.900	0.906
TLI	≥ 0.900	0.901
CFI	≥ 0.900	0.906
RMSEA	<0.080	0.078
CMIN/DF	<3	29

5.DISCUSSION

5.1. Conditions necessary for derivatives markets in Zimbabwe and Botswana

5.1.1. Qualitative research

Conditions necessary for derivative markets in Botswana and Zimbabwe the main themes that emerged from the word cloud were, volatility, market transparency, liquidity, financial stability, legal and regulatory framework, and derivatives regulations as shown in Figure 2 above. This outcome resonates with empirical literature review findings. (ISDA (2022), Bowen, 2017; Schöler-Iordanashvili, 2020).

Figure 3 above showed that the main forms of derivatives used in Zimbabwe and Botswana are mostly swaps, options and forward contracts, this concurs with the results obtained from the derivative survey where the frequencies of using derivatives were; employee stock options (98.4%), swaps (26.7%), and the forward contracts (34%).

For both countries the challenges of adopting derivatives trading emerged as profitability concerns, derivatives risk, lack of liquidity and market concerns as shown in Figure 4 above. This aligns with the findings of Jukonis (2024), Schöler-Iordanašvili (2020) and Buffet (2002).

The market factors considered in the institutionalization of derivatives markets common to both countries emerged as financial market development, market volatility, increased globalization, market price volatility and derivatives perceptions as shown Figure 5 above. This pattern concurs with the findings of Bowen et al. (2017).

5.1.2. Quantitative research

All the variables affecting the conditions necessary for derivatives markets yielded Cronbach's alpha of 0.846 that exceeded the required minimum of at least 0.7, revealing sufficient internal consistency of scale items used in the study as shown in Table 2 above. Normality test was performed through use of SPSS and data items with data extremes values outside skewness and kurtosis range of -2 and +2 were removed from the study (George and Mallery (2010)) as shown in Table 1 above. The study proceeded with CFA analysis and all the variables of the study achieved a KMO of 0.911 that exceeded the minimum required of 0.6 (Wu et al., 2023). Kaiser and Rice

(1974) recommended a value of 0.5 for KMO as the minimum acceptable, representing sufficient sample adequacy before running CFA. For the present study all variables with communalities of less than 0.7 were removed from the study to enhance validity of the model inverted. In addition, the study achieved a Bartlett's sphericity test with a probability of 0.000 meeting the minimum required of $p < 0.001$ (Wu et al., 2023), demonstrating the validity of the KMO test results as reflected in Table 2 above.

The following constructs were deployed in designing structural equation modeling C for the conditions necessary for derivatives to flourish as shown above in Figure 5. The construct of financial awareness was used to measure the investors' specific characteristics; the construct of financial performance was used to measure firms' specific characteristics, and the construct of financial regulation measured the market characteristics influencing the flourishing of derivatives in Zimbabwe and Botswana.

The quantitative part of the research that involved testing hypotheses through running structural equation modeling (SEM) revealed that derivatives markets were significantly and positively correlated with financial regulations as shown in Figure 5 above. This is in agreement with the studies of FCA (2025), Samarakoon (2023), Stelmakh and Prykaziuk (2022), ISDA (2022) and the result is also in contradiction to Gandrélet al. (2020). The study further uncovered that derivatives markets were significantly and positively correlated with financial literacy. The results align with the findings of Bayar et al. (2020) and Bansal (2021). In addition, the quantitative part of the research also demonstrated that derivatives markets were profoundly and negatively correlated with financial performance as displayed in Figure 5 above.

Results of the test of significance and of the absolute and relative fit indices were produced to support the model fitness of the SEM conceptual models that were produced for the unaltered and altered conceptual model C that was designed as shown in Table 7, 8 and 9 above. The study achieved statistical significance of $p \leq 0.05$ (***) for all the constructs of the study as shown in table 7 above. Kwak (2023) declared that p -value of less than 0.05 is judged as "significant," and a p -value greater than 0.05, as "not significant." The altered conceptual model C achieved a significant improvement of Tucker Lewis Index (TLI) of 0.901 as compared to the TLI of 0.789 that was previously yielded for the unaltered model as shown in Table 8 and 9 above. Kenny (2024) asserted that a TLI value between .90 and .95 is considered marginal, above .95 is good, and below .90 is considered to be a poor fitting model. The chi square to df ratio of the study increased from 25 to 29 showing a decrease in the model fit of the altered model C as compared to the unaltered model. Kenny (2024) also recommended a lower chi square to df ratio as long as it was more than one. The RMSEA yielded a significant decrease from 0.184 of the unaltered model to 0.078 of altered concept model C. Kenny (2024) claimed that the RMSEA should not be more than 0.08 as the rule of thumb.

5.2. Discussions for future research

The study revealed the conditions necessary for derivatives markets to flourish in Zimbabwe and Botswana. The study did not embrace the concept of climate change and the need to establish derivatives markets that promote reduction of carbon dioxide emissions and global warming. The financial markets around the world are evolving towards sustainability and low carbon emissions. Therefore, future research should focus on the examination of the conditions necessary for sustainability linked derivatives markets to flourish, particularly focusing as such on countries in the Sub-Saharan African countries.

6. CONCLUSION

The conditions necessary for derivative markets in Zimbabwe and Botswana were liquidity requirement, foreign subsidiary requirement, financial efficiency, financial stability, financial development, derivatives regulations, foreign trade, financial distress, and leverage.

The main form of derivatives used in Zimbabwe and Botswana were the employee stock options and the forward contracts. Most listed firms in Zimbabwe are using the employee stock options as compared to those in Botswana. A higher proportion of listed firms in Botswana use the forward contracts as compared to those in Harare Zimbabwe.

The study revealed that derivatives markets are significantly and positively correlated with financial awareness and financial regulations. Further the study revealed that derivatives markets are significantly and negatively correlated with financial performance. Therefore, the first and second proposed null hypothesis were rejected, and the third null hypothesis for the study was accepted.

It is recommended that policy makers or derivatives self-regulatory authorities should develop robust derivatives regulatory reforms to enhance the institutionalization of derivatives markets. In addition, the public authorities should enter public to private initiatives to boost financial awareness and uptake of derivatives products in the markets. Companies with consistently low financial performance must rethink and deploy derivatives to hedge against fundamental risks.

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