

-RESEARCH ARTICLE-

THE IMPACT OF DISAGGREGATED COUNTRY RISK ON THE SOUTH AFRICAN EQUITY AND BOND MARKET

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—Abstract—

The relation between asset returns and country risk is an important issue for international investors seeking diversification opportunities in emerging markets, particularly in South Africa. This paper aims to evaluate the impact of economic, financial and political components of country risk on stock and bond returns. A non-linear autoregressive distributed lag (NARDL) model was used to analyse the time-varying dynamic relationship between the country risk components and the two financial asset markets for a sample of 15 years monthly data. We found an asymmetric relationship between country risk and asset returns of the two markets. Political risk has long-run and short-run implications on stock and bond returns, while economic risk only has short-run effects on bond returns. These results suggest that international investors should carefully consider different components of country risk when seeking diversification opportunities.

Key Words: *Financial markets, Financial risk, Political risk, Economic risk*

JEL Classification: G20; E44

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1. INTRODUCTION

Over the past few decades, South African stock and bond markets have grown to become the largest and most liquid financial markets in the African continent (World Investment Report, 2018). The growth in these markets has been attributed to domestic financial liberalization, macroeconomic stability and increased private capital flows (Andrianaivo and Yartey, 2009). Despite having good indicators, South Africa's economy continues to face economic challenges, such as political instability, low economic growth, high inflation, among others (IMF, 2018). These challenges pose uncertainties arising from the instability in the political and economic environment, thus consequently increasing the risk of investing in South African markets. The risk level of a country is reflected in risk ratings compiled by rating agencies. Such ratings are among the main reference tools used by investors and governments to assess the risk level of a country (Sensoy, Eraslan and Erturk, 2016). The ratings send strong signals about a country's overall economic health to domestic and international investors. A change in country risk ratings can pose challenges for businesses and government. Prior to 2012, South Africa experienced consecutive periods of long-term credit rating upgrades but this changed after the last quarter of 2012, when economic events forced several agencies to revise credit ratings downwards. Since then, there have been numerous occasions where agencies downgraded ratings and outlook for South Africa (SARB, 2019). In 2017, two rating agencies downgraded South Africa's sovereign credit ratings to sub-investment grade, resulting in significant sell-offs of domestic bonds (SARB, 2019). The downward trend has continued in domestic bond markets, further highlighting investor concerns regarding the country's domestic challenges.

The response of asset returns to country risk indicators has been well documented in the literature. Christopher, Kim and Wu (2012) found evidence of a significant impact of country risk on emerging market assets, whereas, Sensoy et al. (2016) failed to find supporting evidence; thus, leading to the conclusion that the information conveyed by credit risk ratings about country risk, has already been factored into asset prices. Although research on the linkages between disaggregated country risk and stock markets exists (Nasr, Cunado, Demirer and Gupta, 2018; Mensi, Hammoudeh, Yoon and Balcilar, 2017; Mensi, Hammoudeh, Yoon and Nguyen, 2016; Sari, Uzunkaya and Hammoudeh, 2013), the evidence of the role of disaggregated country risk on bond markets is scant and there is no agreement on the effect of each component of country effect on stock and bond markets. Furthermore, the relationship between country risk and financial markets

has mostly been analysed under the assumption of symmetric effects (Liu, Hammoudeh and Thompson, 2013; Sari et al., 2013) without acknowledging the asymmetric behavior of financial markets. Thus, analysing this relationship in an asymmetric manner may provide further insight on this topic as we argue that the effect of country risk components is not constant across asset return distribution. Consequently, this study employs a nonlinear approach to investigate the long- and short-run effect of the financial, economic and political components of country risk on the stock and bond market returns in South Africa.

2. LITERATURE REVIEW

This study relates to the growing strand of literature that examines the impact of country risk ratings on financial markets. The impact of country risk on financial markets has been studied extensively in developed and emerging markets (Hammoudeh, Sari and Uzunkaya, 2013; Erb, Harvey and Vistanka, 1996). Erb et al. (1996) were one of the early researchers to investigate formally the relationship between credit ratings and financial markets. The study found that country credit ratings had a significant influence on expected equity returns. The literature shows similar evidence suggesting that rating downgrades have a larger impact when compared to rating upgrades. For example, a study conducted by Brooks et al. (2004) shows that rating downgrades have a significant and negative impact on domestic stock markets and dollar value of a country's currency, while finding no significant impact of rating upgrades. Li, Jeon and Chiang (2007) found that stock returns across Asian countries were influenced by changes in their domestic as well as global markets' foreign currency sovereign credit ratings. Furthermore, Ferreira and Gama (2007) argue that the effects of downgrades are even more significant in emerging markets. This is supported by Christopher, Kim and Wu (2012) who show that rating announcements had a more significant negative influence for Latin American countries with higher foreign currency debt ratings. In contrast, Sensoy et al. (2016) found that, in general, rating announcements did not influence stock return co-movements.

While the aforementioned studies are important for understanding the impact of country risk on financial markets, there is a growing awareness of the different effects of economic, political and financial risk ratings of a country risk index. Using disaggregated country risk, Erb et al. (1996) found that a decrease in financial risk ratings increased fixed-income returns. Sari et al. (2013) found evidence of a long-run relationship for all three country risk components and stock market movements in Turkey. However, only political and financial risk

ratings had a positive and significant impact on stock market movements in the short-run. Hammoudeh et al. (2013) found that when comparing the responses of stock markets in Brazil, Russia, India, China and South Africa (BRICS) to their own country's risk ratings, China was the only stock market to respond to changes in all country risk rating factors as well as global factors. In a similar study, Liu et al. (2013) show that the positive and negative shocks to country risk components have asymmetric effects on BRICS stock markets. Using a dynamic panel threshold model to examine the nonlinear relationship between stock returns and country risk ratings of BRICS countries, Mensi et al. (2016) found that behaviour of BRICS stock markets mainly depended on market conditions. The analysis shows an asymmetric relationship between political and financial risk ratings and the BRICS stock market returns. The study found that an increase in financial risk ratings had a positive and significant influence on stock market performance during economic upturn, whilst a decrease in financial risk ratings had a negative effect. However, the study found no significant relationship between country risk and BRICS stock returns in the short run. In contrast, Mensi et al. (2017) show that only financial risk ratings have a significant positive effect on stock returns of GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE) but no significant effect of political and economic risk ratings on stock returns. Nasr et al. (2018) provide evidence that economic, financial and political risk have asymmetric effects on stock market returns of individual BRICS stock markets as well as on commodity prices. Although the empirical evidence points to a relationship between country risk and asset returns, the conclusions are varied. We extend this line of research by adding bond market returns to our empirical setting to assess the impact of economic, financial and political risk on asset markets.

When examining the impact of risk ratings across stocks and bonds, Pukthuanthong, Elayan and Rose (2007) concluded that ratings provide new information to financial markets, therefore, affect bond and stock markets. The study also found that rating downgrade events have a significant negative impact on both markets. Afonso, Furceri and Gomes (2011) examined the impact of sovereign credit rating announcements of upgrades and downgrades on sovereign bond yield spreads in European Union countries and found that government bond yield spreads are influenced by changes in credit ratings and rating outlooks. Consistent with the evidence of impact of rating changes, Afonso, Gomes and Taamouti (2014) show that sovereign rating downgrades significantly increased stock and bond market volatility but there were no significant effects imparted by

rating upgrades. Chow, Gupta, Suleman and Wong (2017) employed linear and nonlinear causality techniques to examine the relationship between economic, financial and political risk on government bond spreads for BRICS countries and Portugal, Italy, Ireland, Greece and Spain (PIIGS) economies and found a strong long run relationship between the various risks and bond spreads for both BRICS and PIIGS. However, not all risks strongly predict bond spread for both BRICS and PIIGS. For example, the study found a strong causal relationship between political risk and BRICS bond spreads, but a weak relationship between bond spreads and financial risk. Mutize and Gossel (2019) examined the impact of sovereign rating announcements on stock of 19 African countries and found that a sovereign rating downgrades resulted in negative stock and bond returns.

The study by Mutize and Gossel (2019) examined the impact of country risk ratings on stock and bond markets in the South African context but it used credit rating scores, which are not disaggregated. Thus, our study provides a complementary dimension of disaggregating the multidimensional measure of the country risk index into economic, financial and political risk factors. Knowledge of whether all components of country risk factors have the same impact on stock and bond markets is limited. Our study contributes to the growing strand of research that seeks to show a relationship between economic, financial and political risk and financial assets.

3. DATA AND METHODOLOGY

3.1. Sample and data description

The study uses monthly data spanning the period 1 January 2001 to 31 December 2015 for domestic stock index, bond index and country risk in South Africa. The period was selected based on the country risk data at the disposal of the researchers. The stock market is represented by the Johannesburg Stock Exchange (JSE) All Share Index (ALSI), which is composed of 150 JSE-listed companies, while the bond market is represented by All Bond Indices (ALBI) composed of the top 20 vanilla bonds ranked dually by liquidity and market capitalisation (JSE, 2019). Both indices are denominated in the local currency (Rand) and deflated by the CPI to reflect real asset prices. The stock and bond returns are computed as the difference in logarithm between two consecutive prices. The monthly real returns on stock and bond prices are calculated as, $r_t = \log(p_t) - \log(p_{t-1})$, where r_t is the compounded return, p_t is the real price in period t . Country risk rating information was gathered from the International Country Risk Guide (ICRG) of Political Risk services (PRS). The risk rating consists of 22 indicators categorised

into three risk rating components, namely political risk, financial risk and economic risk. The scores range from zero to 50 for political risk and 0 to 25 for economic and financial risk (ICRG, 2017). A high risk rating value indicates a low level of risk. We also considered the logarithmic changes in components of country risk.

3.2. Model specification

The study employs a non-linear autoregressive distributed lag (NARDL) model, which is an asymmetric extension of the linear ARDL approach originated by Pesaran & Shin (1999). The NARDL used allows for jointly modelling the long- and short-run asymmetries among variables. This model was selected because it examines the asymmetric interactions across variables by distinguishing between positive and negative changes in explanatory variables via partial sums (Shin et al., 2014). The NARDL has the advantage of detecting the hidden long-run relationship resulting from cointegration of positive and negative components identified in a study by Granger and Yoon (2002). In addition, the NARDL model can test for cointegration between data series with different orders of integration as long as none of them are integrated of order 2, I (2). Before estimating the model, the augmented Dicker-Fuller (ADF) test and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test are carried out to check for stationarity and the order of integration of variables. In general, the results of the ADF test and KPSS test reveal that the financial market return series are stationary at levels and the country risk components are stationary at levels and in the first difference, therefore, justifying the need for specification that deals with a mixture of I(1) and I(0).

The standard ARDL enables the investigation of the short- and long-run relationships between country risk components and asset market returns but fails to account for the possibility of nonlinear effects, which was found to be the case in the recent literature (see Liu et al., 2013; Mensi et al., 2016; Nasr et al., 2018). We follow the NARDL methodology of Shin et al. (2014) to determine the asymmetric impact of country risk components on asset market returns. The NARDL approach is the best for examining the dynamic interaction of stock and bond markets and the three components of country risk because it allows for long- and short-run asymmetries. The NARDL model of Shin et al. (2014) is built around the asymmetric long-run equilibrium relationship:

$$y_t = \rho^+ x_t^+ + \rho^- x_t^- + u_t \quad (1)$$

Where u_t is a stationary zero-mean error process that represents deviations from the long-run equilibrium, ρ^+ and ρ^- are the associated asymmetric long-run parameters and x_t is the vector of regressors that captures the asymmetric behaviour of each of the independent variables by decomposing them into their positive and negative partial sums, as follows:

$$x_t = x_0 + x_t^+ + x_t^- \quad (2)$$

The general form for the positive and negative partial sums of x_t are expressed in the following way:

$$x_t^+ \sum_{j=1}^t \Delta x_t^+ = \sum_{j=1}^t \max(\Delta x_j, 0) \text{ and } x_t^- \sum_{j=1}^t \Delta x_t^- = \sum_{j=1}^t \min(\Delta x_j, 0) \quad (3)$$

Where x_t is a $k \times 1$ vector of explanatory variables.

Decomposing the explanatory variable into positive and negative partial sums allows us to examine the effects of a decrease and increase on the asset market returns. The specific NARDL model for this study is expressed as follows:

$$\Delta MKT_t = c + \delta MKT_{t-1} + \rho_1^+ ER_{t-1}^+ + \rho_2^- ER_{t-1}^- + \rho_3^+ FR_{t-1}^+ + \rho_4^- FR_{t-1}^- + \rho_5^+ PR_{t-1}^+ + \rho_6^- PR_{t-1}^- + \sum_{i=1}^{p-1} \beta_i \Delta MKT_{t-i} + \sum_{i=0}^{q-1} (\varphi_i^+ \Delta ER_{t-i}^+ + \varphi_i^- \Delta ER_{t-i}^-) + \sum_{i=0}^{q-1} (\gamma_i^+ \Delta FR_{t-i}^+ + \gamma_i^- \Delta FR_{t-i}^-) + \sum_{i=0}^{q-1} (\gamma_i^+ \Delta PR_{t-i}^+ + \gamma_i^- \Delta PR_{t-i}^-) + \beta_8 D_{1,t-i} + \epsilon_t \quad (4)$$

Where p and q are the lag orders. δ is the symmetric long-run parameter and ρ_i^+ and ρ_i^- are the long-run asymmetric parameters. MKT_t represents the return for stock or bond market in period t . ER, FR and PR represent the logged economic, financial and political risk components, respectively. β is the short-run parameter and the short run adjustment to positive and negative shocks are captured by parameter estimates φ_i^+ , φ_i^- , γ_i^+ and γ_i^- . To account for the effects of the financial crises, a dummy variable (D) was created for the 2008 global financial crisis. It takes a value of one if the date falls during the period of crisis.

We estimated the NARDL equation and used the bounds test proposed by Pesaran *et al.* (2001) to ascertain cointegration amongst the variables. The null hypothesis for our bounds test is where $\delta = \rho_i^+ = \rho_i^- = 0$, for $i=1,2,\dots,6$. We reject the null hypothesis when the F-value is greater than the upper bound critical value. By rejecting the null hypothesis, we confirm cointegration among variables, which indicate the existence of the long-run relationship. If the variables are found to be cointegrated then the error correction model (ECM), based on the NARDL, is estimated to evaluate the short-run asymmetric effects.

4. RESULTS AND DISCUSSION

4.1. Long-run analysis and residuals testing

The results of the ADF and KPSS test show that no variable is I(2), therefore, the preconditions of the NARDL model are met. Table 1 reports the output derived from the bounds testing procedure for cointegration in the NARDL model. The F-statistics and t-statistics are greater than the upper bound critical value at all conventional significance levels, therefore indicating a rejection of the null hypothesis of no cointegration between country risk and financial markets. This result implies that there exists a long-run asymmetric effect of changes in economic, political and financial risk ratings on stock and bond returns. The asymmetries may be due to the complexity of financial markets in which various economic agents with different preferences, risk tolerances and investment objectives interact (Nasr et al., 2018). These agents are active in different market and economic conditions, thus resulting in asymmetric responses of stock and bond markets to positive and negative changes.

Table 1: Bounds test for non-linear ARDL cointegration

	Stock	Bond	5% Lower bound	5% Upper bound
F_{PSS}	31.77716	21.90262	I(0)	I(1)
t_{BDM}	-14.88820	-12.28879	2.45	3.61

The NARDL specification is determined by applying the general-to-specific criterion. Both NARDL models are stable because the coefficients of the lagged stock and bond returns are negative and statistically significant. Furthermore, diagnostic test results show satisfactory results as there was no presence of serial correlation and heteroscedasticity in the residual series, hence we can conclude that the NARDL models are correctly specified. After confirming the cointegration among variables, we proceed to interpreting the findings of the long-run asymmetric impact of economic, financial and political risk on the stock and bond returns presented in equations 5 and 6.

$$Stock_t = - 0.0900FR_t^+ - 0.0059FR_t^- + 0.1632ER_t^+ - 0.0027ER_t^- - 0.2887 PR_t^+ - 0.4242 PR_t^- \quad (5)$$

$$Bond_t = - 0.1059FR_t^+ - 0.0895FR_t^- + 0.0898ER_t^+ + 0.1132ER_t^- + 0.1902PR_t^+ - 0.0248PR_t^- \quad (6)$$

From equation 5, the positive and negative changes in country risk factors have a negative impact on stock returns in the long run, except for a decrease in

economic risk ratings, which has a positive influence. The impact of changes in political risk ratings has a higher impact on stock returns than bond returns. Furthermore, the long run effect of political risk increases and decreases on stock market returns is greater in comparison to economic and financial risk. This evidence is consistent with the argument that political risk ratings are the major drivers of changes in emerging market stock returns (Bekaert, Harvey and Lumsdaine 2002; Bilson, Brailsford and Hooper, 2002). The effect of a political risk rating decrease is larger than the impact of an increase, implying that investors over-react to bad news due to herding effects or risk aversion (Nasr et al., 2018). In contrast, an increase in economic and political risk ratings has a higher long-run effect on bond market returns than a decrease in political risk ratings. An increase in risk ratings of a country signals an increase in the probability of a country not being able to meet its obligations. Therefore, investors increase their expected required returns, which drives bond prices down and causes investors to move their capital from stocks to safer assets, such as bonds (Mutize and Gossel, 2019). However, financial risk rating changes are found to have negative implications on the performance of stock and bond markets regardless of the direction of the change shock.

4.2. Short-run analysis

The results in Table 2 show that the previous month's shocks in stock returns have a significant and negative impact on future stock returns. A similar result is found for the bond returns, such that the previous month's bond returns influence future bond returns. When looking at the impact of economic risk on financial markets, we find that a decrease in economic risk ratings in the current period and two months lagged decrease have a negative and significant short-run impact on bond returns. However, there is no evidence of a short-run relationship between economic risk ratings and stock returns. Our results are consistent with the related literature, which suggests that economic risk has no short run effects on stock markets (Nasr et al., 2018; Sari et al., 2013). The argument is that stock market returns are forward-looking indicators, whilst economic risk ratings are coincident indicators, hence they will have no impact of stock returns because the markets have adjusted for economic risk shocks (Sari et al., 2013).

The absolute value of the current period's financial risk rating increase has a higher effect than the impact of a financial risk rating decrease from two months back, while financial risk rating decrease has a negative impact on bond returns. This result implies that when financial risk is high, the return investors earn on

their bond investment will decrease. This result is consistent with the findings of Afonso et al. (2014), which indicate that credit rating downgrades have negative implications for stock and bond market performance. Out of the three country risk components, political risk is observed to have the most pronounced and significant short-run impact on both financial markets. An increase in political risk ratings has a positive short run effect on stock returns, whilst a decrease in political risk ratings generally has a negative effect. The impact of political risk rating decrease from the previous month has a negative impact on stock returns, whereas the impact is positive for bond returns. The result is suggestive of the flight-to-quality phenomenon. An explanation of this is that an increase in country risk indicates an unfavourable investment environment, which causes investors to seek high returning investments in safer markets (Mutize and Gossel, 2019; Almahmoud, 2014). The error correction term shows the speed of adjustment and it is negative and statistically significant in both specifications, indicating that there is a short-run relationship between country risk and financial market returns and there is cointegration between these variables.

Table 2: Nonlinear ARDL ECM results

Stock		Bond	
Variable	Coefficient	Variable	Coefficient
Constant	-0.003389	constant	0.038740***
$Stock_{t-1}$	-1.136578***	$Bond_{t-1}$	-0.977543***
ER_t^+	-0.185527	ER_t^+	-0.087790
ER_t^-	0.003097	ER_{t-1}^-	-0.110684**
FR_t^+	0.102243	FR_{t-1}^+	0.103514
FR_{t-1}^-	0.006689	FR_{t-1}^-	0.087455
PR_{t-1}^+	0.328146**	PR_t^+	-0.185913**
PR_{t-1}^-	0.482090*	PR_{t-1}^-	0.024211
ΔFR_t^-	0.533992***	ΔER_t^-	-0.225689*
ΔFR_{t-1}^-	-0.148681	ΔER_{t-1}^-	0.216203
ΔFR_{t-2}^-	-0.426489*	ΔER_{t-2}^-	0.322060**
ΔPR_t^+	1.535835***	ΔFR_t^+	-0.061810
ΔPR_{t-1}^+	0.495740	ΔFR_t^-	0.143611
ΔPR_{t-2}^+	-0.167330	ΔFR_{t-1}^-	-0.410237***
ΔPR_{t-3}^+	-1.108472***	ΔFR_{t-2}^-	-0.322425***
ΔPR_t^-	-1.341612**	ΔPR_t^-	0.283121
ΔPR_{t-1}^-	-1.434938**	ΔPR_{t-1}^-	0.914579***
Crisis	-0.040767***	ΔPR_{t-2}^-	0.281263
ECT	-1.136578***	ΔPR_{t-3}^-	0.650325**
		Crisis	0.008408
		ECT	-0.977543***
Diagnostic tests			
χ_{SC}^2	0.174839		1.048921
χ_H^2	3.600486		0.534665
χ_{JB}^2	5.326003*		12.59058***

Note: the superscripts “+” and “-” denote positive and negative partial sums, respectively.

χ_{SC}^2 , χ_H^2 and χ_{JB}^2 denote the LM tests for serial correlation, heteroscedasticity and normality.

In summary, there is a disparity in the results obtained from the NARDL estimations among the variables of interest, with regard to the sign and statistical significance of the impact of political, economic and financial risk on stock and bond markets. Our analysis provides key evidence of a strong influence of political risk in the long- and short-run for stock and bond returns. This result is similar to the related literature, which suggests that political risk is an important determinant of stock market performance in emerging markets (Nasr et al., 2018; Mensi et al., 2016; Bilson, Brailsford and Hooper, 2002; Bekaert et al., 2002). The negative response of stock returns to political risk increase can be explained by investor's risk aversion. Political risk reduces investor's willingness to invest in high risk markets, resulting in a decrease in stock returns (Mutize and Gossel, 2019).

5. CONCLUSION

An empirical analysis was conducted to investigate how changes in economic, financial and political risk ratings affect stock and bond markets using the nonlinear autoregressive distributed lag (NARDL) models. The results suggest that there exists a long- and short-run relationship between risk ratings and financial markets and that the effects of the components of country risk are heterogeneous in both markets. The effect of financial and political risk on both financial markets is asymmetric in the long and short-run. However, the impact of economic risk is asymmetric in the short-run for bond returns while showing no signs of significant asymmetric effects on stock returns. Our findings show both markets react to political and financial risk shocks, while uncertainties in economic policy indicate serious immediate implications on the bond markets.

The results have implications for domestic and international investors who need to consider the effects of financial and political stability when selecting assets for diversification. In general, the impact of a negative shock to country risk ratings is quantitatively higher than the impact of positive shocks. This means that the cost of economic, financial and political uncertainty is larger than the reward associated with economic, financial and political stability; implying that investors overreact to bad news about country risk compared to good news. The uncertainty caused by rating decreases, therefore, may result in persistently low returns in financial markets which will eventually threaten the stability of such financial markets. To maintain a stable investment environment and reduce fluctuations in stock and bond markets, it is important that regulators and policymakers establish early-warning and response mechanisms for the manifestation of economic,

financial and political risk events. We submit that investors should consider the cost associated with each of these risk factors and should thus be rewarded with a country risk premium. Henceforth, further research can explore the pricing of the country risk components within the dynamic environment of financial markets.

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