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Do Wall Street Fundamentals work in the ASX200?

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Do Wall Street fundamentals work in the ASX200?

It is a global market but do the fundamentals of one market necessarily mirror those in another market? **BRUCE VANSTONE** and **ADITYA AGRAWAL** look at the data and come up with some surprising conclusions.



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It has long been accepted by practitioners of fundamental analysis that there exist likely correlations between specific fundamental variables and expected security returns.

O'Shaughnessy (1998) documented a number of relationships between various fundamental variables and expected market returns.

A valid criticism when applying work such as O'Shaughnessy's to the Australian market is that Australian investors may value different fundamental characteristics to US investors. The purpose of this paper is to determine the extent to which O'Shaughnessy's findings are relevant to the Australian stock market.

METHODOLOGY

In O'Shaughnessy's work (1998), a number of portfolios were constructed, each consisting of the 50 stocks with the highest and lowest values of specific fundamental variables. These portfolios were reformed yearly, and the results documented, to show whether excess returns could be expected from the established portfolios.

We take a different approach. We build trading portfolios by assuming a fixed amount of starting capital, then buy stocks which meet the fundamental criteria being tested, and hold them until they no longer meet that criteria (or are no longer in the ASX200).

Thus, our portfolios are not rebalanced yearly; they instead show the long-term implications for the variable being tested.

In a study of this nature, it is necessary to choose some trading parameters to control the simulation:

PARAMETER	VALUE
Starting capital	\$100,000
Position size	2% of equity
Transaction costs	\$20 fixed each way

Position size is set to 2% of equity as suggested by Elder (1993). Transaction costs are nominal, and are in line with what could be expected using an online broker such as CommSec (2004).

Real-world constraints are respected. Once the portfolio is fully invested, no new trades can be initiated until capital has been freed up through sales.

Trades are only entered and exited under the conditions defined for each portfolio. No stops are used in the construction of these portfolios, which allows us to focus on the return spectrum of the fundamental variable being tested.

We build a number of portfolios to expose the nature of the main fundamental variables tested by O'Shaughnessy, namely:

1. Market Capitalisation
2. Price to Earnings Ratio
3. Price to Book Ratio
4. Price to Cashflow Ratio
5. Price to Sales Ratio
6. Dividend Yield
7. One Year Earnings Growth per Share
8. Five Year Earnings Growth per Share
9. Return on Equity.

For each fundamental variable, a number of portfolios need to be constructed. For example, to study Market Capitalisation, we built two portfolios, as follows:

Large Cap Portfolio consisting of securities *above* the mean market capitalisation for that year; and

Not Large Cap Portfolio consisting of securities *below* the mean market capitalisation for that year.

Fundamental data was sourced from the Aspect Financials FinAnalysis database produced by AspectHuntley (2004). This source provides detailed fundamental data on ASX listed companies and includes those companies which were subsequently delisted.

Technical data was sourced from Norgate Investor Services (2004). The trading and portfolio management software used to conduct the tests was Wealth-Lab (version 3.1). In common with many US studies of this nature, all fundamental data was delayed by 6 months before being acted on, to ensure that the fundamental information was available to all market participants.

The period covered by this study is the nine-year period starting at the first day of trading in 1995, through to the final day of trading in 2003. Unfortunately the S&P ASX200 has only been in existence since April 2000. To complete this study, it was necessary to create an ASX200 proxy for the period in which the S&P ASX200 was not in existence, i.e. from the start of trading in 1995 to April 2000.

The constituents for this period were chosen on the basis of their market capitalisation and trading liquidity.

Confidence tests were conducted by creating the entire set of trades for each portfolio, using a fixed amount of capital per trade (\$5,000).

The distribution of profit/period for each portfolio was then compared to the buy-and-hold distribution created in the same way. Statistical significance is determined by exceeding the 95% cut-off from a one-way ANOVA test of each pair of distributions.

This study is primarily a study of the returns resulting from raw price changes. Return calculations do not include dividends. The Sharpe Ratio is calculated with a zero risk-free rate as unexposed portfolio does not accrue interest. Since neither dividends nor interest are included in portfolio returns, the results are (at worst) understated.

RESULTS

Initially, we will present the APR and Sharpe ratio of the naïve buy-and-hold approach. This allows for a comparative benchmark, and a sense of perspective when studying the results.

Next, we present the results from each of our portfolios, which were built as previously described. In presenting these results, we show the APR, the Sharpe Ratio, the average holding period (in trading days) for each portfolio, and an indication of significance. Also, we briefly comment on whether the results are in line with O'Shaughnessy's findings for the US stock market.

THE NAÏVE BENCHMARK

The naïve benchmark is built by simply buying each ASX200 security on the day after it initially becomes available in the market, and holding it until either of the following conditions is met:

- The study period ends (end of trading 2003),
- The stock is delisted (and the value of the trade is set to 0, with a loss of 100% of invested capital)

Under these conditions, the following benchmark exists (APR below is the 10 year S&P ASX200 return as published by Standard & Poor's (2004)):

Buy and Hold	Value
APR	4.48%
Sharpe Ratio	0.44

MARKET CAPITALISATION (MC)

To study the effect of Market Capitalisation we built two portfolios, as follows:

Large Cap Portfolio consisting of securities above the mean market capitalisation for that year; and

Not Large Cap Portfolio consisting of securities below the mean market capitalisation for that year.

LARGE CAP PORTFOLIO (LC)

- **Entry:** $MC \geq MEAN(MC)$ for the year.
- **Exit:** $MC < MEAN(MC)$ for the year.

Under these conditions, the portfolio achieved the following results:

LC Portfolio	Value
APR	3.00%
Sharpe Ratio	0.39
Average Holding Period	1055
Significant?	Y*

* This finding demonstrates that the LC portfolio is significantly worse than the buy-and-hold portfolio.

NOT LARGE CAP PORTFOLIO (NLC)

- **Entry:** $MC < MEAN(MC)$ for the year.
- **Exit:** $MC \geq MEAN(MC)$ for the year.

Under these conditions, the portfolio achieved the following results:

NLC Portfolio	Value
APR	6.83%
Sharpe Ratio	0.56
Average Holding Period	528
Significant?	N

Summary of Findings¹

O'Shaughnessy found NLC stocks (13.23%) performed better than LC stocks (11.92%), and our findings were similar as NLC returns exceeded LC returns (6.83% compared to 3.00% respectively).

PRICE TO EARNINGS RATIO (PE)

To study the effect of Price to Earnings Ratio (and Market Capitalisation) we built four portfolios, as follows:

Large Cap High Price to Earnings Ratio Portfolio (LCHPE) consisting of securities above the mean market capitalisation and above the mean price to earnings ratio for that year,

- **Entry:** $MC \geq MEAN(MC)$ for the year AND $PE \geq MEAN(PE)$ for the year.
- **Exit:** $MC < MEAN(MC)$ for the year OR $PE < MEAN(PE)$ for the year.

Large Cap Low Price to Earnings Ratio Portfolio (LCLPE)

consisting of securities above the mean market capitalisation and below the mean market price to earnings ratio for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $PE < MEAN (PE)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $PE \geq MEAN (PE)$ for the year.

Not Large Cap High Price to Earnings Portfolio (NLCHPE)

consisting of securities below the mean market capitalisation and above the mean market price to earnings ratio for that year,

- **Entry:** $MC < MEAN (MC)$ for the year AND $PE \geq MEAN (PE)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $PE < MEAN (PE)$ for the year.

Not Large Cap Low Price to Earnings Portfolio (NLCLPE)

consisting of securities below the mean market capitalisation and below the mean price to earnings ratio for that year.

- **Entry:** $MC < MEAN (MC)$ for the year AND $PE < MEAN (PE)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $PE \geq MEAN (PE)$ for the year.

Under these conditions, the results achieved by the portfolios are documented in Table 1.

Summary of Findings

O'Shaughnessy found the best performance for LC stocks with a low PE ratio (14.1%), followed by NLC stocks with low PE (12.65%). Low PE stocks performed better than high PE stocks.

Our findings were different with our best performance coming from NLC stocks with low PE (4.79%), followed by LC with high PE (1.70%).

PRICE TO BOOK RATIO (PB)

To study the effect of Price to Book ratio (and Market Capitalisation) we built four portfolios, as follows:

Large Cap High Price to Book Ratio Portfolio (LCHPB)

consisting of securities above the mean market capitalisation and above the mean price to book ratio for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $PB \geq MEAN (PB)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $PB < MEAN (PB)$ for the year.

Large Cap Low Price to Book Ratio Portfolio (LCLPB)

consisting of securities above the mean market capitalisation and below the mean market price to book ratio for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $PB < MEAN (PB)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $PB \geq MEAN (PB)$ for the year.

Not Large Cap High Price to Book Ratio Portfolio (NLCHPB)

consisting of securities below the mean market capitalisation and above the mean market price to book ratio for that year,

- **Entry:** $MC < MEAN (MC)$ for the year AND $PB \geq MEAN (PB)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $PB < MEAN (PB)$ for the year.

Not Large Cap Low Price to Book Ratio Portfolio (NLCLPB)

consisting of securities below the mean market capitalisation

and below the mean price to book ratio for that year.

- **Entry:** $MC < MEAN (MC)$ for the year AND $PB < MEAN (PB)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $PB \geq MEAN (PB)$ for the year.

Under these conditions, the results achieved by the portfolios are documented in Table 1.

Summary of Findings

O'Shaughnessy found the best performance was of NLC stocks with a low PB ratios (15.05%), followed by LC stocks with low PB (14.82%). Low PB stocks performed better than high PB stocks.

Our findings were not in line with O'Shaughnessy. Our best performance too was of NLC low PB stocks (5.08%); however followed by NLC high PB stocks (4.95%). NLC stocks performed better than LC stocks.

PRICE TO CASHFLOW RATIO (PC)

To study the effect of Price to Cashflow ratio (and Market Capitalisation) we built four portfolios, as follows:

Large Cap High Price to Cashflow Ratio Portfolio (LCHPC)

consisting of securities above the mean market capitalisation and above the mean price to cashflow ratio for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $PC \geq MEAN (PC)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $PC < MEAN (PC)$ for the year.

Large Cap Low Price to Cashflow Ratio Portfolio (LCLPC)

consisting of securities above the mean market capitalisation and below the mean market price to cashflow ratio for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $PC < MEAN (PC)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $PC \geq MEAN (PC)$ for the year.

Not Large Cap High Price to Cashflow Ratio Portfolio (NLCHPC)

consisting of securities below the mean market capitalisation and above the mean market price to cashflow ratio for that year,

- **Entry:** $MC < MEAN (MC)$ for the year AND $PC \geq MEAN (PC)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $PC < MEAN (PC)$ for the year.

Not Large Cap Low Price to Cashflow Ratio Portfolio (NLCLPC)

consisting of securities below the mean market capitalisation and below the mean price to cashflow ratio for that year.

- **Entry:** $MC < MEAN (MC)$ for the year AND $PC < MEAN (PC)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $PC \geq MEAN (PC)$ for the year.

Summary of Findings

O'Shaughnessy found the best performance was of LC stocks with a low PC ratios (15.18%), followed by NLC stocks with low PC (14.53%). Low PC stocks performed better than high PC stocks.

Our findings were not in line with O'Shaughnessy as our best performance was from NLC high PC stocks (2.20%); followed by LC high PC stocks (1.29%). High PC stocks performed better than low PC stocks.

TABLE 1 PRICE RATIOS RESULTS

Portfolio	APR	Sharpe Ratio	Avg. Holding Period	Significant?
Price to Earnings Ratio				
LC HPE	1.70%	0.23	783	Y*
LC LPE	-0.69%	-0.27	331	N
NLC HPE	0.04%	0.46	415	N
NLC LPE	4.79%	0.52	289	N
Price to Book Ratio				
LC HPB	1.68%	0.22	667	Y*
LC LPB	1.71%	0.37	368	N
NLC HPB	4.95%	0.39	321	N
NLC LPB	5.08%	0.76	355	N
Price to Cashflow Ratio				
LC HPC	1.29%	0.18	840	Y*
LC LPC	-0.01%	-0.34	316	Y*
NLC HPC	2.20%	0.27	406	N
NLC LPC	0.07%	0.72	248	N
Price to Sales Ratio				
LC HPS	-0.35%	0.01	654	Y*
LC LPS	1.33%	0.23	486	N
NLC HPS	0.04%	0.35	401	N
NLC LPS	7.97%	0.82	337	N

* This finding demonstrates that the portfolio is significantly worse than the buy-and-hold portfolio.

PRICE TO SALES RATIO (PS)

To study the effect of Price to Sales ratio (and Market Capitalisation) we built four portfolios, as follows:

Large Cap High Price to Sales Ratio Portfolio (LCHPS) consisting of securities above the mean market capitalisation and above the mean price to sales ratio for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $PS \geq MEAN (PS)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $PS < MEAN (PS)$ for the year.

Large Cap Low Price to Sales Ratio Portfolio (LCLPS) consisting of securities above the mean market capitalisation and below the mean market price to sales ratio for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $PS < MEAN (PS)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $PS \geq MEAN (PS)$ for the year.

Not Large Cap High Price to Sales Ratio Portfolio (NLCHPS) consisting of securities below the mean market capitalisation and above the mean market price to sales ratio for that year,

- **Entry:** $MC < MEAN (MC)$ for the year AND $PS \geq MEAN (PS)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $PS < MEAN (PS)$ for the year.

Not Large Cap Low Price to Sales Ratio Portfolio (NLCLPS)

consisting of securities below the mean market capitalisation and below the mean price to sales ratio for that year.

- **Entry:** $MC < MEAN (MC)$ for the year AND $PS < MEAN (PS)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $PS \geq MEAN (PS)$ for the year.

Under these conditions, the results achieved by the portfolios are documented in Table 1.

Summary of Findings

O'Shaughnessy found that the best performance was of stocks with low PS ratios, especially NLC low PS stocks (16.09%), followed by LC stocks with low PS (14.15%).

Our findings were in line with the general findings of the book. Like O'Shaughnessy our best performance coming from NLC stocks with low PS (7.97%), followed by LC with low PS (1.33%).

DIVIDEND YIELD (DY)

To study the effect of Dividend Yield (and Market Capitalisation) we built two portfolios, as follows:

Large Cap High Dividend Yield Portfolio (LCHDY) consisting of securities above the mean market capitalisation and above the mean dividend yield for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $DY \geq MEAN (DY)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $DY < MEAN (DY)$ for the year.

Not Large Cap High Dividend Yield Portfolio (NLCHDY) consisting of securities below the mean market capitalisation and above the mean market dividend yield for that year.

- **Entry:** $MC < MEAN (MC)$ for the year AND $DY \geq MEAN (DY)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $DY < MEAN (DY)$ for the year.

Under these conditions, the results achieved by the portfolio are documented in Table 2.

Summary of Findings

O'Shaughnessy found that the best performance was of LC stocks with high DY, 13.43%, followed by NLC stocks with high DY (11.99%).

Our findings were in line with the general findings of O'Shaughnessy. LC high DY stocks (2.56%) performed better than NLC high DY stocks (1.76%).

ONE YEAR EARNINGS GROWTH PER SHARE (EPS1)

To study the effect of One Year Earnings Growth per Share (and Market Capitalisation) we built four portfolios, as follows:

Large Cap High 1 Year Earnings Growth Per Share Portfolio (LCHEPS1) consisting of securities above the mean market capitalisation and above the mean 1 year earnings growth per share for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $EPS1 \geq MEAN (EPS1)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $EPS1 < MEAN (EPS1)$ for the year.

Large Cap Low 1 Year Earnings Growth Per Share Portfolio (LCLEPS1) consisting of securities above the mean

market capitalisation and below the mean market 1 year earnings growth per share for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $EPS1 < MEAN (EPS1)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $EPS1 \geq MEAN (EPS1)$ for the year.

Not Large Cap High 1 Year Earnings Growth Per Share Portfolio (NLCHEPS1) consisting of securities below the mean market capitalisation and above the mean market 1 year earnings growth per share for that year,

- **Entry:** $MC < MEAN (MC)$ for the year AND $EPS1 \geq MEAN (EPS1)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $EPS1 < MEAN (EPS1)$ for the year.

Not Large Cap Low 1 Year Earnings Growth Per Share Portfolio (NLCLEPS1) consisting of securities below the mean market capitalisation and below the mean 1 year earnings growth per share for the year

- **Entry:** $MC < MEAN (MC)$ for the year AND $EPS1 < MEAN (EPS1)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $EPS1 \geq MEAN (EPS1)$ for the year.

Under these conditions, the results achieved by the portfolio are documented in Table 2.

Summary of Findings

O'Shaughnessy found that the best performance was of NLC Low EPS1 stocks (12.04%) followed by LC low EPS1 (11.88%) and NLC high EPS1 (11.68%).

Our findings were in line with the general findings of O'Shaughnessy as our best performance came from NLC low EPS1 stocks (4.58%), followed by LC with low EPS1 (2.37%).

TABLE 2 DIVIDEND YIELD, EARNINGS GROWTH (ONE AND FIVE YEAR) AND RETURN ON EQUITY RESULTS

Portfolio	APR	Sharpe Ratio	Avg. Holding Period	Significant?
Dividend Yield				
LC HDY	2.56%	0.63	326	N
NLC HDY	1.76%	0.39	321	N
One Year Earnings Growth per Share				
LC HEPS1	0.08%	0.07	192	N
LC LEPS1	2.37%	0.31	876	Y*
NLC HEPS1	-0.77%	-0.27	181	N
NLC LEPS1	4.58%	0.49	491	N
Five Year Earnings Growth per Share				
LC HEPS5	1.41%	0.27	375	N
NLC HEPS5	2.99%	0.65	231	N
Return on Equity				
LC HROE	4.36%	0.51	936	Y*
NLC HROE	4.23%	0.47	459	N

* This finding demonstrates that the portfolio is significantly worse than the buy-and-hold portfolio.

FIVE YEAR EARNINGS GROWTH PER SHARE (EPS5)

To study the effect of Five Year Earnings Growth per Share (and Market Capitalisation) we built two portfolios, as follows:

Large Cap High 5 Year Earnings Growth Per Share Portfolio (LCHEPS5) consisting of securities above the mean market capitalisation and above the mean 5 year earnings growth per share for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $EPS5 \geq MEAN (EPS5)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $EPS5 < MEAN (EPS5)$ for the year.

Not Large Cap High 5 Year Earnings Growth Per Share Portfolio (NLCHEPS5) consisting of securities below the mean market capitalisation and above the mean market 5 year earnings growth per share for that year.

- **Entry:** $MC < MEAN (MC)$ for the year AND $EPS5 \geq MEAN (EPS5)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $EPS5 < MEAN (EPS5)$ for the year.

Under these conditions, the results achieved by the portfolio are documented in Table 2.

Summary of Findings

O'Shaughnessy found the better performer to be LC stocks with high EPS5 (10.30%), followed by NLC stocks with high EPS (9.94%).

Our findings were not in line with O'Shaughnessy as NLC high EPS5 stocks (2.99%) performed better than LC high EPS5 stocks (1.41%).

RETURN ON EQUITY (ROE)

To study the effect of Return on Equity (and Market Capitalisation) we built two portfolios, as follows:

Large Cap High Return on Equity Portfolio (LCHROE) consisting of securities above the mean market capitalisation and above the mean return on equity ratio for that year,

- **Entry:** $MC \geq MEAN (MC)$ for the year AND $ROE \geq MEAN (ROE)$ for the year.
- **Exit:** $MC < MEAN (MC)$ for the year OR $ROE < MEAN (ROE)$ for the year.

Not Large Cap High Return on Equity Portfolio (NLCHROE) consisting of securities below the mean market capitalisation and above the mean market return on equity ratio for that year.

- **Entry:** $MC < MEAN (MC)$ for the year AND $ROE \geq MEAN (ROE)$ for the year.
- **Exit:** $MC \geq MEAN (MC)$ for the year OR $ROE < MEAN (ROE)$ for the year.

Under these conditions, the results achieved by the portfolio are documented in Table 2.

Summary of Findings

O'Shaughnessy tested high ROE stocks and found that the best performance was of NLC stocks with high ROE (13.06%), followed by LC stocks with high ROE (11.10%).

Our findings were not in line with the general findings of O'Shaughnessy, as LC high ROE stocks (4.36%) performed better than NLC high ROE stocks (4.23%).

CONCLUSIONS

In Table 3 we summarise the results from multiple perspectives, tabulating the results of each tested portfolio in comparison to the Buy and Hold strategy, and comparing the test results with the corresponding results in O'Shaughnessy, In Table 3:

- UP stands for Under Performs, when the portfolio has an APR below the respective Buy and Hold (4.48% for our tests, 12.1% for O'Shaughnessy).
- OP stands for Over Performs when the portfolio has an APR above the respective Buy and Hold (4.48% for our tests, 12.1% for O'Shaughnessy)
- Rows shaded represent portfolios where our results matched O'Shaughnessy's results.

Our findings for the following four variables were broadly in line with O'Shaughnessy's findings:

- Market Capitalisation (MC)
- Price to Sales Ratio (PS)
- Dividend Yield (DY)
- One Year Earnings Growth per Share (EPS1).

Our findings also overwhelmingly support the "size effect", that is, there appears to be a strong relationship between returns and market capitalisation, a fact first observed by Banz (1981) in the US stock market.

Although the Australian market represents less than 2.24% of the world's market size measured by its MSCI World Index (2005), it is interesting to note that investor preferences in the Australian markets are fairly consistent with O'Shaughnessy's research concerning the US market fundamentals.

According to the Efficient Market Hypothesis (EMH) prices react to available information in a timely manner, and accepting the EMH in principle effectively leads to the random walk hypothesis which states that successive changes in stock prices are independent, identically distributed random variables.

If we accept the basis of EMH then we must see the opportunity to make economically significant trading returns to be exploiting a pocket of inefficiency. The results indicate the fundamental analysts in both US and Australian stock markets tend to concentrate on the same set of fundamentals to identify these ineffective pockets.

Directions of future work include testing of a combination of factors (multifactor models), and comparing the behaviour of these tested variables in other parts of the market (like the ASX300 and S&P All Ordinaries) to compare the difference in investor preferences in different markets.

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TABLE 3: RESULTS OF EACH TESTED PORTFOLIO IN COMPARISON TO THE BUY AND HOLD STRATEGY

Portfolio	O'Shaughnessy results		Our results	
	UP	OP	UP	OP
LC	■		■	
NLC		■		■
LC HPE	■		■	
LC LPE		■	■	
NLC HPE	■		■	
NLC LPE		■		■
LC HPB	■		■	
LC LPB		■	■	
NLC HPB	■			■
NLC LPB		■		■
LC HPC	■		■	
LC LPC		■	■	
NLC HPC	■		■	
NLC LPC		■	■	
LC HPS	■		■	
LC LPS		■	■	
NLC HPS	■		■	
NLC LPS		■		■
LC HDY		■	■	
NLC HDY	■		■	
LC HEPS1	■		■	
LC LEPS1	■		■	
NLC HEPS1	■		■	
NLC LEPS1	■			■
LC HEPS5	■		■	
NLC HEPS5	■		■	
LC HROE	■		■	
NLC HROE		■	■	

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Notes

¹The figures quoted in the Summary of Findings sections are the APR values. **J**