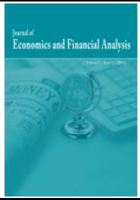
Journal of Economics and Financial Analysis
Type: Double Blind Peer Reviewed Scientific Journal
Printed ISSN: 2521-6627 | Online ISSN: 2521-6619
Publisher: Tripal Publishing House | DOI:10.1991/jefa.v8i1.a64
Received: 23.08.2023 | Accepted: 04.01.2024 | Published: 12.03.2024
Journal homepage: ojs.tripaledu.com/jefa



The Effect of Disaggregated Country Risk on the Returns of the South African Exchange Traded Fund Market

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Abstract

In recent years, investors have drifted towards investments in emerging markets with better risk-return trade-offs, however, these markets are generally characterized by high political, financial, and economic risk. Given the rising popularity of Exchange Traded Funds (ETFs), the objective of this study is to investigate the effect of disaggregated country risk on the returns of the South African ETF market. The study utilises a sample of South African ETFs which are segregated based on their benchmarking strategy (that is, purely domestic benchmarks or international benchmarks), and the sample period ranges from the inception of the first ETF in the respective market till December 2019. A linear and non-linear Autoregressive Distributed Lag (ARDL) approach is used to explore the long- and short-run effects; however, the findings of this study suggest that country risk shocks have significant asymmetric effects on returns. Further analysis suggests that, in the long-run, ETFs with domestic benchmarks are most sensitive to political risk decreases whilst ETFs with international benchmarks are most sensitive to political risk increases. In the short-run, ETFs with domestic benchmarks are only influenced by political and financial shocks whilst all country risk components impact ETFs with international benchmarks. Overall, these findings can assist investors, rating agencies, multi-national enterprises, and policymakers in understanding the effects of country risk components on ETF markets.

Keywords: *Economic Risk; Exchange Traded Fund; Financial Risk; Market Return; Political Risk.*

JEL Classification: *E44, G10, G11.*

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1. Introduction

In recent years, the popularity of emerging markets as investment destinations has soared. This shift to emerging markets can be attributed to their enhanced growth opportunities which lead to better risk-return trade-offs and greater opportunities for foreign investors to achieve portfolio diversification (Sarwar and Khan, 2017; Korinek, 2018). Subsequent to a $180 billion inflow of capital in quarter four of 2020, major emerging stock and bond markets attracted approximately $17 billion in capital inflows in the first three weeks of 2021 (Monk, 2021). However, the drawback of such large capital flows is that financial markets in emerging economies become more vulnerable to changes in the exchange rates, changes in macroeconomic policies, and asset price bubbles (Ahmed and Zlate, 2014). This is also the case in South Africa where the South African economy has been experiencing a depreciation in the exchange rate coupled with high interest and unemployment rates, subsequently, making South African financial markets more vulnerable to external shocks (Hoque and Zaidi, 2020). As a result, investors' exposure to risks increases when investing in emerging markets because economic, financial, and political uncertainties are more prominent in emerging markets, like South Africa (Hoque and Zaidi, 2020). Therefore, investment decisions made by investors are often influenced by assessments of country risk.

Country risk is defined as the likelihood that a sovereign state or borrower from a particular country will default on their financial commitments towards foreign investors and/or lenders (Hoti and McAleer, 2004). The likelihood of debt default increases when a country is experiencing political, economic, or financial challenges (Chiu and Lee, 2017). Hence, aggregate country risk is separated into components of political risk, economic risk, and financial risk. Political risk is associated with a country's political environments, economic risk is associated with a country's economic strengths and weaknesses, and financial risk is associated with a country's ability to service its official, commercial, and trade debt commitments (Ben Nasr et al., 2018). Assessments of country risk and its related components (that is, political, economic, and financial risk) are conducted by rating agencies from a forward-looking perspective and reflect the degree of risk associated with investing in a particular country. As such, country risk ratings serve as an important reference tool which is employed by investors when assessing their risk exposures and, subsequently, changes in country risk ratings could pose a threat to both local and foreign investors (Nhlapho and Muzindutsi, 2020). Therefore, country risk ratings influence investors' trading decisions and, thus, the overall direction of financial markets.

Existing research shows that disaggregated country risk ratings exhibit a significant effect on price movements in stock (Mensi et al., 2017; Suleman et al., 2017), bond (Nhlapho and Muzinduti, 2020; Muzindutsi and Obalade, 2020), real estate (Lee, 2006; Muzindutsi et al., 2020), and futures (Lee et al., 2019) markets. However, existing studies have not reached a consensus on the manner in which disaggregated country risk components influence market returns for these asset classes. For instance, Sari et al. (2013) find that economic risk exhibits a significant effect on the returns of the Turkish stock market in the long-run but an insignificant effect in the short-run. Moreover, contrary to Sari et al. (2013) who report that political risk exhibits a significant effect on returns in Turkey's stock market, Almahmoud (2014) finds evidence that political risk exhibits an insignificant effect on returns in Saudi Arabia's stock market. Another inconsistency is displayed by the results of Mensi et al. (2017) who report that financial risk ratings exhibit a positive effect on stock market returns whilst Ben Nasr et al. (2018) find evidence of a negative effect of financial risk ratings on stock market returns. These inconsistencies stem from the different markets under observation as the behaviour of market participants and market dynamics differ across countries. The variability in findings concerning the impact of country risk on stock market returns may similarly apply to the Exchange Traded Funds (ETFs) market, given that ETFs are inherently linked to stock markets. However, the effect of disaggregated country risk on the returns of the market for ETFs has not yet been explored despite the growing interest in ETF markets.

An ETF represents a pooled investment fund that trades on exchanges and in which the constituents are selected to replicate the risk and return characteristics of a specific benchmark or index (Kunjal et al., 2021). Like stocks, ETFs trade on exchanges but differ in that ETFs have exposure to a variety of asset classes including stocks, bonds, real estate, and commodities. Hence, the popularity of ETFs as investment tools has grown substantially in recent years due to their diversification benefits in addition to their low transaction costs, high liquidity levels, and increased transparency (Wu et al., 2021). Furthermore, ETFs are more accessible than mutual funds because they are listed on securities exchanges, and they are traded by both retail and institutional investors. By the end of December 2020, a total of 78 ETFs were trading on the Johannesburg Stock Exchange (JSE) with a combined market capitalization of approximately R102 billion (Brown, 2021). Together, these values represent an increase of approximately 200 percent in the number of ETFs and the market capitalization of ETFs trading on the JSE during the last decade.

Despite the soaring popularity of ETFs, ETFs are not immune to the effects of aggregate country risk and other risks (Schnusenberg et al., 2007). South Africa is characterised by unstable political, economic, and financial conditions due to high corruption levels, sluggish economic growth rates, and high exchange rate volatility (Vengesai and Muzindutsi, 2020). Given the rising economic, financial, and political risks in South Africa, ETF investors may require additional premiums for their exposure to country risk components and, therefore, increases in country risk may lead to significant increases in ETF returns. On the contrary, given the diversification benefits of ETFs (Wu et al., 2021), investors may believe that their exposure to specific components of country risk may be diversified away by investing in ETFs and, thus, shocks in certain country risk components may not significantly impact ETF returns. Likewise, investors may believe that their exposure to South African country risk shocks could be diversified away by investing in ETFs with international benchmarks, therefore, there is a possibility that country risk changes do not significantly influence ETFs with international benchmarks. As such, it is possible that disaggregated country risk components have a differential effect on the returns of the South African ETF market. Against this backdrop, the objective of this study is to investigate the effect of disaggregated country risk (that is, economic, financial, and political risks) on the returns of the market of South African ETFs with domestic benchmarks and the market of South African ETFs with international benchmarks.

Understanding the response of the South African ETF market to changes in economic, political, and financial risk ratings is of great importance to policymakers and regulators who are responsible for enhancing the quality of the South African ETF market, to rating agencies providing country risk ratings, and to both local and foreign investors trading in the South African market. This study, therefore, contributes to existing literature in several ways. Firstly, unlike the majority of existing research which employ aggregate country risk or a single indicator of country risk (Schnusenberg et al., 2007; Mutize and Gossel, 2018; Mutize and Gossel, 2019), this study examines the effects of country risk at a disaggregated level. This approach will allow for the individual assessment of how each country risk component influences the returns of ETFs. Therefore, the findings of this study can assist local and foreign investors, rating agencies, multi-national enterprises, and policymakers in understanding the effects of political, economic, and financial risk on South African financial markets.

Secondly, there is lack of studies focusing on the effect of country risk components on the return of ETF markets. Whilst Kunjal (2022) and Kunjal et al. (2022) have shown that country risk components have a significant effect on the liquidity and volatility of South African ETFs, respectively, the effect of country risk components on the returns of the ETF market has not been established. Given that prior research has shown that different countries respond differently to country risk components, it is also possible that the returns of different asset classes (such as, ETFs) respond differently to country risk components. Therefore, by examining the effect of disaggregated country risk components on the returns of the South African ETF market, this study provides insight into the response of ETF markets to changes in economic, political, and financial risks. The results of this study, thus, provide insight into whether ETFs can be used to mitigate investors' exposure to shocks in the country risk ratings of South Africa. This is particularly important in the South African context where there is a lot of uncertainty in the country's political, economic, and financial environments. Thirdly, whilst the majority of existing research assumes that the effect of country risk on financial markets is symmetric (Nhlapho and Muzindutsi, 2020), this study accounts for short- and long-run asymmetries in the behaviour of financial markets by employing a non-linear approach. Investors react differently to good and bad news about economic, financial, or political shocks and these different reactions could have varying effects on financial markets (Ben Nasr et al., 2018). Hence, the results of this study provide insight into whether or not the effects of country risk components are symmetric over the return distribution.

The paper is structured as follows: Section 2 reviews literature relevant to this study. Sections 3 and 4 outline the data and methodology employed in this study, respectively. Section 5 presents and analyse the findings whilst Section 6 concludes by summarising the results of this study and provides recommendations for future studies.

2. Literature Review

2.1. Conceptualisation of the Risk-Return Relationship

Decisions made by investors in the presence of risk can be explained by two classes of models, specifically, utility-based models and risk-return models. Utility-based models, such as the Expected Utility Theory introduced by Bernoulli (1954) and the Prospect Theory introduced by Kahneman and Tversky (1979), assert that decisions are made by assessing the value and weight of each likely outcome and the overall value of a choice is calculated as the weighted sum of the likely outcome values (Mohr et al., 2010). Risk-return models, such as the Markowitz Portfolio Theory (MPT) introduced by Markowitz (1952), assert that decisions are made by assessing the risk and return associated with each choice and the overall value of a choice is the risk-adjusted average return. The MPT is the foundation of many traditional asset pricing models and, therefore, pioneers the quantitative analysis of the risk-return relationship (Fahmy, 2020).

One of the most extensively researched topics in financial economics is the risk-returns trade-off due to its influence on asset prices, portfolio allocation, cost of capital, risk management, and market efficiency (Ahmed, 2020). Traditional asset pricing models assert that the relationship between risk and expected returns is positive, thus, suggesting a positive risk-return trade-off (Bali and Peng, 2006). One of the most fundamental asset pricing models is the Capital Asset Pricing Model (CAPM) introduced by Sharpe (1964) and further developed by Lintner (1965) and Black (1972). The CAPM hypothesizes that the relationship between an asset’s excess returns and systematic risk is positive. Whilst this theoretical hypothesis is in line with economic intuition, existing empirical evidence on the risk-return trade-off is vastly inconsistent. For instance, Bali and Peng (2006), Müller et al. (2011), and Chiang et al. (2015) report evidence of a positive and significant risk-return trade-off; however, Ang et al. (2009), Badshah et al. (2016) and Jin (2017) find evidence of a significantly negative risk-return trade-off. This difference in the observed risk-return relationships may be due to the selection of risk factors because some risk factors may be priced by the market whilst others are not priced. Moreover, even when risk factors are priced by a market, they may not be priced in a uniform manner across different markets. Noteworthy is that the Arbitrage Pricing Theory (APT), an alternative to the CAPM, introduced by Ross (1976) is a multi-factor asset pricing model which suggests that a security’s returns can be predicted based on the linear relationship between the expected return of the asset and multiple macroeconomic variables that capture systematic risk. Amongst other risk factors, country risk signifies a systematic risk that could impact the performance of financial markets (Kara and Karabiyik, 2015). Hence, investors, multi-national organizations, policymakers, and regulators have given considerable interest to country risk ratings and its effect on financial markets especially after the 2008 Global Financial Crisis.

A market’s ability to fulfil its roles in the pricing of capital and the diversification of investment risk depends on its level of efficiency (Alagidede, 2011). The Efficient Market Hypothesis (EMH) proposed by Fama (1965) asserts that the prices of securities respond immediately to reflect any new information and, as a result, security prices fully incorporate all available information when a market is efficient. Lee and Chen (2020) argue that, if a market is efficient, country ETFs should only be exposed to risks in their home country and not risks in the markets that they are listed. However, ETFs with international benchmarks may be exposed to risks in the markets that they are listed because of investors’ behavioural biases and/or underlying correlations between the home and listing markets (Levy and Lieberman, 2013). On this background, the research question that this study attempts to answer is how do country risk components impact ETF returns and how do these effects differ across ETFs with domestic and international benchmarks?

2.2. Review of Empirical Studies

The seminal work of Erb et al. (1996a) is one of the earliest studies to investigate the effect of country risk on equity returns. Erb et al. (1996a) employ a single beta model to examine the linear relationship between country credit risk ratings (obtained from Institutional Investor's ratings) and the returns of forty-seven stock markets (as proxied by the MSCI's indices), however, the authors conclude that a linear model is inappropriate and, subsequently, opt for a log model to capture the non-linearities in equity returns. Erb et al. (1996a) find that country credit risk ratings are negatively associated with the returns of stock markets in both developed and emerging economies; however, the magnitude of this effect is greater in emerging markets. Whilst Erb et al. (1996a) examine country risk ratings at an aggregate level; Erb et al. (1996b) conduct a study on disaggregated country risk. Erb et al. (1996b) find that financial and economic risk can be used to predict equity returns in both developed and emerging markets whilst political risk can be used to predict equity returns only in emerging markets and not developed markets. Similarly, a recent study by Suleman et al. (2017) documents that aggregate, political, economic, and financial risks can be used to predict the returns of developed and emerging markets.

Hammoudeh et al. (2013) study the effect of disaggregated country risk ratings on stock market returns in BRICS (that is, Brazil, Russia, India, China, and South Africa) countries using an Autoregressive Distributed Lag (ARDL) approach. The authors find that only returns of the Chinese stock market are sensitive to all disaggregated country risk factors. This finding is attributed to the high rates of saving and low investment alternatives outside the stock and real estate markets in China. Hammoudeh et al. (2013) also find that returns in Brazil are sensitive to financial and economic risks whilst the Russian stock market returns show a strong sensitivity to political risk. A study by Sari et al. (2013) also employs an ARDL approach and reports that returns in the Turkish stock market is significantly influenced by economic, financial, and political risk factors in the long-run. However, in the short-run, the returns are positively and significantly influenced by only financial and political risk ratings. On the contrary, Almahmoud (2014) find that, in the short-run, economic risk ratings exhibit a significant, positive effect on Saudi Arabia's stock market returns whilst financial risk ratings exhibit a negative effect on returns. Given that higher country risks ratings are associated with lower country risk for the respective component, these findings suggest that, in the short-run, Saudi Arabia's market returns increase when economic risk decreases but financial risk increases. However, in the long-run, both economic and financial risk ratings significantly and positively impact the returns of Saudi Arabia's stock market. Notably, Almahmoud (2014) finds that political risk has no significant impact on Saudi Arabia's stock market returns in both the short- and long-run. However, the limitation of the studies conducted by Hammoudeh et al. (2013), Sari et al. (2013) and Almahmoud (2014) is that these studies do not account for non-linearities and asymmetries in the return distributions.

Using Dynamic Panel Threshold Models, Mensi et al. (2016) finds evidence that the response of returns in BRICS stock markets to country risk components is asymmetric and differs across lower and upper regimes. Specifically, Mensi et al. (2016) discovers that, when the first lag of the stock return is employed as the threshold variable, BRICS stock market returns respond negatively to economic risk ratings under the upper regime, thus, suggesting that a reduction in economic risk leads to a decrease in stock market returns. On the contrary, the returns respond positively to political risk ratings under the lower regime indicating that a reduction in political risk leads to an increase in stock market returns. Notably, financial risk exhibits a significant effect on the BRICS stock market returns in both regimes. The importance of financial risk is further highlighted by Mensi et al. (2017) who report that only financial risk rating exhibits a significant effect on stock market returns in countries of the Gulf Cooperation Council (GCC) and this effect is positive, therefore, suggesting that low levels of financial risk increase the returns of GCC stock markets. Ben Nasr et al. (2018) examine the effect of country risk ratings on the returns of BRICS stock markets and report that, whilst BRICS stock markets do not respond to country risk changes in a uniform manner, positive and negative rating changes have significant effects on stock market returns in some BRICS nations. Specifically, Ben Nasr et al. (2018) find that, irrespective of the sign of the change, changes in political and financial risk ratings negatively influence stock market returns in the long-run whilst the opposite is found for economic risk ratings. Further analysis by Ben Nasr et al. (2018) reveals that negative ratings changes exhibit a greater impact on return, thereby, indicating that bad news has higher influence on BRICS stock market movements.

More locally, Muzindutsi and Obalade (2020) document that country risk factors significantly impact South African bond returns only during bear regimes and not during bull regimes using two-stage Markov switching models. Specifically, Muzindutsi and Obalade (2020) report that, during bear regimes, changes in financial risk lead to a decrease in bond returns whilst changes in political and economic risks lead to an increase in bond returns. Nhlapho and Muzindutsi (2020) report that political and financial risks exhibit an asymmetric effect on the returns of both stock and bond returns in the short- and long-run. However, economic risk exhibits an asymmetric effect on bond returns only in the short-run and exhibits no significant asymmetric effect on return in the stock market. In the context of housing markets, Muzindutsi et al., (2020) document that, in the long-run, an increase in political and economic risk leads to a rise in housing prices but an increase in financial risk leads to a drop in housing prices. Notably, in the short-run, housing prices are only significantly impacted by political risk and not economic and financial risk factors. The findings of Muzindutsi et al., (2020) and Nhlapho and Muzindutsi (2020) suggest that the manner in which South African stock, bond and real estate markets respond to changes in country risk ratings is not uniform in both the short- and long-run. These inconsistent findings, therefore, highlight the need to conduct further research on the topic especially with regards to other asset classes, such as, ETFs because these inconsistent responses to shocks in disaggregated country risk may also be imminent in ETF markets. For instance, ETF markets may respond differently to different country risk components in terms of the sign and magnitude of the responses as well as whether the responses are symmetric or asymmetric. Furthermore, the responses of ETFs to changes in country risk components may differ across different ETF markets viz. ETFs with domestic benchmarks and ETFs with international benchmarks.

With regards to ETFs, Schnusenberg et al. (2007) investigate the effect of changes in the Coface Group aggregate country risk ratings on equity returns by using a sample of country-specific ETFs or closed-end funds (CEFs). The authors find that equity returns do not respond significantly to changes in the aggregate country risk ratings provided by the Coface Group. This finding could be because the information contained in the Coface ratings are already priced by the market which anticipates these ratings changes based on other information (Schnusenberg et al., 2007). However, recent evidence suggests that ETF returns could be significantly influenced by political, economic, and financial conditions. For instance, Chen, Liu and Hsu (2016) report that political uncertainty significantly influences the returns of ETFs trading in Taiwan whilst Lee and Chen (2021) find that economic, monetary, and fiscal and trade policy uncertainties influence the returns of ETFs trading in the United States (U.S).

Moreover, Chen et al. (2017) show that the returns of ETFs trading in the United States (U.S) are significantly influenced by economic freedom, inflation, public debt, currency exchange ratio, and even the current account balance. Lee and Chen (2020a) discover that the returns of U.S-listed ETFs are also impacted by the absence of corruption, confidence in national governments, and Gross Domestic Product (GDP). In another study, Lee and Chen (2020b) find that the returns of U.S-listed country ETFs are significantly influenced by geopolitical risks in the U.S and in the home country, and these effects are asymmetric across quintiles. Noteworthy is that Lee and Chen (2020b) report that geopolitical risks in the home country exhibit a greater effect on ETF returns relative to geopolitical risks in the U.S, and thus, ETFs may signify a safe haven against geopolitical risks in the U.S. However, existing empirical studies do not evaluate whether international benchmarking can be used to limit an investor's exposure to country risk shocks. Notably, there exist only a few studies which examine the effect of country risk on ETF returns, however, these studies concentrate on an aggregate level of country risk (Schnusenburg et al., 2007). Moreover, studies that examine the effect of components of country risk on ETF returns are limited to a few variables and do not differentiate between long- and short-run relationships whilst only a few studies account for asymmetry in the responses. Furthermore, the majority of these studies focus on ETFs in developed markets (specifically, the U.S) which have different characteristics from emerging markets. This lack of existing studies on the response of ETF returns to changes in disaggregated country risk further highlights the need to explore the effects of disaggregated country risk ratings on the returns of ETF markets.

3. Data

3.1. Sampling and Measurement of EFT Market Returns

To assess the effect of disaggregated country risk on the returns of the South African ETF market, all South African ETFs[1] trading on the Johannesburg Stock Exchange (JSE) on or before the 31st of December 2019 are included in this study's sample. To avoid the survivorship bias, the sample comprises of both currently listed and delisted ETFs. However, to mitigate issues relating to the small sample problem and, therefore, to increase the reliability of the results, each ETF included in the sample needs to have been registered on the JSE for at least 1 year. This results in a total sample of 80 ETFs – 14 of which have been delisted and 66 of which are currently trading on the JSE. If the theory of market efficiency holds, ETFs should only be exposed to risks in their home country and not risks in the country that they trade (Lee and Chen, 2020b). Accordingly, the total sample of ETFs is divided into two categories, namely: a market of South African ETFs tracking domestic benchmarks and a market of South African ETFs tracking

[1] These include ETFs with exposure to equities, bonds, commodities, real estate, and money market funds.

international benchmarks. The analysis, therefore, sheds light on the differential effects of country risk components on ETFs with different benchmarks and provides insight into whether South African ETFs with international benchmarks can be used to minimize an investor's exposure to South African country risk changes.

Daily ETF closing prices and number of shares outstanding are obtained from the IRESS database, and monthly returns for each market are computed by aggregating the daily returns on a market value-weighted portfolio which constitutes of all ETFs in the respective market. Monthly observations are used due to data constraints, specifically; ICRG country risk ratings are available in monthly frequencies only. The sample period for each market is based on the inception date of the first ETF with the respective benchmark, such that, the sample period for the market of ETFs with domestic benchmarks ranges from November 2000 to December 2019 whilst the sample period for the market of ETFs with international benchmarks ranges from October 2005 to December 2019. This results in 230 and 171 data points for the markets of ETFs with domestic and international benchmarks, respectively.

3.2. Measurement of Disaggregate Country Risk

This study uses disaggregated country risk ratings for South Africa from the International Country Risk Guide (ICRG) which is constructed by the Political Risk Services (PRS) Group. In addition to its multi-dimensional assessment of country risk, ICRG is the only rating system to provide detailed and consistent monthly ratings (Lee et al., 2020). The political risk rating relates to a country's political stability and is based on law and order, corruption, democratic accountability, government stability, internal conflicts, external conflicts, investment profile, military in politics, religious tensions, ethnic tensions, bureaucratic quality, and socioeconomic conditions (Sari et al., 2013). The economic risk rating relates to a country's economic strengths and weaknesses and is based on the annual inflation rate, GDP per capita, real GDP growth, current account as a percent of GDP, and the budget deficit as a percent of GDP (Ben Nasr et al., 2018). Lastly, the financial risk rating relates to a country's ability to service its debt commitments and is based on exchange rate stability, current account as a percent of exports of goods and services, foreign debt service as a percent of exports of goods and services, foreign debt as a percent of GDP, and net international liquidity as months of import cover (Mensi et al., 2016). Political risk ratings range from 0 to 100 points, however, economic and financial risk ratings range from 0 to 50 points (Lee et al., 2019). Notably, higher risk rating scores are associated with lower risk, such that, an increase in the risk rating score reflects a decrease in the respective risk (Hammoudeh et al., 2013).

4. Model Specification

Following Muzindutsi et al. (2020), a linear and non-linear Autoregressive Distributed Lag (ARDL) approach is employed to investigate the relationships between the variables in the system. The ARDL approach introduced by Pesaran and Pesaran (1997) and Pesaran et al. (2001) is used to uncover the short- and long-run relationships between the variables irrespective of whether the variables are stationary at levels [I(0)], integrated at order one [I(1)] or mutually cointegrated like country risk ratings which are used in this study. Therefore, a key advantage of the ARDL approach is that it helps to overcome problems (such as, spurious regressions) associated with non-stationary data. Another advantage of the ARDL approach is that it determines more efficient cointegration relationships within small samples (Ghatak and Siddiki, 2001; Narayan, 2005). This, therefore, allows ETF markets with small samples to be included in the analysis.

Prior to the estimation of the ARDL model, the stationarity of the variables are examined to ensure that the variables are I(0) and/or I(1). In this study, the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test for stationarity and the augmented Dickey-Fuller (ADF) unit root test are used to assess the stationary of each variable. The ARDL model is then estimated for the market portfolio of South African ETFs with domestic benchmarks and the market portfolio of South African ETFs with international benchmarks. The ARDL approach employed in this study is a three-step procedure. The presence of cointegration among the variables is examined using the bounds-testing procedure in the first step. In step one, the following linear ARDL model is used for the bounds-testing procedure:

$$\Delta lnM_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta lnM_{t-i} + \sum_{i=0}^{n} \delta_i \Delta lnP_{t-i} + \sum_{i=0}^{n} \varphi_i \Delta lnF_{t-i} + \sum_{i=0}^{n} \vartheta_i \Delta lnE_{t-i} + \gamma_1 lnM_{t-1} + \gamma_2 lnP_{t-1} + \gamma_3 lnF_{t-1} + \gamma_4 lnE_{t-1} + \mu_t \qquad (1)$$

where ΔlnM represents the change in the natural logarithm of the respective ETF market return, and ΔlnP, ΔlnF, and ΔlnE represent the change in the natural logarithm of the political, financial, and economic risk rating scores, respectively. In the ARDL model above, β_i, δ_i, φ_i, and ϑ_i represent short-run coefficients whilst γ_1 - γ_4 represent long-run coefficients. α_0 and μ_t denote the constant and error terms, respectively. The optimal lag lengths for the bounds-testing procedure are determined using the Akaike Information Criteria (AIC). This is because the AIC tends to suggest a higher lag length and, thus, provides better insight into the ARDL by uncovering more features of the data (Lin et al., 2010). Following Ben Nasr et al. (2018), a maximum lag order of 12 is used since the data is of a monthly frequency. Noteworthy is that the null hypothesis of no cointegration implies that $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$.

The second step in the linear ARDL approach is to estimate the long-run coefficients by employing the ARDL (x, y, z, l) model -where the alphabets in parentheses represent the optimal lag length of each variable as selected by the bounds-testing procedure. The final step in the linear ARDL approach is to determine the short-run dynamics by estimating the error-correction model (ECM) that is associated with the long-run regression. The ECM is derived from Equation (1), and follows the following specification:

$$\Delta lnM_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta lnM_{t-i} + \sum_{i=0}^{n} \delta_i \Delta lnP_{t-i} + \sum_{i=0}^{n} \varphi_i \Delta lnF_{t-i} + \sum_{i=0}^{n} \vartheta_i \Delta lnE_{t-i} + \theta\mu_{t-1} + \varepsilon_t \quad (2)$$

where μ_{t-1} is the error-correction term (ECT), θ is the ECT coefficient which provides insight into the speed of adjustment with respect to the long-run equilibrium and ε_t denotes an error term.

Whilst the linear ARDL model is a popular technique employed to investigate the long- and short-run relationships between variables in the system, the linear ARDL model does not account for non-linearity in economic relationships. Following Muzindutsi et al. (2020), a non-linear ARDL (NARDL) model is estimated to supplement the findings of the linear ARDL models, and the results are compared. The following NARDL model is estimated to capture asymmetries in the long- and short-run relationships:

$$\Delta lnM_t = \alpha_0 + \sum_{i=1}^{n-1} \beta_{1i} \Delta lnM_{t-i} + \sum_{i=0}^{n-1} (\delta_{1i}^{+} \Delta lnP_{t-1}^{+} + \delta_{2i}^{-} \Delta lnP_{t-1}^{-}) + \sum_{i=0}^{n-1} (\varphi_{1i}^{+} \Delta lnF_{t-1}^{+} + \varphi_{2i}^{-} \Delta lnF_{t-1}^{-}) + \sum_{i=0}^{n-1} (\vartheta_{1i}^{+} \Delta lnE_{t-1}^{+} + \vartheta_{2i}^{-} \Delta lnE_{t-1}^{-}) + \gamma_1 lnM_{t-1} + \gamma_2^{+} lnP_{t-1}^{+} + \gamma_3^{-} lnP_{t-1}^{-} + \gamma_4^{+} lnF_{t-1}^{+} + \gamma_5^{-} lnF_{t-1}^{-} + \gamma_6^{+} lnE_{t-1}^{+} + \gamma_7^{-} lnE_{t-1}^{-} + \mu_t \quad (3)$$

where P^{+} and P^{-} represent an increase and decrease in the political risk rating, respectively. The same applies for economic and financial risk ratings. In line with the linear ARDL model, the null hypothesis of no cointegration implies that $\gamma_1 = \gamma_2^{+} = \gamma_3^{-} = \gamma_4^{+} = \gamma_5^{-} = \gamma_6^{+} = \gamma_7^{-} = 0$. If cointegration is present, the long-run coefficients are then estimated based on Equation (3). Additionally, the following ECM is estimated to examine the short-run relationships:

$$\Delta lnM_t = \alpha_0 + \sum_{i=1}^{n-1} \beta_{1i} \Delta lnM_{t-i} + \sum_{i=0}^{n-1} (\delta_{1i}^{+} \Delta lnP_{t-1}^{+} + \delta_{2i}^{-} \Delta lnP_{t-1}^{-})$$

$$+ \sum_{i=0}^{n-1} (\varphi_{1i}^{+} \Delta lnF_{t-1}^{+} + \varphi_{2i}^{-} \Delta lnF_{t-1}^{-}) + \sum_{i=0}^{n-1} (\vartheta_{1i}^{+} \Delta lnE_{t-1}^{+} + \vartheta_{2i}^{-} \Delta lnE_{t-1}^{-})$$

$$+\pi \mu_{t-1} + e_t \qquad (4)$$

where μ_{t-1} is the error-correction term and e_t denotes an error term.

The Wald test procedure is used to examine the asymmetry of the long-run effects of positive and negative changes in the ratings using the following null hypotheses; $\gamma_2^{+} = \gamma_3^{-}$, $\gamma_4^{+} = \gamma_5^{-}$, and $\gamma_6^{+} = \gamma_7^{-}$. Likewise, the asymmetry of the short-run effects of positive and negative changes in the ratings is examined using the Wald test procedure with the following null hypotheses: $\sum_{i=0}^{n-1} \delta_{1i}^{+} = \sum_{i=0}^{n-1} \delta_{2i}^{-}$, $\sum_{i=0}^{n-1} \varphi_{1i}^{+} = \sum_{i=0}^{n-1} \varphi_{2i}^{-}$, and $\sum_{i=0}^{n-1} \vartheta_{1i}^{+} = \sum_{i=0}^{n-1} \vartheta_{2i}^{-}$. Furthermore, to ensure that the estimated models do not violate the applicable econometric assumptions, diagnostics tests for autocorrelation, heteroscedasticity, and structural stability are conducted. Notably, if a model fails the parameter stability tests, a dummy variable is added to account for the 2008-2009 financial crisis which impacted global financial markets.

5. Empirical Results and Discussion

5.1. Descriptive Statistics

Table 1 summarises the descriptive statistics for the ratings and return series. The average political risk rating is 66.34 points whilst the average financial and economic risk ratings are 38.20 and 34.67 points, respectively. Based on the ICRG's methodology as outlined by Howell (2011), these statistics suggest that, on average, South Africa's political and economic risk was moderate whilst financial risk was low. With the exception of a few spikes in the ratings, South Africa's political, financial, and economic risk ratings remained fairly similar from November 2000 to December 2019 as indicated by their low standard deviations which are 2.66, 1.90, and 2.18 points, respectively. Notably, the average monthly return for the market of ETFs with domestic and international benchmarks is 1.20% and 0.98%, respectively. These statistics suggest that, on average, ETFs with domestic benchmarks performed better than ETFs with international benchmarks. This is not surprising because the returns of ETFs with international benchmarks are constrained by exchange rate volatility, mismatched trading times, and dividend withholding taxes (Steyn, 2019). Notably, the ARDL and NARDL models employed in this study use the natural logarithm of the ratings and return series as dependent and explanatory variables. Hence, the next section analyses the stationarity of the logarithmic data series. However, since the return series include negative returns, the logarithmic return series is computed by adding a constant value (specifically, 1) to each return prior to computing the natural logarithm.

Table 1. Descriptive Statistics

	Returns for the market of ETFs with domestic benchmarks	**Returns for the market of ETFs with international benchmarks**	**Political risk ratings**	**Financial risk ratings**	**Economic risk ratings**
Mean	0.012	0.010	66.341	38.202	34.670
Maximum	0.140	0.125	72.000	42.000	38.500
Minimum	-0.139	-0.133	61.500	31.500	29.000
Std. Dev.	0.044	0.044	2.657	1.900	2.181
Skewness	-0.243	-0.082	0.173	-0.641	0.045
Kurtosis	3.428	3.525	2.102	3.228	2.220
Jarque-Bera	4.023	2.154	8.874	16.238	5.904
Probability	0.134	0.341	0.012	0.000	0.052

5.2. Tests for Stationarity and Optimal Model Selection

The results of the ADF unit root tests and the KPSS tests for stationarity are presented in Table 2. For the ADF unit root test, the null hypothesis of a unit root in the series is rejected at a 1 percent level of significant for the logarithmic market return and financial risk ratings series at levels but at first difference for the logarithmic political and economic risk ratings series. Hence, the results of the ADF tests suggest that the logarithmic market return and financial risk ratings series are stationary at levels (that is, I(0)) whilst the logarithmic political and economic risk ratings series are stationary at first difference (that is, I(1)). These findings are further supported by the results of the KPSS tests which fail to reject the null hypothesis of stationarity in the series at levels for the logarithmic market return and financial risk ratings, and at first difference for the logarithmic political and economic risk ratings series. Overall, the results of stationary tests indicate that the series are a combination of I(0) and I(1) variables and there are no variables which are integrated of order 2 (that is, I(2)), thus, supporting the use of the linear and non-linear ARDL models.

Table 2. Stationary Results

Variable	**Model**	**ADF Test Statistic**		**KPSS Test Statistic**		**Order of Integration**
		Levels	***First Diff.***	***Levels***	***First Diff.***	
Segment A: Market of ETFs with Domestic Benchmarks						
lnM	Constant	-16.842*	--------	0.083	--------	I(0)
lnP	Constant	-2.200	13.694*	0.795*	0.061	I(1)
lnF	Constant	-4.573*	--------	0.178	--------	I(0)
lnE	Constant	-1.845	-14.551*	1.254*	0.049	I(1)
Segment B: Market of ETFs with International Benchmarks						
lnM	Constant	-14.092*	--------	0.188	--------	I(0)
lnP	Constant	-2.287	-12.620*	1.238*	0.111	I(1)
lnF	Constant	-4.195*	--------	0.144	--------	I(0)
lnE	Constant	-1.910	-12.299*	0.821*	0.049	I(1)

Notes: The *, **, *** represent statistical significance at a 1%, 5%, and 10% level of significance, respectively.

After evaluating 26 364 ARDL models for each market, the Eviews statistical programme suggests the ARDL(8,9,0,3) and ARDL(1,5,0,9) models as optimal for the market of ETFs with domestic benchmarks and the market of ETFs with international benchmarks, respectively. Regarding the NARDL models, the Eviews statistical programme evaluated 57 921 708 models for each market, and suggests the NARDL(6,1,2,5,0,0,0) and NARDL(1,12,8,0,2,2,12) models as optimal for the market of ETFs with domestic benchmarks and the market of ETFs with international benchmarks, respectively. These models are selected because they minimize the AIC as illustrated in Appendix A. Further analysis suggests that AIC favours the linear ARDL(8,9,0,3) model over the NARDL(6,1,2,5,0,0,0) model for the market of ETFs with domestic benchmarks because the information criteria is minimized in the linear ARDL model.

Table 3. Wald Test Results

Null hypothesis	Segment A: Market of ETFs with Domestic Benchmarks	Segment B: Market of ETFs with International Benchmarks
	F-statistic	**F-statistic**
$\gamma_2^+ = \gamma_3^-$	4.431**	2.486
$\gamma_4^+ = \gamma_5^-$	0.162	1.320
$\gamma_6^+ = \gamma_7^-$	0.036	6.036**
$\sum_{i=0}^{n-1} \delta_{1i}^+ = \sum_{i=0}^{n-1} \delta_{2i}^-$	3.978**	0.751
$\sum_{i=0}^{n-1} (\varphi_{1i}^+) = \sum_{i=0}^{n-1} (\varphi_{2i}^-)$	----	----
$\sum_{i=0}^{n-1} (\vartheta_{1i}^+) = \sum_{i=0}^{n-1} (\vartheta_{2i}^-)$	----	8.153*

Notes: The *, **, *** represent statistical significance at a 1%, 5%, and 10% level of significance, respectively. The missing Wald test statistics are because, in the short-run, economic risk ratings (increases and decreases) and decreases in financial risk ratings do not impact ETFs with domestic benchmarks whilst increases in financial risk ratings do not impact ETFs with international benchmarks.

One of the limitations of the study by Muzindutsi et al. (2020) is that the optimal model between the ARDL and NARDL models are selected using only information criteria. However, this may often lead to the incorrect conclusions. Hence, this study employs the Wald test to further support the choice of the optimal model. In this study, the Wald test results do not concur with the results of the information criteria – that the linear ARDL model is optimal for ETFs with domestic benchmarks. Specifically, the results of the Wald test procedure which are presented in Table 3 suggests that political risk exhibits significant asymmetric effects on the returns of ETFs with domestic benchmarks in both the long- and short-run. Additionally, the Wald test results suggest that economic risk exhibits significant asymmetric effects on the returns of ETFs with international benchmarks in both the long- and short-run. Due to the presence of significant asymmetric effects in both markets, the non-linear ARDL models are selected as optimal, and these results are interpreted in the subsequent sections.

5.3. Analysis of Long-run Relationships

The results of the bounds-testing procedure and the long-run equations are presented in Table 4. The F-statistics in the NARDL models estimated for both markets are statistically significant at a 1 percent level of significance as they exceed the upper bound critical values. Hence, the null hypothesis of no long-run cointegration amongst the variables in the system is rejected for both markets. Therefore, the results of the bounds-testing procedure indicate that long-run cointegration is present between market returns and political, economic, and financial risk ratings. Given that long-run cointegration is present between the variables in the system, the next step is to estimate the long-run coefficients in order to obtain a deeper understanding of the long-run relationships.

The results of the Wald test procedure suggests that country risk shocks exhibit a significant asymmetric effect on the ETF returns in the long-run. Accordingly, the analysis of the long-run relationships focuses on the long-run equations from the NARDL models which are presented in Table 4. An increase (decrease) in the country risk rating implies a decrease (increase) in the respective country risk component. Therefore, for the market of ETFs with domestic benchmarks, decreases and increases in political risk exhibit positive effects on returns whilst decreases and increases in financial and economic risks exhibit negative effects on returns. This contrasting effect of political risk and economic and financial risks could be attributed to herding effects and information inefficiencies which hamper the processing of new information in a fundamental manner (Ben Nasr et al., 2018).

Overall, political risk changes exhibit the greatest impact on the returns of ETFs with domestic benchmarks – in particular, a 1% decrease in political risk increases returns by 0.676% whilst a 1% increase in political risk increases returns by 0.447%. This increase in returns as a result of changes in political risk suggest that, when political risk fluctuates in South Africa, investors drift towards investing in ETFs with domestic benchmarks which may be perceived as risk-reducing due to their diversification benefits. This phenomenon could be attributed to the portfolio adjustment effect which describes the tendency of investors to redistribute their portfolios during fluctuations in risk (Markowitz, 1952). Notably, the market for ETFs with domestic benchmarks is most sensitive to decreases in South Africa's political risk, thereby, suggesting that increasing the returns of ETFs with domestic benchmarks requires a decrease in South Africa's political risk. Nevertheless, the high sensitivity of returns to political risk is consistent with the findings of Muzindutsi et al. (2020) and Nhlapho and Muzindutsi (2020) who report that the South African housing and stock markets are most sensitive to political risk relative to financial and economic risks. This is in line with the notion that political risk is one of the main drivers of returns in emerging markets (Bilson et al., 2002).

Table 4. Bounds Cointegration Test Results and Long-run Equations

Model	**AIC**	**F-statistic**	**Sign. Levels**	**ARDL bounds F-critical values**		**Conclusion**
				Lower bound	***Upper bound***	
Segment A: Market of ETFs with Domestic Benchmarks						
ARDL (8,9,0,3)	-3.545	7.930	5% 1%	2.79 3.65	3.67 4.66	Co-integrated
	Long-run Equation: lnM = 0.607lnP - 0.147lnF - 0.139lnE - 0.645					
NARDL (6,1,2,5,0,0,0)	-3.514	4.719	5% 1%	2.27 2.88	3.28 3.99	Co-integrated
	Long-run Equation: lnM = 0.676lnP^{+} $+$ 0.447lnP^{-} - 0.182lnF^{+} - 0.120lnF^{-} - 0.189lnE^{+} - 0.239lnE^{-} - 0.0002					
Segment B: Market of ETFs with International Benchmarks						
ARDL (1,5,0,9)	-3.406	35.623	5% 1%	2.79 3.65	3.67 4.66	Co-integrated
	Long-run Equation: lnM = - 0.009lnP $+$ 0.034lnF - 0.081lnE $+$ 0.210					
NARDL (1,12,8,0,2,2,12)	-3.513	25.238	5% 1%	2.27 2.88	3.28 3.99	Co-integrated
	Long-run Equation: lnM $=$ 0.116lnP^{+} + 0.735lnP^{-} + 0.073lnF^{+} - 0.017lnF^{-} - 0.217lnE^{+} - 0.317lnE^{-} + 0.006					

Similar effects of political and economic risk are present in the market of ETFs with international benchmarks. Specifically, political risk decreases and increases also exhibit a positive effect on the returns whilst economic risk decreases and increases exhibits a negative effect on the returns. However, decreases in financial risk increase the returns whilst increases in financial risk decrease the returns. Overall, both markets display the lowest sensitivity to financial risk. In contrast to ETFs with domestic benchmarks, ETFs with international benchmarks display the highest sensitivity to increases in political risk – in particular, a 1% increase in political risk leads to a 0.735% increase in the returns of ETFs with international benchmarks. This finding suggests that investors overreact to bad news relating to political risk due to their risk aversion (Ben Nasr et al., 2018). Together, the long-run coefficients suggest that decreases in political risk and increases and decreases in financial risk exhibits a lower impact on the market of ETFs with international benchmarks, thereby, suggesting that ETFs with international benchmarks can be used to reduce an investors exposure to decreases in political risk and financial risk increases and decreases in the long-run. On the contrary, increases in political risk and economic risk increases and decreases exhibits a lower impact on the market of ETFs with domestic benchmarks, subsequently, suggesting that ETFs with domestic benchmarks can be used to decrease an investors exposure to increases in political risk and economic risk increases and decreases in the long-run.

5.4. Analysis of Short-run Relationships

The Wald test results suggest that, in the short-run, country risk exhibits significant asymmetric effects on both markets and, therefore, this section discusses the short-run results of the NARDL models which are presented in Table 5. The error-correction terms (ECT) are negative and statistically significant at a 1% level of significance in both NARDL models. It suggests that there is convergence from the short-run to the long-run which, thereby, provides further evidence of cointegration among the variables in the system. Notably, Johansen (1995, 46) proposes that the stability condition for error-correction models is that the error-correction terms should be greater than -2 but less than 0, therefore, all the coefficients estimated for the error-correction terms meet the stability condition. However, the error-correction terms in both models are less than (or more negative) than -1 which implies that the process of error correction fluctuates around the long-term value in a dampening manner but convergence to the equilibrium is quick once this error correction process is complete (Narayan and Smyth, 2006).

Table 5. NARDL Short-run Results

Segment A: Market of ETFs with Domestic Benchmarks		**Segment B:** Market of ETFs with International Benchmarks	
Variable	**Coeff.**	**Variable**	**Coeff.**
$D(lnM(-1))$	-0.040	$D(lnP^{+})$	-0.668
$D(lnM(-2))$	-0.020	$D(lnP^{+}(-1))$	0.110
$D(lnM(-3))$	0.010	$D(lnP^{+}(-2))$	1.457*
$D(lnM(-4))$	-0.029	$D(lnP^{+}(-3))$	1.980*
$D(lnM(-5))$	-0.174*	$D(lnP^{+}(-4))$	0.906
$D(lnP^{+})$	2.104**	$D(lnP^{+}(-5))$	0.417
$D(lnP^{-})$	-1.374	$D(lnP^{+}(-6))$	0.783
$D(lnP^{-}(-1))$	-1.444	$D(lnP^{+}(-7))$	0.253
$D(lnF^{+})$	-0.278	$D(lnP^{+}(-8))$	2.279*
$D(lnF^{+}(-1))$	-0.506	$D(lnP^{+}(-9))$	0.353
$D(lnF^{+}(-2))$	-0.814**	$D(lnP^{+}(-10))$	0.344
$D(lnF^{+}(-3))$	0.291	$D(lnP^{+}(-11))$	-1.435**
$D(lnF^{+}(-4))$	-0.893**	$D(lnP^{-})$	0.880
ECT	-1.051*	$D(lnP^{-}(-1))$	-0.562
		$D(lnP^{-}(-2))$	-0.822
		$D(lnP^{-}(-3))$	-1.847*
		$D(lnP^{-}(-4))$	0.897
		$D(lnP^{-}(-5))$	-0.491
		$D(lnP^{-}(-6))$	-2.868*
		$D(lnP^{-}(-7))$	-1.329***
		$D(lnF^{-})$	-0.211
		$D(lnF^{-}(-1))$	0.299***
		$D(lnE^{+})$	-0.965*
		$D(lnE^{+}(-1))$	-1.247*
		$D(lnE^{-})$	0.290
		$D(lnE^{-}(-1))$	0.214
		$D(lnE^{-}(-2))$	0.721*
		$D(lnE^{-}(-3))$	0.195
		$D(lnE^{-}(-4))$	1.010*
		$D(lnE^{-}(-5))$	0.013
		$D(lnE^{-}(-6))$	0.706**
		$D(lnE^{-}(-7))$	-0.245
		$D(lnE^{-}(-8))$	0.853*
		$D(lnE^{-}(-9))$	0.807*
		$D(lnE^{-}(-10))$	-0.120
		$D(lnE^{-}(-11))$	0.812*
		ECT	-1.177*

Notes: The *, **, *** represent statistical significance at a 1%, 5%, and 10% level of significance, respectively.

Hence, the error-correction terms which are less than -1 suggest that the deviations from equilibrium are reduced in less than one month (Olczyk and Kordalska, 2017). This short duration to restore equilibrium in both ETF markets could be attributed to the presence of high liquidity in ETF markets (Wu et al., 2021).

The returns of ETFs with domestic benchmarks are negatively and significantly related to historical returns ($D\big(lnM(-5)\big)$) at a 1 percent level of significance. This negative autocorrelation in the returns could be attributed to time-varying expected returns, feedback trading, or non-synchronous trading. In addition, the short-run dynamics in Table 5 suggest that country risk shocks exhibit significant effects on both markets in the short-run. Specifically, the returns of ETFs with domestic benchmarks significantly increase when political risk in the current period decreases ($D(lnP^{+})$) but significantly decrease when historical financial risk decrease ($D(lnF^{+}(-2))$ and $D(lnF^{+}(-4))$). The market of ETFs with international benchmarks shows significant responses to historical political risk decreases ($D(lnP^{+}_{t-2}), D(lnP^{+}_{t-3}), D(lnP^{+}_{t-8}), D(lnP^{+}_{t-11})$). In addition, historical political risk increases ($D(lnP^{-}_{t-3}), D(lnP^{-}_{t-6}), D(lnP^{-}_{t-7})$) exhibit significant negative effects on the returns of ETFs with international benchmarks. Likewise, these returns also decrease when economic risk decreases in the current ($D(lnE^{+})$) and lagged one month ($D(lnE^{+}_{t-1})$) periods. On the contrary, increases in historical financial risk ($D(lnF^{-}_{t-1})$)and economic risk ($D(lnE^{-}_{t-2}), D(lnE^{-}_{t-4}), D(lnE^{-}_{t-6}), D(lnE^{-}_{t-8}), D(lnE^{-}_{t-9}), D(lnE^{-}_{t-4})$) lead to an increase in the returns of ETFs with international benchmarks.

Overall, these short-run dynamics suggest that the returns of ETFs with domestic benchmarks do not respond to shocks in political, economic, and financial risk ratings in a uniform manner. This is also the case with ETFs with international benchmarks. These differential effects could be a result of information inefficiencies which prevents investors from processing information in a fundamental manner (Ben Nasr et al., 2018). Consistent with the long-run estimations, the magnitude of the short-run coefficients suggest that the returns of both markets are most sensitive to changes in political risk ratings even in the short-run. Notably, the returns of ETFs with domestic benchmarks are not sensitive to changes in economic risk as well as increases in financial risk and, therefore, may limit an investors exposure to these shocks in the short-run. On the contrary, the returns of ETFs with international benchmarks are not sensitive to decreases in financial risk and, accordingly, could limit an investors exposure to financial risk decreases in the short-run. Therefore, it is important that investors consider these varying risk sensitivities when hedging against country risk shocks.

5.5. Diagnostics Tests

The results from the diagnostics and parameter stability tests are provided in Table 6 for the ARDL and NARDL models estimated for both markets. In the Breusch-Godfrey test, the null hypothesis of no serial correlation is not rejected, subsequently, indicating that autocorrelation is not present in the estimated models. Additionally, the null hypothesis of homoscedasticity is not rejected by the White test for heteroscedasticity which, therefore, indicates that the residuals in all models are homoscedastic. Finally, the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) graphs suggest that the models are stable. However, it is important to note that, the ARDL model estimated for the market of ETFs with domestic benchmarks did not pass the initial parameter stability tests. Hence, a dummy variable was included to account for the 2008 global financial crisis. Thereafter, the ARDL model with the dummy variable estimated for the market of ETFs with domestic benchmarks passed the parameter stability tests. The reason for these outliers could be the 2008 global financial crisis which impacted global financial markets, including South African financial markets (Muzindutsi et al., 2020).

Table 6. Results of the Diagnostics Tests

Model	Breusch-Godfrey Test for Serial Correlation		White Test for Heteroscedasticity		CUSUM and CUSUMSQ
	F-stat.	***P-value***	***F-stat.***	***P-value***	
Segment A: Market of ETFs with Domestic Benchmarks					
ARDL	0.937	0.487	1.510	0.068	All models are stable at a 5% level of significance.
NARDL	1.348	0.222	1.640	0.046	
Segment B: Market of ETFs with International Benchmarks					
ARDL	0.895	0.522	0.657	0.848	
NARDL	0.342	0.947	0.693	0.913	

5.5. Discussion of Findings

In summary, the results of the stationarity tests suggest that the market returns and country risk ratings are a mixture of I(0) and I(1) variables and, therefore, the use of ARDL and NARDL models is appropriate for examining the long- and short-run relationships between disaggregated country risk and market return. The results of the Wald test procedure confirm that the effects of country risk components on market returns is asymmetric in both the long- and short-run and, subsequently, the NARDL models are selected as optimal. F-statistics of the bounds-testing procedure confirm the presence of long-run cointegration amongst country risk components and the respective market returns. The results of the NARDL models indicate that, in the long-run, increases and decreases in political risk lead to an increase in the returns of both markets whilst increases and decreases in economic risk lead to a decrease in the returns. With respect to financial risk, increases and decreases in financial risk lead to a decrease in the returns of ETFs with domestic benchmarks whilst increases in financial risk lead to a decrease in the returns of ETFs with international benchmarks but decreases in financial risk lead to an increase in these returns.

Overall, ETFs with domestic benchmarks show the highest sensitivity towards decreases in political risk, however, ETFs with international benchmarks show the highest sensitivity towards increases in political risk. The high sensitivity of ETFs with international benchmarks towards increases in South Africa's political risk could be attributed to a flight-to-safety phenomenon in which investors' risk aversion causes investors to move towards securities with international exposure as they are expected to perform better during periods of heightened uncertainty in the local market. These findings are consistent with the findings of Muzindutsi et al. (2020) and Nhlapho and Muzindutsi (2020) who report that South African markets are highly sensitive towards political risk in comparison to financial and economic risks. Notably, ETFs with domestic benchmarks show a lower sensitivity towards increases and decreases in economic risk and increases in political risk, thereby, suggesting that these ETFs could be used to reduce an investor's exposures to these respective risks in the long-run. On the contrary, ETFs with international benchmarks could be used to reduce an investor's exposure towards increases and decreases in financial risk and decreases in political risk because these ETFs display lower sensitivity to these risks in the long-run relative to ETFs with domestic benchmarks.

In the short-run, decreases in contemporaneous political risk significantly increase the returns of ETFs with domestic benchmarks but decreases in historical financial risk and historical market returns significantly reduce these returns. For

ETFs with international benchmarks, decreases in historical political risk and increases in historical financial and economic risk significantly increase their returns. However, their returns are significantly reduced by increases in historical political risk and decreases in current and historical economic risk. Overall, ETFs with domestic benchmarks exhibit no sensitivity towards increases in financial risk and any changes in economic risk whilst ETFs with international benchmarks exhibit no sensitivity towards only decreases in financial risk. These findings suggest that country risk shocks impact ETF markets differently and, therefore, investors should consider the different sensitivities of these markets when attempting to reduce their short- and long-term exposures to country risk shocks.

Noteworthy is that these findings have important implications for market efficiency and market quality. Fama (1965) argues that, if markets are efficient, all available information would be incorporated in prices, such that, the market should only respond to developments that are not expected. However, when a market is significantly influenced by contemporaneous country risk shocks, it indicates that the market is unable to anticipate these risk changes or that these risk changes are not effectively priced if they were anticipated, subsequently, implying that markets are not efficient (Hammoudeh et al., 2013). This lack of efficiency may be due to insufficient disclosure of information or insider trading (Hammoudeh et al., 2013). Furthermore, lagged values of country risk shocks can be used to significantly explain returns and, thus, provides evidence against market efficiency. Notably, the significant effects of shocks in South Africa's country risk components on the returns of ETFs with international benchmarks provides further evidence against market efficiency because Lee and Chen (2020) assert that, if market efficiency holds, then ETFs should only be exposed to risks in their home country and not risks in the country they trade. However, the significant effects of South Africa's country risk changes on the returns of ETFs with international benchmarks may be a result of investors' behavioural biases or underlying correlations between South Africa and the countries on which the international benchmarks are based (Levy and Lieberman, 2013). Overall, this loss of efficiency could pose a threat to the overall quality of the South African ETF market by creating mispricing and incorrect valuations of JSE-listed ETFs.

6. Conclusion

This study investigates the long- and short-run effects of disaggregated country risk components on the returns of the South African ETF market. To achieve its objectives, this study employs linear and non-linear ARDL models and, the South African ETF market is segregated into a market of ETFs replicating domestic benchmarks and a market of ETFs replicating international benchmarks. The findings of this study indicate that the effect of country risk shocks on the return of ETF markets is asymmetric in the long- and short-run. In the long-run, ETFs with domestic benchmarks are most sensitive to political risk decreases but ETFs with international benchmarks are most sensitive to political risk increases. Together, these findings support the notion that political risk is one of the key drivers of returns in emerging markets. In the short-run, ETFs with domestic benchmarks are only influenced by its own preceding adjustment and political and financial shocks whilst all country risk components have implications for ETFs with international benchmarks. The magnitude of the sensitivities to country risk shocks differs across markets in both the long- and short-run and, therefore, each market is unique in terms of its ability to assist investors in reducing their risk exposures to specific country risk shocks. These findings have important implications for the overall efficiency and quality of the South African ETF market and, therefore, it is vital that regulators and policymakers implement policies which ensure stable political, economic, and financial environments in an attempt to increase market efficiency. Amongst other factors, these policies could relate to corruption, bureaucratic quality, real GDP growth, inflation rates, net international liquidity, and exchange rate stability.

For investors and fund managers, the findings of this study can be used to improve their market timing strategies especially when trading in the South African ETF market. Given that the market for ETFs with domestic benchmarks and the market of ETFs with international benchmarks respond differently to shocks in country risk components, these findings suggest that investors can use specific ETFs (based on their benchmarking strategy) to limit their exposures to specific country risk components. However, it is also important that investors ensure that their ETF trading decisions are not biased as this could further deteriorate the efficiency of the South African ETF market. Hence, future research could explore the effect of disaggregated country risk components on the pricing efficiency of ETFs as this could provide further insight into the effects of country risk shocks on market efficiency and quality. Future studies could also explore the effects of country risk on ETFs trading in other emerging and African countries in order to identify any similarities or differences in their responses.

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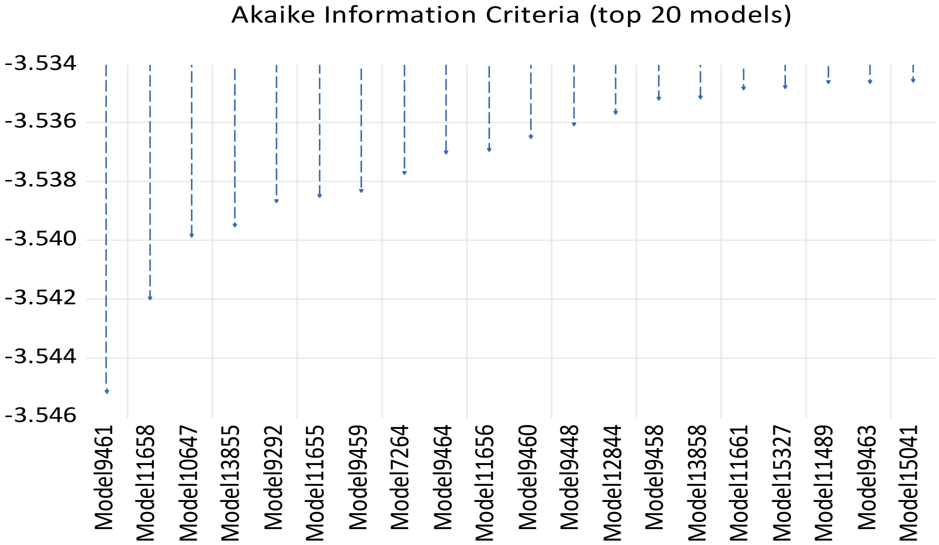
APPENDICES

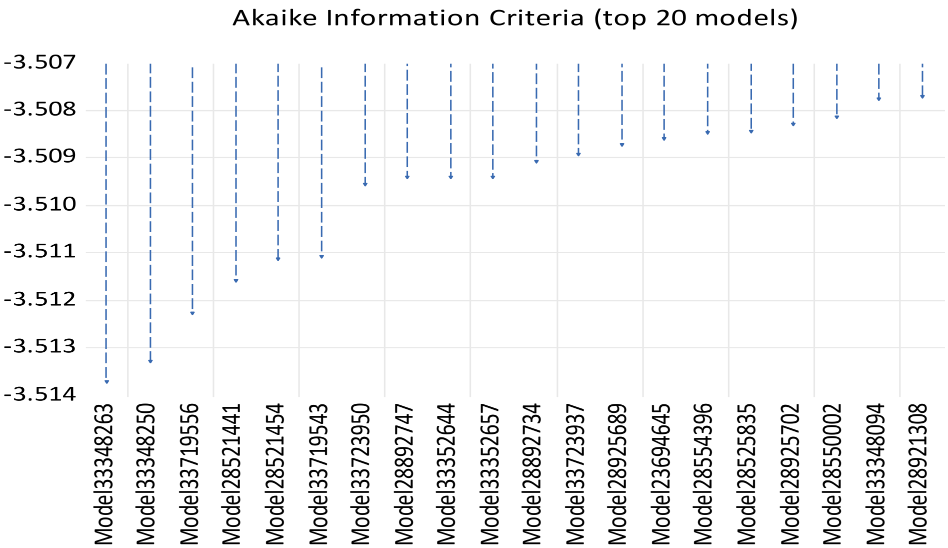
Appendix A: Optimal Lag Length Selection

A1. Segment A: Market of ETFs with Domestic Benchmarks

A1.1. Optimal Lag Length Selection for ARDL Model

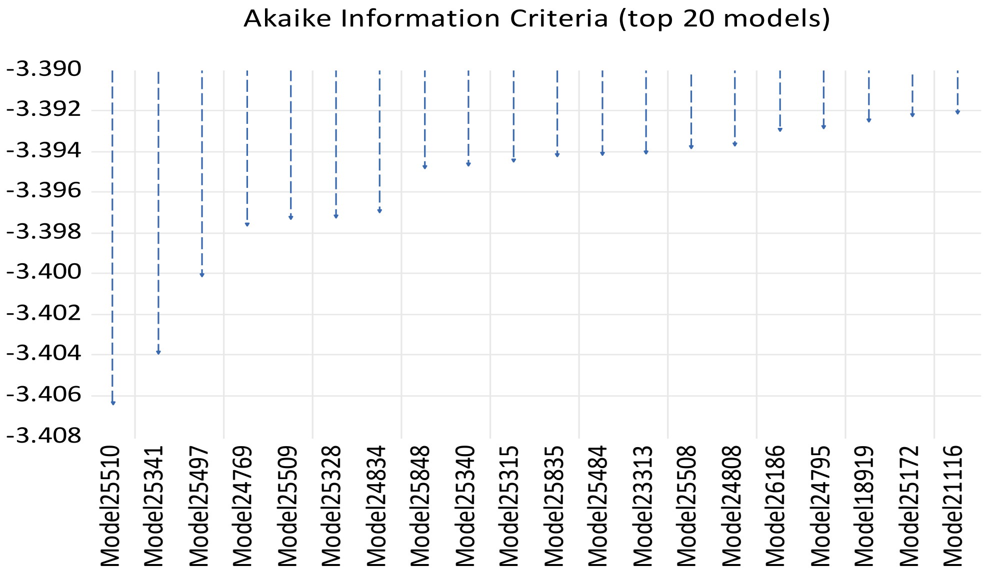


A1.2. Optimal Lag Length Selection for NARDL Model



A2. Segment B: Market of ETFs with International Benchmarks

A2.1. Optimal Lag Length Selection for ARDL Model



A2.2. Optimal Lag Length Selection for NARDL Model