Much Ado About Dividends

Gabriel Rambanapasi[a], Nico Katzke[b]

[a] *Stellenbosch University, Cape Town, South Africa*

[b] *Satrix, Cape Town, South Africa*

Abstract

This paper investigates dividends return predictive signals, focusing on Dividend Yield (DY) and Dividend Growth (DG) signals, within both domestic and international contexts. Over an extended investment horizon, dividend portfolios consistently exhibit positive excess returns, with notable variations across regional indexes. Notably, these portfolios demonstrate capital protection during periods of heightened market volatility, particularly the DY strategies. Surprisingly, South African portfolios perform well during market turbulence, a departure from the typical flight to safety. In contrast, during interest rate cycles, all strategies perform optimally in low-interest-rate environments. Information ratio analysis highlights that dividend strategies do not uniformly maintain positive ratios, with varying performance patterns across different regions. When integrated with drawdown analysis, advanced economies exhibit lower systematic risk, while South African and Emerging Market drawdowns suggest reduced systematic risk in these markets. Within the South African context, dividend portfolios display potential value during high volatility and rising interest rate cycles, though P/E-based portfolios outperform them in other scenarios. Consequently, dividend portfolios may not be an ideal proxy for value. Investors with specific preferences may still find value in these strategies, but for those constrained by investment policy statements, DG portfolios offer practical, lower-volatility alternatives to achieve returns akin to the market index. This study contributes insights into dividend portfolio dynamics, enabling investors to make informed choices based on their objectives and constraints.

Introduction

This paper aims to investigate the return predictive signal of dividend-paying stocks. The value of dividends to shareholders has long been a subject of debate among academics and practitioners, with evidence both for their relevance and irrelevance. Miller & Modigliani (1961) proposed the dividend irrelevance theorem, which argues that dividend payments are irrelevant because they do not affect shareholder wealth, as it is the income a firm generates that impacts wealth, not the way the firm distributes that income. In contrast, Gordon (1962) argued that investors should prefer cash flows because they are certain, as opposed to the riskier capital gains. According to this theory, the "Bird in Hand Theorem" is used to justify the demand for dividend stocks, especially for less risk-tolerant investors. Moreover, a closer examination of the Miller & Modigliani (1961) theory reveals unrealistic assumptions, rendering arguments immaterial once real-world constraints, such as

*Corresponding author: Gabriel Rambanapasi
Email addresses: gabriel.rams44@gmail.com (Gabriel Rambanapasi), (Nico Katzke)

taxes, transaction costs, and behavioral biases, are considered. Consequently, theories that consider information asymmetries, tax considerations, and signaling provide convincing arguments for the relevance of dividend payments in addressing real-world considerations. Campbell (2017) posits that the value of a stock is a function of its future cash flow. If markets are assumed to be efficient, then companies that do not pay dividends should have a value of zero unless there is an expectation of future receipts from the investment in said company. Therefore, we can safely assume a direct relationship between share price and new information that affects future cash flows. Event studies on various types of dividend payments address this, and it is often noted that the payment of dividends leads to a decrease in stock prices and thus stock valuation. Suwanna (2012) demonstrates that dividend announcements decrease share prices by the value of the dividend. This could be because dividends are a capital budgeting decision, and their payment reduces retained earnings, consequently affecting the share price.

This study provides an extensive investigation into the return signaling of dividend portfolios. Firstly, it reviews existing literature on dividend payments, their rationale, and the theories both for and against their relevance. Secondly, it outlines our methodology for constructing dividend portfolios, which includes our utility optimizer and associated constraints. Thirdly, the study discusses the results by addressing the first question: When do dividend signals work? To answer this, we initially examine the cumulative excess returns offered by global dividend indexes to provide a comprehensive overview of the performance of geographical dividend portfolios. Our analysis shows that dividend portfolios, whether high yield (HY) or dividend growth (DG), do not consistently provide a clear signal for returns. However, when we stratify our sample according to interest rate cycles (Hiking, Cutting, and Neutral) and market regimes (High and Low Volatility), unique to each geographical region, we begin to find that within specific market regimes, dividend signals exhibit defensive characteristics and offer higher excess returns during periods of High Volatility. This, however, does not guarantee positive returns for all indexes, as our proxies for the United States (US) HY, UK HY, and World indexes returned negative results over their respective periods.

Regarding performance consistency, when examining the rolling information ratio, we observe an inherent lack of consistency in dividend portfolio performance, with most strategies underperforming the benchmark over the past 15 years. Nevertheless, coupled with drawdowns experienced in different jurisdictions, we acknowledge that advanced market dividend portfolios experience the least variation in drawdowns compared to emerging markets. The results indicate that both growth and high-yield dividend portfolios tend to underperform relative to their benchmarks, raising questions about their ability to extract a value premium.

Lastly, the paper delves into how dividend portfolios work with the goal of constructing a portfolio that can best harness the existing premium. We utilize share data from the Johannesburg Stock Exchange (JSE), with our benchmark being the Capped SWIX Top 50. We construct four portfolios using 3-month and 9-month measures of HY, 1 and 3-year DG measures, together with price momentum and dividend coverage ratios. Similar to the analysis of international dividend portfolios, our portfolios exhibit defensive properties in high-volatility periods but fail to consistently capture a premium over investing in a market index.

Literature Review

The observed decline in shareholder value has sparked a long-running debate on the relevance and irrelevance of dividends. In 1961, Miller (1985) proposed the Dividend Irrelevance Theory (MM theory), arguing that dividends are irrelevant to shareholders. According to this theory, shareholders are indifferent to dividend payments, implying that there is no optimal dividend policy, and all dividend policies are equally good. Miller contended that dividend payments could easily be reinvested in shares and would make no difference to shareholder wealth. However, the MM theorem fails to consider real-world market imperfections that may render dividends relevant.

Opposing the MM theory, Gordon (1962) argued that investors prefer receiving less risky cash flows in the form of dividends rather than potentially uncertain capital gains in the future. This preference for dividends has implications for the cost of equity, as companies that issue more dividends are perceived as less risky, leading to higher share prices. Supporters of the MM theory, however, argue that the risk of future cash flows is influenced by dividend payments, which can negatively affect share prices, especially after the ex-dividend date. The dividend puzzle takes into account real-world constraints and suggests that while dividends may reduce equity value, they serve as a reward to investors who bear the risk associated with their investments, providing an additional source of return on investment (Black, 1996).

Various literature has presented compelling arguments for corporations to pay dividends. These include tax considerations, dividend signaling, and agency costs associated with issuing dividends. Tax considerations argue in favor of dividend relevance since dividends are often taxed at higher income tax rates than capital gains in various jurisdictions. This can lead investors with higher tax rates to favor stocks with lower dividend payouts, potentially increasing stock prices, known as the clientele effect (Van, 2013; Baker, 1999). Proponents of the MM theory counter this argument, suggesting that the clientele effect causes a substitution effect, where investors adjust their capital allocation based on tax treatment, leading to a net zero effect on prices.

Another factor that gives relevance to dividend payments is information asymmetry between shareholders and managers. Managers have greater knowledge of a business's operations and value at any given point than shareholders. As a result, investors rely on dividend announcements to assess a company's valuation. Dividend signaling conveys information about a company's quality (Al, 2018; Baker, 1999). However, concerns exist about management potentially "gaming" the dividend signal, making it an imperfect indicator of share prices.

Principal agency issues provide another reason for the issuance of dividends. The free cash flow hypothesis suggests that dividend payments force management to raise capital from external sources, increasing borrowing costs and scrutiny from capital markets. This reduces management's ability to make suboptimal investments, aligning management and shareholder objectives (Baker, 1999).

Constructed Dividend Portfolios

From the dividend relevance theories, it can be concluded that dividend payments emanate from proxy arguments, rather than being considered an attractive feature in themselves. High dividend-paying companies can act as proxies for the quality of management structures over time, indicating their ability to consistently afford dividend payments. They can also signal prudent cash-flow management capabilities and often resemble value stocks (Basu, 1977). This is supported by research by Basu (1977), who used price-to-earnings ratios to predict stock performance and found that low price-to-earnings stocks tend to outperform their higher price-to-earnings counterparts.

When we consider the formula for dividend yield: $DY = \frac{EPS}{Price} \times PayoutRatio$, it becomes evident that dividend yield, when the payout ratio is held constant, is a function of earnings yield. Therefore, identifying low price-to-earnings stocks through dividends can serve as a proxy for value. However, it's important to note that value stocks carry higher levels of risk as they are more prone to financial distress and uncertainty in future earnings (Chen, 1998).

To address some of the negative aspects of high dividend yield (HY), dividend growth (DG) is used as a signal. DG stocks, unlike HY, are not affected by stock price but maintain properties that allow for inferences about management quality. As management is aware of the signaling effect of dividends, this may induce a "value trap," forcing management to continually increase dividends to maintain a certain valuation. However, such companies are more vulnerable to financial distress (Baker, 2009).

The "Dogs of the Dow" strategy, as explored by O'Higgins (1991), involves ranking 30 companies by HY and selecting the 10 highest-yielding shares for a portfolio. This strategy has shown superior returns compared to the Dow Jones Industrial Average (DJIA) and lower risk, achieving a higher Sharpe Ratio. Other studies across jurisdictions have yielded similar conclusions (Lemmon, 2015; Brzeszczynski, 2007; Visscher, 2003; Filbeck, 1997; Wang, 2011).

In South Africa, Fakir (2013) employed a parametric approach to investigate dividends as an investment strategy, further contributing to the literature on the topic.

Methodology

To evaluate the return predictive signal of dividends, we employ an applied approach that constitutes constructing subset portfolios and compare in sample performances. Our approach aims to give valuable insights based on risk and return for systematically constructed dividend portfolios.

Portfolio optimzation

The Modern Portfolio Theory defines risk of a portfolio of (n) assets as the variance (σ^2) of its returns (r_t). We add a refinement to this, and our definition returns is achieved by decomposing it into common factor (Xf) and specific return (u) as $(r = Xf + u)$. From these returns we create a factor covariance matrix, defined as $(XFX^T + D)$ in which we derive our multiple factor universe consists of (k) common factors.

We periodically calculate each asset exposure to the common factors calculated in the factor covariance matrix. This then assists us in computing forecasts of the level of each asset specific risk. The short term risk forecasts will then be used to gauge contribution of each asset to a portfolio over risk which contributes to the portfolio construction process. For our optimization, risk takes on two forms being total risk (only portfolio holdings are considered and benchmark holdings are irrelevant for the optimization process) and active risk (difference between portfolio holdings and benchmark holdings are given consideration in the optimization problem).

where,

Constraints

To evaluate the return predictive signals of dividends, we employ an applied approach that involves constructing subset portfolios and comparing their in-sample performance. Our approach is designed to provide valuable insights into risk and return for systematically constructed dividend portfolios.

Portfolio Optimization

In the context of Modern Portfolio Theory, the risk of a portfolio consisting of n assets is typically defined as the variance (σ^2) of its returns (rt). We refine this definition by decomposing returns into common factors (Xf and specific return (u), represented as $r = Xf + u$. From these returns, we create a factor covariance matrix, denoted as

$$XFX^T + D, \begin{array}{ll} X & = n \times k \text{ matrix of asset exposures to the factors,} \\ F & = k \times k \text{ positive semi-definite factor covariance matrix, and} \\ D & = n \times n \text{ positive semi-definite covariance matrix representing a} \\ & \text{forecast of asset specific risk.} \end{array} \text{ risk.}$$

We periodically calculate each asset's exposure to the common factors, which aids in computing forecasts of each asset's specific risk level. These short-term risk forecasts are used to assess the contribution of each asset to a portfolio in terms of risk, a crucial component of the portfolio construction process. For optimization purposes, risk is considered in two forms: total risk, where only portfolio holdings are considered (benchmark holdings are irrelevant for the optimization process), and active risk, which takes into account the difference between portfolio holdings and benchmark holdings.

Defined as: *Total Risk*: $h^T \left(\lambda_F XFX^T + \lambda_D D\right) h$

Active Risk: $(h - h_B)^T \left(\lambda_F XFX^T + \lambda_D D\right) (h - h_B)$ Where:

$$\begin{aligned} \lambda_F &= \text{ common factor risk aversion parameter,} \\ \lambda_D &= \text{ specific risk aversion parameter,} \\ h &= n \times 1 \text{ vector of managed portfolio's holdings, and} \\ h_B &= n \times 1 \text{ vector of normal (benchmark) portfolio's holdings} \end{aligned}$$

The optimization process involves a set of constraints designed factor in practical considerations faced by portfolio managers. The choice of constraints varies depending on the risk objectives and goals of portfolio managers, taking into account investor risk preferences.

We employ the following constraints:

- Common factor and specific risk aversion parameters are set at 0.0075 and 1, respectively.
- Our investment universe consists of the Top 50 stocks listed on the JSE, and the selection criteria depend on market capitalization and liquidity.
- The Capped SWIX is used as the benchmark.
- Portfolios are rebalanced quarterly.
- Active risk constraints relative to the benchmark are set at 5%.
- Sector exposure is constrained within a range of +/-10%, with no property stocks in the portfolio.
- Individual stock exposure is limited to 15%.
- Quarterly turnover is limited to 10%.

1. Dividend Signals

In constructing our portfolios, we rank the stocks in the Capped SWIX based on either dividend yield or dividend growth per share. Our in-house measures for dividend yield (DY 3m fwd and DY 9m fwd) are constructed using industry analyst estimates of future earnings. These measures are forward-looking, providing an estimate of potential future dividend yields. Similarly, our dividend growth measures for 1 and 3 years are constructed using forward-looking estimates. To further refine our portfolio construction, we employ price momentum and dividend coverage filters. These filters reward companies with strong price momentum and sustainable dividend practices, which have been shown to enhance stock selection for portfolios.

2. DIVI1

Rank score (0 to 100) calculated using a combination of 2/3 DY (3m fwd), 1/3 DY (9m fwd), Dividend Coverage Ratio, and Price Momentum. The signal uses the following conditions:

If the dividend cover score is in the bottom quintile, it is weighted at 15% (15% dividend cover, 66.667% * 0.85 DY 3m, 33.333% * 0.85). If the price momentum score is in the bottom quintile, it is weighted at 35% (35% price momentum score = 66.667% * 0.65 DY 3m, 33.333% * 0.65). If both dividend cover and momentum are in the bottom quintile, a combination weight is applied (15% dividend cover score = 35% price momentum score, 66.667% * 0.5 DY 3-month, 33.333% * 0.5). This portfolio utilizes price momentum and dividend cover ratio as filters to enhance the dividend yield signal. It rewards sustainability in dividend payments and avoids companies that may not afford to pay dividends, reducing the risk of capital gain losses.

3. DIVI2

Rank score (0 to 100) is calculated based solely on dividend yield, which is a blend of forward-looking metrics (2/3 DY 3m fwd and 1/3 DY 9m fwd).

This portfolio represents a straightforward dividend yield strategy that ranks stocks based on their dividend payment potential.

4. DIVI3

Rank score (0 to 100) is based on the price-to-earnings (P/E) ratio, serving as an alternative proxy for value.

5. DIVI4

Rank score (0 to 100) is calculated using a combination of DPS Growth 1-Year (40%), DPS Growth 3-Year (30%), Forward 3 (20%), and Forward 9 (10%).

This portfolio focuses on dividend growth, utilizing trailing dividend growth rates and forward-looking measures to make informed stock selections.

Incorporating these signals in our portfolio construction process enhances our ability to capture dividend-related return signals and create diversified portfolios that align with investor objectives and risk preferences. It's important to note that these strategies are grounded in empirical research and industry best practices, contributing to the academic rigor of our approach.

Data

In this study, we focus on return and risk measures to evaluate the effectiveness of dividend signals as an investment strategy. Our data spans from June 30, 2003, to June 30, 2023. The choice of start and end dates is primarily dictated by data availability on the selected dividend indices at the time of writing.To conduct our analysis, we collected historical daily price data for the dividend portfolios and the constituents of the Capped SWIX Top 50 listed on the Johannesburg Stock Exchange (JSE) from Bloomberg. Please refer to **??** for a comprehensive guide to the indices used and codenames referenced in the subsequent results and analysis.

Additionally, we gathered volatility and interest rate proxies for the various geographical regions under investigation over the same sample period as our dividend portfolios. Specifically, we used the Chicago Board Options Exchange (CBOE) VIX Index for the United States and emerging markets (EM), V2X for Europe, IVUK for the United Kingdom, and JALSH VR for South Africa as volatility proxies. For interest rate data, we considered the policy rates set by central banks for the respective geographies within our study. These included the Federal Fund rate for the United States and emerging markets, the Minimum Deposit Financing Rate for the European Union, the Bank of England Bank Rate, and the South African Reserve Bank Repo rate.

To classify periods of high and low volatility (Hi-vol and Lo-vol), we devised a rule by computing the top and bottom quantiles in standard deviation for our respective proxies. Subsequently, we identified the dates corresponding to these periods and calculated annualized returns by geometrically chaining the monthly returns.

However, it's important to note that when the VIX, V2X, or JALSH RV breached the top or bottom quintile for fewer than 50 trading days, we excluded those periods from our analysis to prevent the annualization of small sample sizes.

Furthermore, we differentiated between Hiking, Cutting, and Neutral interest rate cycles. We defined these periods based on changes in interest rates, specifically as five consecutive quarters of upward changes for Hiking and downward changes for Cutting. Alternatively, if central banks maintained interest rates at a constant level, we categorized the period as Neutral

Results and Discussion

When Do Dividend Strategies Work

We begin our analysis by evaluating several performance metrics of globally traded dividend portfolios. It is important to note that Table 5.1 does not facilitate direct comparisons across indexes and regions due to differences in the inception dates of the respective instruments. Table 5.1 presents four key performance measures, encompassing relative return (annualized excess return), total return (cumulative return), maximum drawdowns, and standard deviation. The latter two measures provide an initial insight into the risk characteristics of our selected investment universe, though a more detailed risk analysis will follow in our subsequent analysis.

An immediate observation from the table is that total returns, as assessed by cumulative returns, are positive for approximately 42% of the sample. Specifically, dividend yield (DY) strategies exhibit the highest total returns. When examining annualized excess returns, we notice that the majority of strategies outperform their respective benchmarks. However, it's worth noting that the relative performance against their benchmarks is marginal, with relative performance between - 0.01% to 0.01%.

Turning our attention to risk, we find that there is a narrow range in annualized standard deviation across most strategies. Nevertheless, drawdowns exhibit variation across strategies and regions. Drawdowns do not provide a definitive picture of the return characteristics of the constituents, but in broad terms, DY strategies tend to experience lower drawdowns compared to dividend growth (DG) strategies.

	Index	Ann Return	Std dev	Max Drawdowns	Cumulative Return
1	EM_HY	-0.00	0.04	0.13	0.58
2	SA_HY	0.01	0.04	0.17	0.22
3	SA_DG	0.01	0.04	0.19	0.21
4	EU_DG	0.01	0.03	0.14	0.11
5	EU_HY	-0.00	0.04	0.24	0.03
6	W_HY	-0.00	0.03	0.21	-0.06
7	JP_HY	0.00	0.05	0.28	-0.10
8	UK_HY_B	-0.00	0.04	0.24	-0.13
9	JP_DG	-0.00	0.04	0.31	-0.13
10	US_HY	-0.00	0.03	0.27	-0.18
11	US_DG	-0.00	0.03	0.29	-0.20
12	UK_HY	0.01	0.03	0.29	-0.24

Table 5.1: Global Index Portfolio Performance

A more discernible picture emerges as we stratify the performance of global dividend portfolios according to market volatility and interest rate cycles. Our categorization of market volatility into "High Vol" and "Low Vol" cycles is achieved through a two-step process. First, we calculate the rolling 12-month standard deviations of volatility proxies. Second, we identify the 5th and 95th percentiles of observations and extract the corresponding dates. Following this stratification, we calculate excess returns within these periods, geometrically chaining them and subsequently annualizing the excess returns with the appropriate periodicity.

Tables 5.2 and 5.3 present the performance of dividend portfolios during periods of market distress (Hi Vol) and market calm (Lo Vol). This stratification allows for comparisons across regions and strategies, although it's crucial to be aware that the duration of market volatility can impact strategy performance.

From our stratification, we find that 37.5% of observations yield positive excess returns. Among those, HY indexes, which constitute approximately 67% of the portfolios with positive returns, tend to perform better in periods of market distress compared to market calm. In fact, most indexes in the high volatility periods exhibit returns close to 0%. For instance, in Hi Vol conditions, HY consistently outperforms DG strategies, with SA_HY (2.74%) outperforming SA_DG (-4.07%), EU_HY (0.08%) outperforming EU_DG (-4.84%), and US_HY (-0.35%) outperforming US_DG (-0.68%).

In contrast, during Lo Vol periods, we observe greater dispersion in annualized excess returns, making it less clear whether prolonged periods of market calm lead to lower returns. The performance is less consistent in low volatility periods. Overall, our market cycle stratification reveals that DY and DG strategies tend to offer defensive characteristics in periods of higher volatility. However, it's important to note that only a few of our portfolios generate positive excess returns in these periods. Therefore, idiosyncrasies within the market play a significant role in determining the performance of these signals.

Name	Market Period	Months	Annualized Return (%)
UK_HY_B	High Vol	36	8.70

Continued on next page

Name	Market Period	Months	Annualized Return (%)
EU_HY	High Vol	36	5.40
EU_DG	Low Vol Period	55	3.53
EM_HY	Low Vol Period	69	3.33
SA_DG	Low Vol Period	44	3.24
SA_HY	High Vol	39	2.74
JP_DG	High Vol	58	2.52
JP_HY	High Vol	58	0.37
EM_HY	High Vol	58	0.08

Table 5.2: Over Performance Volatility Stratification

Name	Market Period	Months	Annualized Return (%)
EU_HY	Low Vol Period	55	-0.11
JP_HY	Low Vol Period	69	-0.28
US_HY	High Vol	58	-0.35
US_DG	High Vol	58	-0.68
W_HY	High Vol	58	-0.69
US_DG	Low Vol Period	69	-0.76
W_HY	Low Vol Period	69	-1.22
SA_HY	Low Vol Period	44	-1.99
US_HY	Low Vol Period	69	-2.42
UK_HY_B	Low Vol Period	55	-3.63
SA_DG	High Vol	39	-4.07
EU_DG	High Vol	36	-4.84
JP_DG	Low Vol Period	69	-6.46
UK_HY	Low Vol Period	55	-7.20
UK_HY	High Vol	36	-24.01

Table 5.3: Under Performance Volatility Stratification

When we stratify our analysis according to interest rate cycles in Tables 5.4 and **??** focusing on Hiking, Cutting, and Neutral cycles, we encounter an interesting anomaly in Japan. Unlike other economies, Japan does not have distinct hiking or cutting cycles, as its central bank has largely maintained constant interest rates. Therefore, we exclusively assess Japan's performance within the confines of a neutral interest rate cycle. Upon stratification, we geometrically chain quarterly excess returns and then annualize them to enable comparisons across indices. Our analysis reveals several insights. The average and median annualized cumulative excess returns of the US and EU dividend indexes during cutting cycles suggest that DG strategies tend to outperform, particularly when interest rates are declining. Underperformance during hiking cycles is less pronounced in the US, especially when considering annualized excess returns between Hiking and Cutting cycles. Finally, EU, both DY and DG strategies exhibit outperformance during hiking cycles, with dividend growth strategies outperforming to a greater extent. To provide further context for this analysis, we include results from a principal component analysis on returns of each dividend portfolio and its benchmark in Appendix 2. After identifying the principal components, we regress the first three principal components against returns to formalize our assessment of the return drivers for our portfolios. Notably, dividend portfolios, whether high yield (HY) or dividend growth (DG), exhibit similar loadings relative to their benchmarks, although the loadings are slightly larger. Given practical considerations in constructing indexes and the results from our models, we posit that dividend portfolios may effectively proxy the market index, providing investors with exposure similar to the hypothetical index.

Name	Market Period	Quarters	Annualized Return (%)
US_DG	Cut	15	13.40
EU_DG	Cut	14	6.15
EU_DG	Neutral	29	3.37
US_DG	Hiking	36	3.19
EM_HY	Hiking	36	2.81
JP_HY	Neutral	49	1.88
SA_HY	Hiking	39	1.74
JP_DG	Neutral	49	1.29
EU_DG	Hiking	27	1.12
SA_DG	Hiking	39	1.10
US_HY	Cut	15	0.05

Table 5.4: Over Performance in Interest Rate Regimes

Name	Market Period	Quarters	Annualized Return (%)
EU_HY	Cut	14	-0.87
EU_HY	Neutral	29	-1.07
EU_HY	Hiking	27	-2.01
US_HY	Hiking	36	-2.51
EM_HY	Cut	15	-2.73
UK_HY_B	Neutral	22	-2.91
US_DG	Neutral	20	-3.32
SA_DG	Cut	27	-6.77
SA_HY	Cut	27	-7.48
EM_HY	Neutral	20	-7.88
US_HY	Neutral	20	-8.83
UK_HY_B	Cut	19	-13.11
UK_HY	Neutral	22	-14.72
UK_HY	Cut	19	-25.36
UK_HY_B	Hiking	30	-27.06
UK_HY	Hiking	30	-34.58

Table 5.5: Under Performance in Interest Rate Regimes

In our final analysis, we consider a dynamic measure to evaluate the risk-adjusted performance of dividend portfolios over time. Figure 5.1 provides a visual representation of the consistency in the performance of dividend portfolios. We achieve this by employing a rolling 60-month information ratio, which helps avoid the influence of short-term events that may skew performance results. This ratio is computed by determining the rolling excess return of the index relative to its benchmark and then dividing this by the volatility of those excess returns. The red line in the figure represents out performance relative to the benchmark while considering risk, serving as a yardstick to assess satisfactory performance. From Figure 5.1, UK_HY exhibits undesirable consistency in returns over the sample period. The EM and Japan dividend portfolios exhibit polarizing performances throughout the sample period. From 2005 to 2015, returns for these portfolios were consistently positive, but over the last eight years, information ratios have been negative.

In contrast, South African portfolios, particularly dividend growth portfolios, have shown positive information ratios since 2010 to 2020. SA_HY only turned positive since 2017. The US and EU indexes exhibit similar intra-region performance, with information ratios that remain close to 0 and show minimal deviation over time. Overall, our analysis based on information ratios yields similar results to our whole sample analysis on total return in Table 5.1. It suggests that dividend strategies, with the exception of SA_HY (which has seen a steady decline in its information ratio), generally fail to outperform their benchmark. This result contradicts our findings from stratification, where we observed outperformance of dividend strategies in low-interest rate environments or periods of high volatility. The varying performance of these strategies highlights their sensitivity to the economic and market conditions in which they operate.

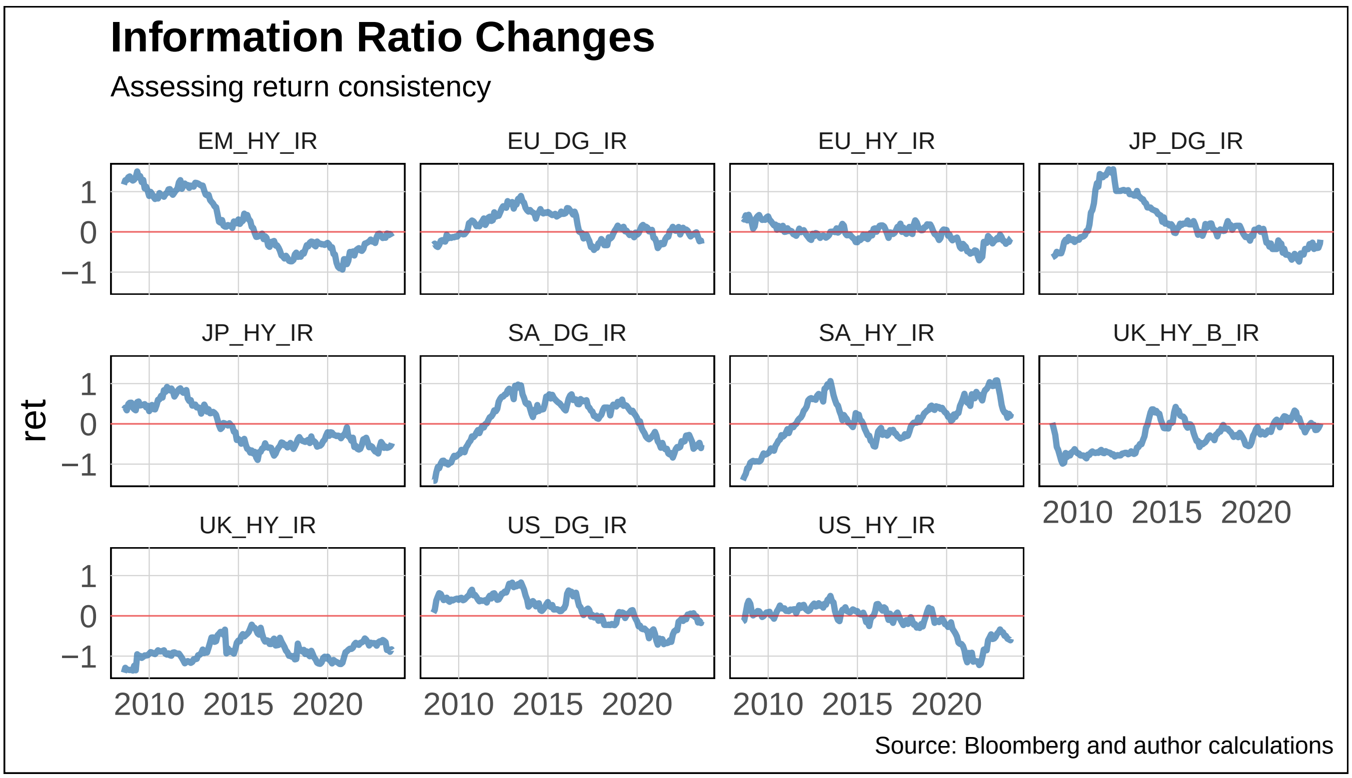

Figure 5.1: Rolling 3 Year Returns

Application to South Africa

Backtest Results from Dividend Portfolio Signals

Figure 5.2 provides a visual representation of the cumulative returns of our dividend portfolios, along with a display of the total capital invested during the sample period. These portfolios are categorized into Dividend Yield (DY), Dividend Growth (DG), Price Momentum, and Sustainability, and they are compared to the performance benchmark represented by the SWIX Top 40 index. In line with our earlier analysis of the SA_HY and SA_DG portfolios, a noticeable pattern emerges, indicating that the returns over the sample period fall short of the benchmark set by the market index. Furthermore, our vanilla portfolio, Dividend High Yield (HY), displays the lowest cumulative returns. Similarly, the Price Momentum and Sustainability portfolios exhibit diminished performance when compared to both the Value and DG portfolios. This observation highlights a consistent trend of underperformance in our portfolios when evaluated against the broader market index.

This outcome prompts further examination and investigation to uncover the underlying factors and potential implications within the context of dividend-oriented investment strategies. It is essential to understand the reasons behind this consistent underperformance and consider adjustments or enhancements to the strategies to potentially improve their effectiveness.

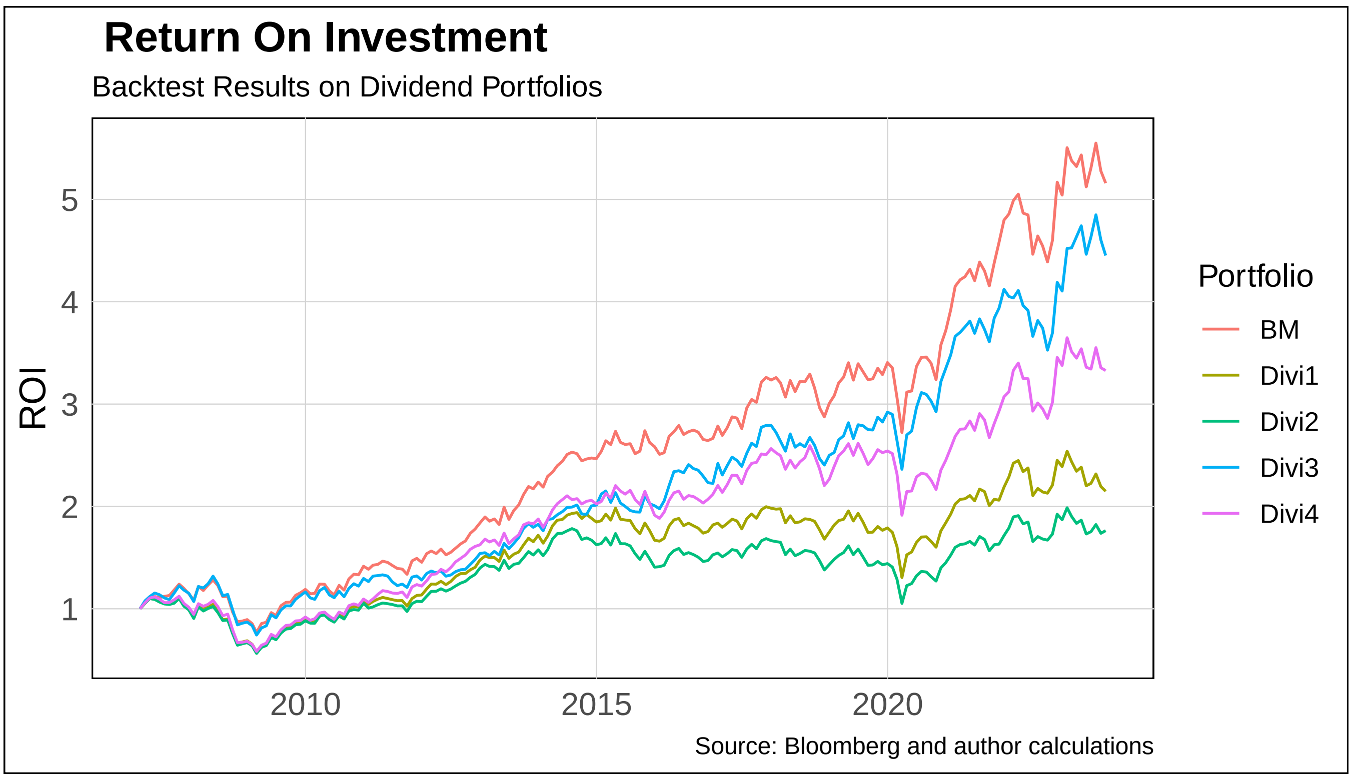

Figure 5.2: Rolling 3 Year Returns

Tables 5.6 and 5.7 offer a detailed breakdown of total investments during periods characterized by market cycles and interest rate regimes, specifically high or low volatility, and hiking or cutting cycles. These categorizations align with the realized market volatility and interest rate regime stratification dates we used in our analysis of Tables 5.2 and 5.3 for the SA_HY and SA_DG indexes.

Consistent with our findings from internationally traded portfolios, we once again observe the favorable characteristics of dividend portfolios when stratified according to interest rate regimes and volatility levels. Notably, these dividend portfolios exhibit significant defensive attributes, with the price momentum-adjusted and sustainability portfolios generating the highest returns during hiking periods and times of high volatility. Furthermore, it's essential to emphasize that our portfolios consistently outperform the market index during these periods.

These results highlight the resilience and attractiveness of dividend-oriented investment strategies in challenging market conditions, underscoring their potential as a valuable component of an investor's portfolio. Further analysis and research could shed more light on the underlying factors contributing to this outperformance and help investors make informed decisions in constructing their portfolios.

	Portfolio	ROI	Ann ROI %	SD %	MarketCycle
1	BM	1.06	-0.87	0.02	High Volatility
2	Divi1	1.02	-0.91	0.03	High Volatility
3	Divi2	1.04	-0.89	0.03	High Volatility
4	Divi3	1.00	-0.92	0.01	High Volatility
5	Divi4	1.06	-0.88	0.04	High Volatility
6	BM	1.83	2.09	0.08	Low Volatility
7	Divi1	1.13	-0.82	0.06	Low Volatility
8	Divi2	1.26	-0.66	0.05	Low Volatility
9	Divi3	1.45	-0.23	0.08	Low Volatility
10	Divi4	1.66	0.73	0.09	Low Volatility

Table 5.6: Market Cycle Perforomance

During cutting cycles or during periods characterized by low market volatility, an examination of the correlation between market cycles and the performance of South African portfolios reveals a consistent and noteworthy relationship. Specifically, in such scenarios, akin to the broader spectrum of return on investment, it becomes evident that the market index tends to yield relatively superior returns. It is worth noting that among the various portfolios under scrutiny, our DIVI2 portfolio has exhibited a relative underperformance when compared to our other dividend portfolios. Consequently, this analysis leads to the inference that dividend-oriented portfolios can serve as an effective instrument for investors seeking to augment their returns during phases of heightened market volatility.

	Portfolio	ROI	Ann ROI %	SD %	MarketCycle
1	BM	0.16	-1.00	0.01	Hiking
2	Divi1	0.67	-0.99	0.07	Hiking
3	Divi2	0.41	-1.00	0.06	Hiking
4	Divi3	0.32	-1.00	0.02	Hiking
5	Divi4	0.20	-1.00	0.03	Hiking
6	BM	3.41	6.15	0.26	Cutting
7	Divi1	1.22	-0.88	0.12	Cutting
8	Divi2	1.48	-0.74	0.15	Cutting
9	Divi3	1.95	-0.24	0.14	Cutting
10	Divi4	2.51	1.07	0.23	Cutting

Table 5.7: Interest Rate Regime Performance

To ascertain the periods during which our dividend portfolios offer value, we implement a relative performance evaluation method by computing the product of excess returns and excess weights, yielding a relative performance metric. This involves calculating the disparity in monthly excess returns from the most recent rebalancing date within our back-testing, conducted annually in October, covering the period from October 30, 2007, to October 30, 2022[1]

Figure 5.3, visually represents our metric for assessing relative return performance, encompassing the influence of excess weights across our entire investment horizon.

[1]It is crucial to note that within our analysis of back-test results, there were instances, specifically on October 30, 2008, where no weight data was available for any of the portfolios. Consequently, these specific data points have been excluded from our analysis, as their isolated occurrence did not exert a significant influence on the overarching long-term trends, thus upholding the overall integrity of our analysis. Also, it is important to emphasize that our analysis does not consider sector-specific returns and weights for the portfolios and benchmarks. Nevertheless, we enhance our measurement by amalgamating the excess returns and excess weights to derive a return attribution analysis for the comprehensive strategy. This refined approach enables us to discern subtle performance nuances attributed to strategic decisions concerning the overweighting or underweighting of assets during opportune moments. For an in-depth exploration of the rationale underlying our use of this return attribution methodology and its merits, interested readers are encouraged to refer to the work of Brinson & Fachler (1985)

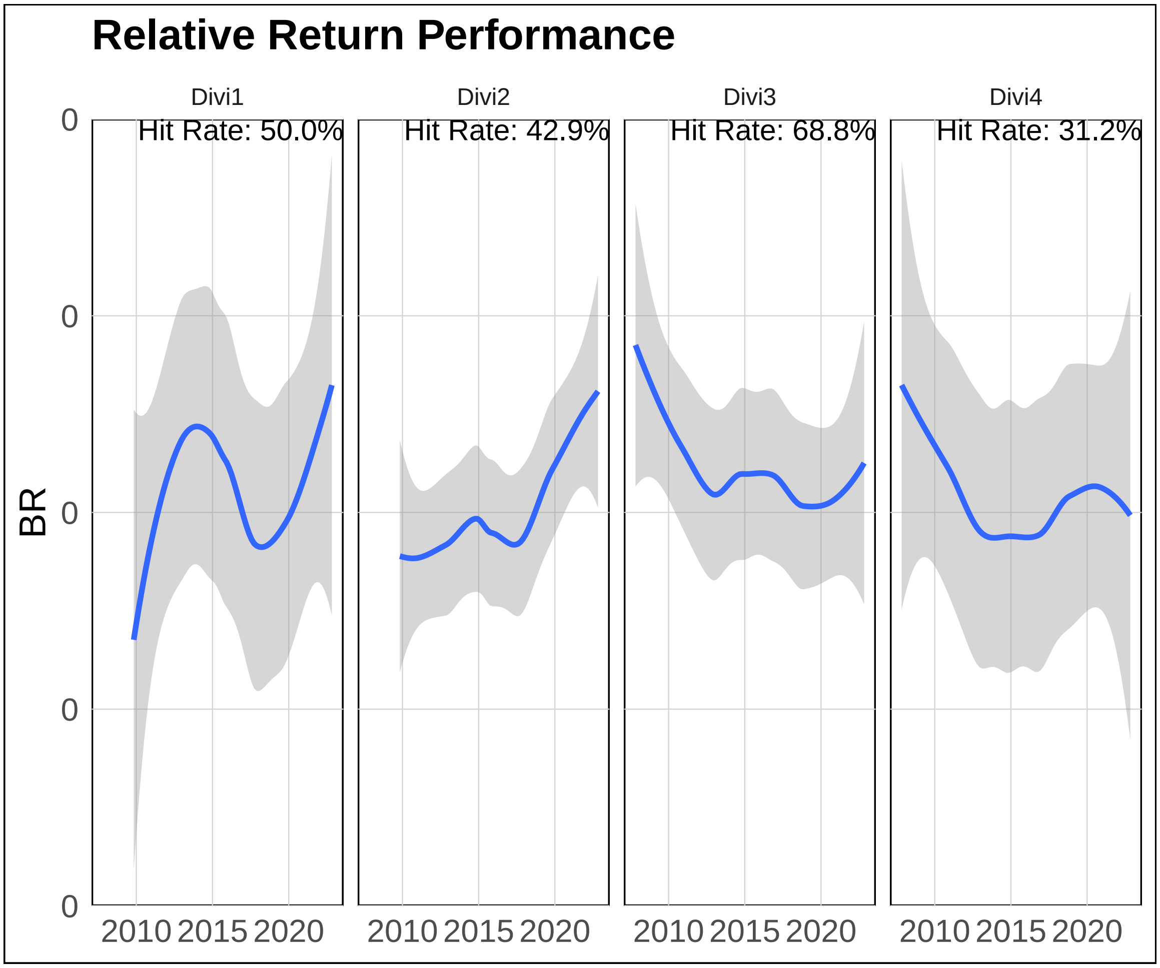

Figure 5.3: Rolling 3 Year Returns

In contrast to the findings presented in 5.2, where all dividend signals yielded diminished Return on Investment (ROI) over the course of our comprehensive back-test period, our dividend portfolio displayed superior performance compared to the Capped SWIX Top 50 index, as measured by Hit Rates (HR). Specifically, Divi1 exhibited a HR of 50%, Divi2 achieved a HR of 42.9%, Divi3 attained a remarkable HR of 68.8%, and Divi4 registered a HR of 31.2% during the observed period.

Significantly, our value-oriented portfolio (Divi 3) exhibited the highest HR among the dividend portfolios, followed by Divi 1, Divi 2, and Divi 4, in descending order. While these results align with our ROI analysis for the first portfolio, it is important to note that the sequence of performance differs for Divi 4, Divi 1, and Divi 2.

Based on this comprehensive analysis, we draw the conclusion that the utilization of a proxy for value, as opposed to a strict dividend signal, contributes more significantly to the overall performance of

Conclusion

Over the course of time, dividend portfolios, encompassing both DY and DG strategies, have consistently displayed positive excess returns, evident in the cumulative excess return figures. Although the UK_HY index notably exhibits the highest cumulative return, this trend is not uniformly observed across various regional indexes. However, when we segment these portfolios based on different periods of market volatility, a distinct pattern emerges. During phases of heightened market volatility, dividend strategies prove to be effective in providing capital protection when integrated into a diversified asset portfolio. Furthermore, during such high volatility periods, DY strategies outperform the DG strategies. An intriguing observation is that South African portfolios tend to perform well during these high volatility periods, which is somewhat unconventional, given that such times are typically associated with a flight to safety. Emerging Markets (EM) and, by extension, South Africa, are generally perceived as riskier investments.

Expanding our analysis to incorporate interest rate cycles reveals a contrasting effect compared to the volatility-based stratification. It becomes evident that all strategies tend to yield the highest returns during low interest rate cycles. Information ratio analysis indicates that dividend strategies generally do not exhibit consistent return performance. At a broader level, these portfolios do not consistently maintain a positive information ratio over an extended investment horizon. However, disparities in performance emerge, with South African dividend indexes consistently delivering positive ratios over the past decade. Conversely, Emerging Markets and Japanese indexes have experienced substantial declines in their information ratios, despite seemingly consistent performance prior to 2015. Meanwhile, the United States, European Union, and United Kingdom indexes have exhibited unpredictable performance over the sampled period.

When we combine our information ratio findings with drawdown analysis, we observe that advanced economies have experienced fewer drawdowns over the sample period, with the exception of the UK. This could suggest a relatively lower level of systematic risk in these economies. Conversely, South African and Emerging Market drawdowns have been less severe, possibly indicating reduced systematic risk in emerging markets.

In the context of South Africa, focusing on the top 50 companies by market capitalization, we observe a performance pattern similar to our international analysis. Firstly, dividend portfolios do not convincingly deliver superior total returns, as calculated by cumulative returns. However, their value becomes apparent during periods of high volatility and rising interest rate cycles. Moreover, when we consider more traditional proxies for value, such as the Price to Earnings (P/E) ratio, the efficacy of dividend signals diminishes. In other words, portfolios constructed based on P/E ratios perform exceptionally well in our back-test and performance criteria, outperforming the market index 68.8% of the time.

In conclusion, dividend portfolios may not serve as an ideal proxy for value, and investors may benefit more from exploring investment products that provide an income component to their total returns. However, it's worth noting that investor preferences can vary, potentially driving demand for specific dividend portfolio strategies. Based on the evidence, investors constrained by investment policy statements may find value in equity portfolios constructed using Dividend Growth (DG) strategies as these use signals that do a better job of capturing company cash flow management and managerial qualities. Despite their lower hit rate, DG portfolios exhibit lower volatility in achieving returns, making them a practical and profitable means of attaining returns that closely align with the market index.

Appendix

TICKER	NAME	Codename	Inception Dates
FUDP	FTSE UK Dividend+ Index	UK_HY	
M2EFDY	MSCI EM HY Gross Total Return USD Index	EM_HY	
M2GBDY	MSCI UK HY Gross Total Return USD Index	UK_HY	
M2JPDY	MSCI Japan HY Gross Total Return USD	JP_HY	
M2USADVD	MSCI USA HY Gross Total Return USD Index	US_HY	
M2WDHDVD	MSCI World HY Gross Total Return Total Return USD Index	W_HY	
SPDAEET	S&P EU 350 Dividends Aristocrats Total Return Index	EU_DG	
SPJXDAJT	S&P/JPX Dividend Aristocrats Total Return Index	JP_DG	
SPDAUDT	S&P 500 Dividend Aristocrats Total Return Index	US_DG	
SPSADAZT	S&P South Africa Dividend Aristocrats Index ZAR Gross TR	SA_DG	
TJDIVD	FTSE/JSE Dividend+ Index Total Return Index	SA_HY	
M2EUGDY	MSCI Europe Ex UK HYGross Total Return USD Index	EU_HY	
TUKXG	FTSE 100 Total Return Index GBP	UK	
GDUEEGF	MSCI Daily TR Gross EM USD	EM	
GDDUUK	MSCI UK Gross Total Return USD Index	UK_B	
TPXDDVD	Topix Total Return Index JPY	JP	
GDDUUS	MSCI Daily TR Gross USA USD	US	
GDDUWI	MSCI Daily TR Gross World USD	W	
SPTR350E	S&P Europe 350 Gross Total Return Index	EU_2	
SPXT	S&P 500 Total Return Index	JP	
SPXT	S&P 500 Total Return Index	US_2	
JALSH	FTSE/JSE Africa All Share Index	SA	
JALSH	FTSE/JSE Africa All Share Index	SA	
GDDUE15X	MSCI Daily TR Gross Europe Ex UK USD	EU	

Table 5.8: Index Description

Dividend Defintions

Bloomberg has two main categories for distributions: Cash Dividends and Stock Dividends. Various kinds of distributions appear under these definitions that do not necessarily only apply to ordinary issued shares (the only security type that we consider in our study). In the next two subsections we define the types of distributions that fall under these categories and in some cases provide additional information. Our sample only comprises of final, interim and regular cash dividends. These dividends are categorized by Bloomberg as Normal Cash.

Cash Dividends

- Final: dividend declared for the financial year-end
- Interim (includes 2nd interim, 3rd interim and 4th interim): dividend paid after a reporting period (eg. quarterly or semi-annually) Special Cash: dividend declared for the financial year-end or interim period over and above the normal dividend
- Regular Cash: a dividend distribution made in cash
- Omitted: A company has elected to skip a scheduled payment
- Discontinued: The discontinuance of dividend payments on an ongoing basis
- Interest on Capital: interest paid on fixed income instruments

- Income: mutual fund dividends, in most cases
- Liquidation: a distribution of a companies assets to shareholders during (interim) or after delisting (final)
- Return of Capital: a non-taxable cash payment to investors from the company that represents a return on invested capital as opposed to a dividend
- Memorial: a special dividend. For example a company celebrating an anniversary might pay a memorial dividend
- Proceeds from sale of shares: a distribution of cash to shareholders after selling shares. For example this may occur when the company sells the shares of a shareholder who was not eligible to receive shares in an offering and then distributes the proceeds to shareholders
- Cancelled: the cancellation of a previously declared dividend
- Return Premium: special cash dividend paid from a special reserve
- Preferred Rights Redemption: a company pays a dividend in exchange for previously issued preferred rights

Stock Dividends

Bonus: also known as a scrip or capitalization issue. Shareholders are given additional stock in proportion to their holdings - Scrip: a free issue or bonus of shares - Stock Dividend: portion of a company's retained earnings that are distributed to shareholders in stock. The JSE treats stock dividends as a capitalization issue

Appendix 2

Principal Component Analysis Results

	(Intercept)	EM	EM_HY
1		-1.60278736871812e-05	5.72316592929999e-05
2	lag(ret)	(8.81517172979451e-05)	(8.4009832916283e-05)
3		0.0626773846003959 ***	0.068477837097736 ***
4	PC1	(0.00768871355176577)	(0.00773785727574978)
5		-0.211323715240927 ***	-0.197839406763045 ***
6	PC2	(0.0021054107455268)	(0.00200626418696844)
7		-0.181093632569239 ***	-0.174627648441878 ***
8	PC3	(0.00455691863989387)	(0.0043357228611195)
9		0.0553668947582391 ***	0.0249326112521369 ***
10	N	(0.00540584158153239)	(0.00515349303427833)
11	R2	5217	5217
12	*** p < 0.001; ** p < 0.01; * p < 0.05.	0.71193328402896	0.707540316745546
13		*** p < 0.001; ** p < 0.01; * p < 0.05.	*** p < 0.001; ** p < 0

Table 5.9: PCA Results

	(Intercept)	EU	EU_2	EU_DG
1		-7.59999898186529e-06	-1.10071320078484e-05	9.0058717836
2	lag(ret)	(7.10642224371418e-05)		(7.863215552
3		-0.0226465097709638 ***	-0.0128979223892329 *	0.007922760
4	PC1	(0.00576197722007948)	(0.00575507231249308)	(0.00795541
5		-0.280883723797031 ***	-0.237445919816283 ***	-0.20358837
6	PC2	(0.00169729922318746)	(0.00139733652974771)	(0.00187659
7		-0.031933386457366 ***	-0.0030388217366709	-0.00621726
8	PC3	(0.00381344544966598)	(0.00319068365639232)	(0.00420207
9		-0.155678383289745 ***	-0.135775502214704 ***	-0.12758541
10	N	(0.00445119616658202)	(0.00368269427686028)	(0.00490212
11	R2	5217	5217	5217
12	*** p < 0.001; ** p < 0.01; * p < 0.05.	0.855570865468774	0.861482054224444	0.71986026

Table 5.10: PCA Results

	(Intercept)	JP	JP_DG
1		-9.99214323094622e-05	-3.00703367334358e-05
2	lag(ret)	(7.46579373997006e-05)	(8.66511282175394e-05)
3		0.00566154299912426	-0.00937744419485014
4	PC1	(0.00584090791543381)	(0.00725886667366239)
5		-0.121814953493272 ***	-0.100873310563148 ***
6	PC2	(0.00178023967587767)	(0.00206606448195023)
7		-0.402988732366009 ***	-0.348154775899471 ***
8	PC3	(0.00376080427125469)	(0.00436402895533763)
9		0.389512643216594 ***	0.362500842309265 ***
10	N	(0.00455716388404002)	(0.00528940026452518)
11	R2	5217	5217
12	*** p < 0.001; ** p < 0.01; * p < 0.05.	0.822256241789988	0.725506416469889
13		*** p < 0.001; ** p < 0.01; * p < 0.05.	*** p < 0.001; ** p < 0

Table 5.11: PCA Results

	...1	SA	SA_DG
1	(Intercept)	0.000174424066652349	0.000154599642594047
2		(0.000104831488132788)	(0.000135743539551013)
3	lag(ret)	-0.0260201275509458 **	0.0162962308506602
4		(0.00910355525354117)	(0.0116751097704669)
5	PC1	-0.192079580415969 ***	-0.125588385439684 ***
6		(0.00249964852578935)	(0.00323707057649618)
7	PC2	-0.134145033571322 ***	-0.113928595170158 ***
8		(0.00540516980619619)	(0.00688136494957077)
9	PC3	-0.127959733778058 ***	-0.12232707950307 ***
10		(0.00645043177866384)	(0.00830039210400402)
11	N	5217	5217
12	R2	0.595503774888565	0.302127435161338
13	*** p < 0.001; ** p < 0.01; * p < 0.05.	*** p < 0.001; ** p < 0.01; * p < 0.05.	*** p < 0.001; ** p < 0

Table 5.12: PCA Results

	...1	UK	UK_B
1	(Intercept)	-2.892336667118e-06	-7.57345221694089e-05
2		(6.50211737869564e-05)	(5.67565475934448e-05)
3	lag(ret)	-0.0387511686606318 ***	-0.0376835890925414 **
4		(0.00650337136955424)	(0.0046125612803052)
5	PC1	-0.221863534152518 ***	-0.280858203670326 ***
6		(0.00155225612418535)	(0.00135498861352277)
7	PC2	-0.0178361496500972 ***	-0.0603959906146276 **
8		(0.0035135719566689)	(0.00304188777775765)
9	PC3	-0.141868473212785 ***	-0.191398139763492 ***
10		(0.00407108588530721)	(0.00354224579865907)
11	N	5217	5217
12	R2	0.818124055502306	0.906484923580086
13	*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.	*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.	*** $p < 0.001$; ** p < 0

Table 5.13: PCA Results

	...1	US	US_2
1	(Intercept)	-1.15532052845367e-05	1.63629844176586e-05
2		(3.35413352219375e-05)	(4.60750384698967e-05)
3	lag(ret)	-0.0294796579219486 ***	-0.020354188614454 ***
4		(0.00341321696819235)	(0.00452661143914563)
5	PC1	-0.233864956202208 ***	-0.230159358796096 ***
6		(0.000819555292176499)	(0.0011230023500934)
7	PC2	0.308957501335324 ***	0.31675590488915 ***
8		(0.00199246158915227)	(0.00268173299058554)
9	PC3	0.267585573231036 ***	0.267259539144946 ***
10		(0.00204680429842257)	(0.00281157396528542)
11	N	5217	5217
12	R2	0.958636359037242	0.923969196587223
13	*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.	*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.	*** $p < 0.001$; ** p < 0

Table 5.14: PCA Results

	(Intercept)	W	W_HY
1		-2.68877305546502e-05	-1.60412046201327e-05
2	lag(ret)	(2.66934004733464e-05)	(3.62741169219996e-05)
3		0.00173290808467087	0.012868806430677 **
4	PC1	(0.00305791906183213)	(0.00413386998598336)
5		-0.232673492817017 ***	-0.22906874305533 ***
6	PC2	(0.000644347752549236)	(0.00087055856947328)
7		0.120226620730606 ***	0.0858355323895155 ***
8	PC3	(0.0015371543580596)	(0.0020483834598137)
9		0.149969169492583 ***	0.0454159637409487 ***
10	N	(0.00163434044095793)	(0.00223590470954708)
11	R2	5217	5217
12	*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.	0.964070088675355	0.931627271013059

Table 5.15: PCA Results

References

Brinson, G.P. & Fachler, N. 1985. Measuring non-US. Equity portfolio performance. *The Journal of Portfolio Management*. 11(3):73–76.

Gordon, M.J. 1962. The savings investment and valuation of a corporation. *The Review of Economics and Statistics*. 37–51.

Miller, M.H. & Modigliani, F. 1961. Dividend policy, growth, and the valuation of shares. *The Journal of Business*. 34(4):411–433.