Earnings or Dividends
Which had More Predictive Power?

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Abstract
This paper reviews two important investment strategies employed by value investors; the Price to Earnings Ratio ("PER") and Dividends yield ("DY") strategy. In this paper, I review the performance of 16 portfolios formed on listed equity instruments on the Nigerian stock exchange ("NSE") which were divided into quartiles within the period 2003 and 2014. I utilise various measures; "Jensen Alpha" measure and Sharpe ratio, to assess which portfolio would have earned Nigerian investors above market returns in the period.
The evidence from this study indicates that a portfolio formed using a market capitalization weighted approach for the highest quartile of dividend yielding stocks overall outperforms a buy-the-market and-hold policy. Also, equal weighted and market capitalization weighted portfolios based on earnings yield have been unable to outperform the NSE All Share Index in the review period. Put differently, the PER has no predictive power but dividends yields do. The limitations of the study are also discussed.
Keywords: Price to Earnings Ratio, Dividends yield, Nigeria, Jensen's alpha, Sharpe ratio, Risk adjusted returns, Value investing

1. Introduction
The work of Basu (1983) showed that the common stock of high E/P firms earn, on average higher risk-adjusted returns than the common stock of low E/P. E/P represents the earnings yield where E is the earnings per share and P is the price per share of the stock. Basu (1983) provided evidence supporting the notion that low price to earnings stocks outperform high price to earnings stocks. This finding was very important as it ushered in many studies reviewing this phenomenon across different time frames and in different markets. Similarly, the work of Dow (1920), Ball (1978), Fama and French (1978) all show that Dividends / Prices or the dividends yield have some degree of predictive power for security prices. Beyond these early works, several studies have expanded on their work. In Brooks (2005), he states that the PE ratio is a stock's price to its earnings over the last company year (historical P/E) and to analysts' consensus forecast earnings for this year (prospective P/E), are perhaps the statistics most widely used to describe a company and as a result constitute the investment style of many large fund managers. In Oduwole (2015), it was shown that Nigerian fund managers underperformed the Nigerian stock exchange all share index ("NSE ASI") in the period 2011 – 2014 but it failed to show why this was the case. If the P/E ratio investing style is utilized by many fund managers around the world with Nigeria included, then it's imperative to ascertain whether the returns to this style or strategy can outperform the NSE ASI.

In this paper, I describe the data and methodology utlised to review the performance of each investment style or strategy in section 2 and discuss the results in section 3. The limitations of the study are also discussed. Beyond the creation of the portfolios, I utilize the Sharpe ratio and Jensen's alpha to further review the performance of these portfolios.

2. The Data and Analysis
The data utilized for analysis in this paper was collected from the Data team of the Nigerian Stock Exchange in Lagos, Nigeria. Available quarterly earnings per share, annual interim and final dividends were collected from the team. Missing data points were supplemented with data collected from an equity research team in Lagos, Nigeria. The data collected was from the period 2001 – 2014, however there was insufficient data for two years, 2001 and 2008. The dataset doesn't suffer from survivorship bias because the constituents of portfolios were dependent on the number of listed instruments on the Nigerian Stock Exchange for each year but not as at 2014 alone. Table 1 shows the number of stocks utilized for the analysis year on year.

2.1 Analysis and Model
Annual earnings per share ("EPS") data were computed by adding four quarters of EPS for each year.
cases where less than four quarters of EPS data was available, the following transform was conducted;

$$TEPS = \frac{\sum_{1}^{4} EPS}{K}$$

(1)

Where K = $\dfrac{EPS_{period}}{4}$

TEPS is the total EPS for one year, EPS$_{period}$ is the number of EPS data available.
Price Earnings Ratios ("PER") are computed using the following formula;

$$PER = \frac{P_t}{TEPS_{t-1}}$$

(2)

Where TEPS$_{t-1}$ is the previous year's EPS. PER's were calculated once a year in April of every year. All PER's are ranked from the highest to the lowest and divided into quartiles. Each quartile in April of each year is used to form a portfolio based on equal weights and their market capitalization. Market capitalization is calculated using the closing price for each stock on the last trading day in April multiplied by the number of shares outstanding for each listed equity instrument. Each portfolio is rebalanced every year and holds only stocks in the quartile assigned to it.
Dividend Yields are computed using the following methodology;

$$DY = \frac{D_{t-1}}{P_t}$$

(3)

Where D$_{t-1}$ is the annual dividend for year $t - 1$ and P$_t$ is the current price for the stock. Each year, the Dividend yields are computed and ranked from the highest to the lowest. Portfolios are created for each quartile based on an equal weight methodology and market capitalization approach.
Annual portfolio returns are calculated using the following approach;

$$\sum_{i=1}^{N} \ln\left(\frac{p_t}{P_{t-1}}\right) * wi$$

(4)

Where P$_t$ is the price today and P$_{t-1}$ is the previous price or rate and w$_i$ is the portfolio weight. 16 portfolios are created using two different approaches;

Equal Weighting of Portfolios
Market Capitalisation / Value Weighting of Portfolios

In Nigeria, there are no uniform reporting year ends except in the banking sector, as a result, portfolios are created only once a year in April of the year. Performance Measures include; Sharpe ratio and Jensen's alpha, all were discussed in Oduwole (2015) on the performance of Nigerian mutual funds, models are presented below;

2.2 The Sharpe Ratio
Let Rt denote the one-period simple return of a portfolio or fund between dates, $t - 1$ and t and denoted by μ and σ^2 its mean and variance:

$$\mu = E(R_t)$$

(5)

and

$$\sigma^2 = Var(R_t)$$

(6)

According to Sharpe (1966) and Lo (2002), the Sharpe ratio (SR) is defined as the ratio of the excess expected return to the standard deviation of return

$$SR = \frac{\mu - R_f}{\sigma}$$

(7)

where the excess expected return is usually computed relative to the risk-free rate, R$_f$. Because μ and σ are the population moments of the distribution of R$_t$, they are unobservable and must be estimated using historical data.

2.3 Jensen's Alpha
Jensen's alpha can be estimated using equation (8) below.

$$\overline{R}_{it} - \overline{R}_{ft} = \alpha_i + \beta_i (\overline{R}_{mt} - \overline{R}_{ft}) + \overline{u}_{it} \qquad (8)$$

$$\beta_i = \frac{cov\,(R_i, R_m)}{\sigma^2(R_m)} \qquad (9)$$

Where is $\overline{R}_{it}$ the return to asset i at time t, $\overline{R}_{ft}$ is the return to the riskfree asset at time t.

According to Jensen (1967) α_i represents the average incremental rate of return on the portfolio per unit time which is due solely to the managers ability to forecast future security prices. It is interesting to note that a naive random, buy and hold policy can be expected to yield a zero intercept. In addition if the manager is not doing as well as a random selection buy and hold policy, α_i will be negative. At first glance it might seem difficult to do worse than a random selection policy, but such results may very well be due to the generation of too many expenses in unsuccessful forecasting attempts.

The intercept in the Ordinary Least Squares equation (8) is also very useful because it prevents us from regressing through the origin and improves the fit of the model. However, given that we observe a positive intercept in any sample of returns on a portfolio we have the difficulty of judging whether or not this observation was due to mere random chance or to the superior forecasting ability of the portfolio. A simple student t test of statistical significance is employed.

A positive Sharpe ratio is also a measure of portfolio manager skill because the higher the Sharpe ratio, the easier it is for the portfolio to get leverage and invest the cash in the strategy employed. If one held the NSE All Share index, in a rising market, one would expect a positive Sharpe ratio.

3. Results
3.1 Dividend Yield Portfolios
Within the review period, eight dividend yield portfolios were created in equal amounts; four value weighted portfolios and four equal weighted portfolios. Value weighted high dividend yield portfolios outperformed the NSE ASI in cumulative return terms. The actual portfolio performance is summarized in tables 2 – 5 below. The highest quartile dividend portfolio returned 323% in the review period versus the 201% returned by the NSE ASI. Also, high dividends yield value weighted portfolios outperform the low dividend yield value weighted portfolios.

Therefore in the review period, purchasing high dividend yields portfolio would have led to outperformance beyond the buy and hold portfolio and the low dividend yield portfolios with portfolio weights determined by market capitalisation. However, this is not the case for equal weighted dividend yield portfolios, the NSE ASI outperforms all portfolio quartiles. In addition, the high dividend yield portfolios still marginally outperform the low dividend yield portfolios.

The highest Equal weighted dividend yield portfolio returned 133% as opposed to the 201% returned by the NSE ASI.

3.2 PER Portfolios
In terms of PER, the results showed that holding a low PER portfolio doesn't outperform the NSE ASI or high dividend yield portfolios in the review period. The value weighted low PER portfolios however outperformed the high PER portfolios, which is in line with various studies. However on an equal weighted portfolio case, high PER portfolios outperform low PER portfolios. The difference in portfolio weightings and performance therefore makes the choice of choosing either low or high PER portfolios inconclusive on Nigerian listed equity instruments. It is therefore difficult to say that PER portfolios were a good strategy to employ.

3.3 The Sharpe and Jensen's Alpha
Half of the portfolios created generated positive Sharpe ratios. The risk free rate chosen for the purpose of this analysis is the one month Nigerian Inter-bank Treasury Bills True Yields ("NITTY") as published by the FMDQ OTC. This was chosen because it is a simple available short term proxy for the Treasury Bills rate in Nigeria.
The positive Jensen's alphas were however not statistically significant, this could be attributed to the fact that outperformance of the NSE ASI has only happened since the year 2009.

The main corollary is that within the review period, the high dividend yield stocks were able to outperform the NSE ASI, however investing using the PER approach has not outperformed the NSE ASI. The lack of statistical significance is however a worry as it makes it difficult to conclude that employing this strategy would definitely ensure outperformance going forward.
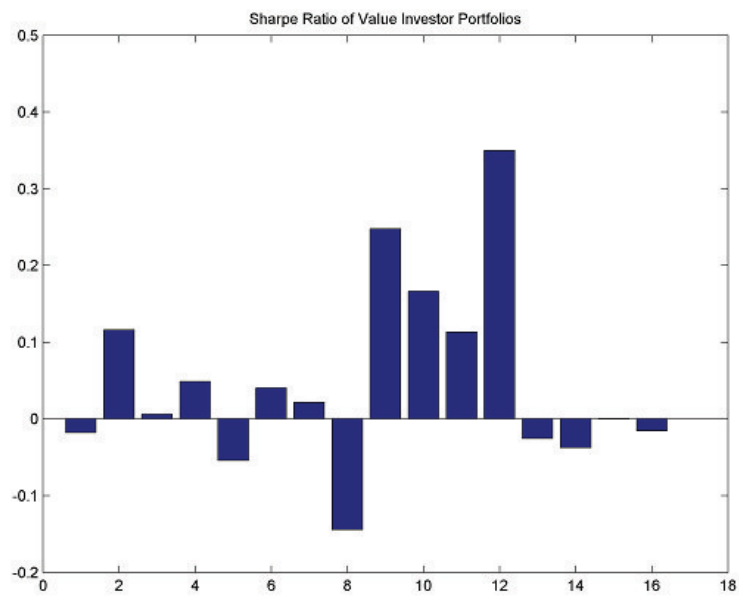
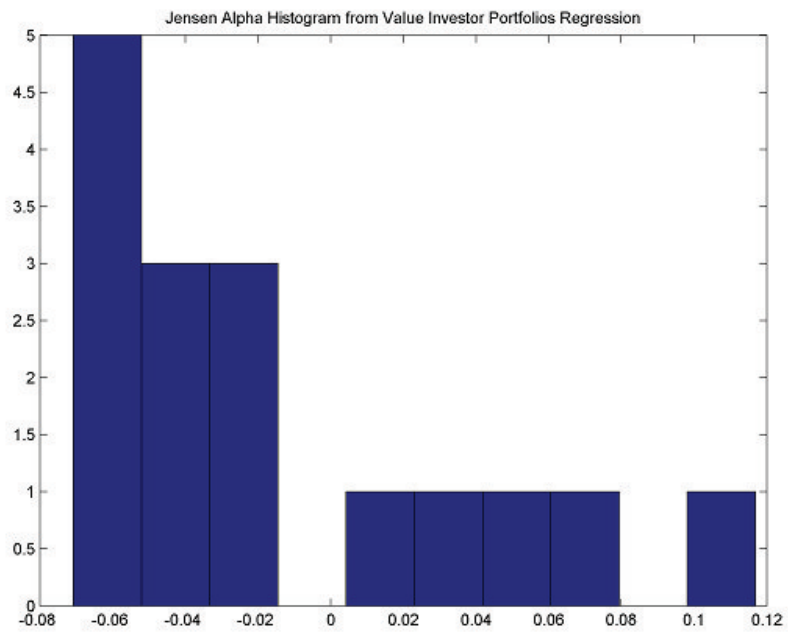Figure 1. Value investor Sharpe ratio for all 16 portfolios

Figure 2. Value investor Jensen Alpha Histograms for all 16 portfolios

Table 1. Number of companies utilised per year for the DY analysis

Year	Number of Companies
2003	33
2004	34
2005	33
2006	39
2007	34
2009	26
2010	91
2011	85
2012	74
2013	101
2014	98

Table 2. Full names for each portfolio

Code	Full Name
EWLPE1	Equal Weighted Low Price Earnings Quartile 1
EWLPE2	Equal Weighted Low Price Earnings Quartile 2
EWHPE1	Equal Weighted High Price Earnings Quartile 1
EWHPE2	Equal Weighted High Price Earnings Quartile 2
VWLPE1	Market Cap Weighted Low Price Earnings Quartile 1
VWLPE2	Market Cap Weighted Low Price Earnings Quartile 2
VWHPE1	Market Cap Weighted High Price Earnings Quartile 1
VWHPE2	Market Cap Weighted High Price Earnings Quartile 2
VWLDIV1	Market Cap Weighted Low Dividends Yield Quartile 1
VWLDIV2	Market Cap Weighted Low Dividends Yield Quartile 2
VWHDIV1	Market Cap Weighted High Dividends Yield Quartile 1
VWHDIV2	Market Cap Weighted High Dividends Yield Quartile 2
EWLDIV1	Equal Weighted Low Dividends Yield Quartile 1
EWLDIV2	Equal Weighted Low Dividends Yield Quartile 2
EWHDIV1	Equal Weighted High Dividends Yield Quartile 1
EWHDIV2	Equal Weighted High Dividends Yield Quartile 2

Table 3. Returns to PER portfolios

Dates	EWLPE1	EWLPE2	EWHPE1	EWHPE2	VWLPE1	VWLPE2	VWHPE1	VWHPE2	NSEIndex
30-Apr-03	4.7%	-22.5%	-15.8%	-15.5%	-8.1%	-24.5%	-5.3%	-15.5%	18.3%
30-Apr-04	122.3%	1.4%	49.6%	69.5%	90.6%	-1.8%	60.2%	27.7%	91.2%
30-Apr-05	-19.2%	-12.9%	-19.0%	-4.3%	-5.4%	-1.7%	-19.6%	-11.4%	-14.9%
30-Apr-06	-5.5%	-0.5%	24.3%	23.9%	-94.7%	15.1%	27.6%	48.7%	6.1%
30-Apr-07	80.5%	249.4%	183.9%	109.6%	72.3%	185.4%	84.6%	9.5%	102.2%
30-Apr-09	-39.4%	-7.5%	-51.6%	-51.2%	-39.4%	-7.5%	-51.6%	-51.2%	-63.8%
30-Apr-10	4.1%	6.5%	-5.4%	2.8%	36.9%	18.1%	30.0%	2.8%	23.1%
30-Apr-11	-13.3%	-19.9%	-23.9%	5.5%	-21.8%	-5.4%	-27.5%	4.5%	-5.3%
30-Apr-12	-17.8%	-16.2%	-17.9%	-7.7%	-11.6%	-21.3%	-3.6%	14.1%	-12.0%
30-Apr-13	16.7%	15.4%	19.4%	32.4%	55.4%	11.4%	35.8%	65.3%	51.7%
30-Apr-14	-0.4%	58.4%	5.4%	8.3%	11.6%	22.8%	31.8%	-3.5%	15.1%
31-Dec-14	-0.9%	-5.2%	-3.2%	-6.9%	22.6%	-21.8%	-10.8%	-1.8%	-10.0%
SUM	131.7%	246.4%	146.0%	166.2%	108.4%	168.9%	151.7%	89.2%	201.8%

Table 4. Returns to Dividend Yield portfolios

Dates	VWLDIV1	VWLDIV2	VWHDIV1	VWHDIV2	EWLDIV1	EWLDIV2	EWHDIV1	EWHDIV2	NSEIndex
30-Apr-03	-7.26%	-17.14%	-0.36%	11.81%	-14.38%	-5.73%	1.99%	1.75%	18.33%
30-Apr-04	98.72%	42.38%	59.76%	54.47%	96.52%	36.57%	62.94%	21.16%	91.23%
30-Apr-05	-21.43%	4.83%	-14.82%	-18.15%	-19.62%	-7.48%	-19.22%	-7.73%	-14.85%
30-Apr-06	15.95%	32.09%	-29.40%	12.80%	0.27%	12.94%	9.60%	2.18%	6.10%
30-Apr-07	78.60%	236.65%	124.71%	81.42%	70.07%	148.69%	131.71%	132.03%	102.24%
30-Apr-09	-4.84%	-53.93%	-34.26%	3.57%	-39.44%	-49.95%	-43.66%	-44.02%	-63.84%
30-Apr-10	61.48%	52.14%	32.74%	53.02%	6.32%	1.56%	2.73%	7.37%	23.09%
30-Apr-11	-2.74%	-11.99%	-6.60%	25.00%	-13.56%	-15.15%	-18.41%	-11.35%	-5.34%
30-Apr-12	-13.74%	-24.40%	-16.12%	-42.72%	-21.26%	-18.22%	-20.33%	-30.85%	-11.96%
30-Apr-13	57.40%	30.24%	65.01%	93.89%	31.36%	11.39%	19.21%	35.70%	51.69%
30-Apr-14	10.15%	8.75%	16.31%	67.88%	43.76%	15.66%	14.90%	8.08%	15.11%
31-Dec-14	-8.93%	-10.96%	7.89%	-19.57%	-11.16%	-10.53%	0.01%	19.04%	-9.96%
SUM	263.36%	288.67%	204.87%	323.41%	128.90%	119.74%	141.47%	133.36%	201.81%

Table 5. Cumulative returns for all portfolios and NSE ASI

Code	Cumulative Returns
VWHPE2	89.24%
VWLPE1	108.41%
EWLDIV2	119.74%
EWLDIV1	128.90%
EWLPE1	131.75%
EWHDIV2	133.36%
EWHDIV1	141.47%
EWHPE1	145.98%
VWHPE1	151.74%
EWHPE2	166.25%
VWLPE2	168.86%
All Share Index	201.81%
VWHDIV1	204.87%
EWLPE2	246.37%
VWLDIV1	263.36%
VWLDIV2	288.67%
VWHDIV2	323.41%

Table 6. Jensen alpha OLS regression T- Statistic

Portfolio	T Statistic
EWLPE1	-0.94661
EWLPE2	0.18356
EWHPE1	-0.52086
EWHPE2	-0.46682
VWLPE1	-0.68016
VWLPE2	-0.13002
VWHPE1	-0.69115
VWHPE2	-0.80639
VWLDIV1	0.95896
VWLDIV2	0.41989
VWHDIV1	0.090632
VWHDIV2	1.2439
EWLDIV1	-0.98294
EWLDIV2	-0.8005
EWHDIV1	-0.82581
EWHDIV2	-0.60953

4. Conclusion

The results of the dividend yield market capitalization weighted portfolios show that an investor can outperform the NSE ASI by purchasing the highest quartile of dividend yielding portfolios. It is important to point out that the outperformance only began in 2009 and this portfolio underperformed the all share index from 2003 – 2009. There is no evidence that low PER portfolios out-perform high PER portfolios. The Jensen Alpha regressions show that the outperformance is however not statistically significant. In future studies, other value indicators could be employed in the portfolio formation process and a longer review period could be employed.

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