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**IPOs in New Zealand:
Valuation Multiples and Benchmark Adjusted Performance**

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IPOs in New Zealand: Valuation Multiples and Benchmark Adjusted Performance

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Abstract: This study examines the performance of 96 IPOs listed on New Zealand Stock Exchange (NZSE) during the 25-year period from July 1991 to June 2015. The NZX Gross All Index and two portfolios of matched peers based on sector/ industry and either sales forecast or book-to-market ratio are constructed as benchmarks. Compared with three benchmark portfolios, IPO firms outperform in the short term (1 year) but underperform in the medium and long term investment horizons (3-5 years). Depending on the benchmark for which the IPO returns are compared to, investors investing in the IPO portfolio and holding it for five years earn a cumulative average abnormal return (CAR) of between -5 percent and -20.4 percent and an average holding period return differential of between -2.7 percent and -20.07 percent. We conduct three sub-sample analyses to examine the association between differences in valuation multiples (E/P, EBITDA/EV, and P/S) and long term average returns. The findings are consistent with the general consensus of superior returns from value investments: IPOs with above median E/P and EBITDA/EV and below median P/S exhibit higher CAR than IPOs with below median earnings ratio (E/P and EBITDA/EV) and above median P/S. Compared with their respective peers selected based on sales forecasts, IPOs with high E/P achieve a CAR of 9.92 percent over a five-year period whereas IPOs with low E/P experience a five-year CAR of -33.16 percent.

Keywords: Initial public offering; cumulative abnormal return; holding period returns; wealth relative; valuation multiples.

JEL Classifications: G24

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1. Introduction

Since the global financial crisis (GFC) the New Zealand economy has been a strong performer, as has the local equity market. New Zealand's equity market has been recognised as one of the best performers worldwide since 2012, rising 25 percent in 2012, 16 percent in 2013, and 18 percent in 2014. In 2015, the NZX50 Index achieved a modest gross return of 13.6 percent, still outperforming all other developed markets¹. From the lowest point of the GFC in March 2009 through to June 2016 the NZX50 index tripled.

The outstanding performance of the New Zealand equity market during the past four years can be attributed to several initiatives. The growth of the New Zealand Superannuation Fund and the introduction of the KiwiSaver retirement savings scheme in 2007 increased the flow of capital in New Zealand as earners began depositing more into capital market based retirement funds. Low interest rates in international markets have persisted for several years, and the resulting high demand for dividend paying stocks has introduced more funds into the equity markets of New Zealand and driven prices up whilst increasing liquidity.

The Capital Markets Development Taskforce was created in 2008 with the goal of improving the investment environment to encourage economic growth. A complete review suggested that New Zealand's capital markets lacked size, depth, and breadth, and access to new capital was made costly through cumbersome disclosure requirements. Subsequently the Financial Markets Authority (FMA) was formed, followed by the introduction of the Financial Markets Conduct Act (FMCA). The FMCA creates a shift away from extensive and unwieldy disclosure requirements, particularly in the realm of initial public offerings. It is unsurprising that the taskforce, chaired by the executive chairman of a large New Zealand investment bank, has created legislation which makes IPOs easier to orchestrate.

Furthermore, four large government asset sales through the mixed ownership model share offer program, Mighty River Power (formerly MRP, now Mercury MCY), Meridian (MEL), Genesis (GNE) and Air New Zealand (AIR), helped raise awareness of equity markets within the general

¹ <https://milfordasset.com/2015-share-market-returns-kiwi-investors-the-big-winners/> (accessed on 29 October 2016)

public and emphasised the need to diversify investment portfolios which, for most retail investors, are heavily concentrated in real estate. To encourage small unsophisticated investors to invest in three privatized energy companies, the Government offered generous shareholder loyalty schemes. Those invested in MRP and GNE shares at the offer who held the shares for respectively two and one year received bonus shares at no cost. Meridian (MEL) issued the first instalment receipts (as opposed to shares as in other IPOs) in May 2014 and offered investors the chance to pay for the final instalments one year later. Investors in MEL received the full dividend on the number of shares they registered to purchase at the offer. The mixed ownership model share offer program has generated a huge 111,000 new shareholders and added almost NZD10 billion to the total capitalisation of the New Zealand Stock Exchange (NZSE). These new shareholders mostly consist of small Mum and Dad investors, with limited knowledge of equity markets and portfolio theory.

Since listed, the three energy companies in the mixed ownership model program have offered attractive dividend payments. Investors who bought MRP, MEL and GNE shares at the offer and held their shares to 28 October 2016 achieved a holding period return of 18.8 percent, 42.3 percent and 27.1 percent respectively. Other examples of strong performers include Scales Ltd (SCL), Arvida Group (ARV), and Vista Group International Ltd (VGL). In the 18 months following their 2014 listing, SCL achieved a holding period return of 65 percent compared to the market's 33 percent. ARV has more than doubled its IPO forecasted net profit and outperformed the market strongly following the 2014 listing. VGL has surged from NZD2.35 to NZD6.01 per share², offering investors a holding period return of 156 percent as of 28 October 2016.

Investing in IPOs in New Zealand does not incur any direct costs for investors. This is quite attractive for small retail investors given the high transaction costs in New Zealand. The minimum transaction cost for a seasoned equity investment is NZD29.50 for a transaction-only online broker or 1.5 percent for a full-service broker³. Whilst many investors in New Zealand look positively at IPOs, others are sceptical at best, influenced by tales of private equity IPOs gone wrong and a general distrust of equity capital raising by several mainstream media outlets. Firms like Dick Smith Electronics, which went public in late 2013 and into receivership mid-2016, certainly do not foster confidence. Listed in 2004, Pumpkin Patch has been struggling over a mountain of debt and falling sales for the past four years, and it went into receivership in late October 2016. The crime software company Wynyard Group, which was spun out of Jade Software in 2012, was also placed in voluntary administration a few days earlier. There have also been failed attempts at public offerings in recent years. For example,

² Adjusted price retrieved from Yahoo Finance

³ The transaction costs range between \$29.50 (ANZ) to \$80 (Craigs Investment Partners) or 1.5% (Forsyth Barr)

private equity firm Next Capital dropped their Hirepool IPO in 2014 after the proposed price was shunned by institutional investors for being unrealistically high and the 2016 IPO plans of the loss-making 2Degrees barely got off the ground before being cancelled. It is not uncommon to see private equity owners sell down their stakes through an IPO after turning an underperforming firm around. If the majority of the IPO proceeds are not invested back to the firm, it sends a warning signal to potential investors that the IPO is simply a profit-making exit strategy for its private equity owners instead of an opportunity to grow the firm. In 2016 a class action suit against Feltex Carpets was launched, claiming investors should have been informed of the fact that the 25 percent increase in fundraising mid-IPO was simply so the company could pay a dividend after listing. This suit has reminded investors of the fact that Feltex collapsed less than three years after listing, and brings further uncertainty into investors' minds.

We have observed several high-tech firms falling from grace following their IPOs in recent years. As of 28 October 2016, IkeGPS Group Ltd (IKE) has fallen 47 percent, EROAD Ltd (ERD) depreciated almost 40 percent, Orion Health (OHE) declined 44 percent, Serko Ltd (SKO) went down 62 percent, SLI Systems (SLI) dropped 75 percent since being listed. Intueri Education Group (IQE) has plunged from NZD2.35 to NZD0.8 per share⁴, a 66 percent decrease since going public in April 2014. It is worth noting that while these cases may seem to be small pieces of the puzzle, the puzzle doesn't have many pieces: In 2013, 2014, and 2015 there were 6, 12, and 3 IPOs listed on the NZSE respectively, with 2014 considered to be a significant boom year for the number of IPOs: With the restrictive sample selection criteria used in this chapter, 2014 had the highest number of IPOs seen in over two decades.

Given the mixed medium to long term performance of IPOs and that some IPOs specifically target small retail Mom and Dad investors, a natural question arises. Should unsophisticated investors purchase shares at IPOs or should they invest in either a market index or a diversified portfolio consisting of seasoned listed firms? We first examine this question and provide insights into the relative performance of IPOs in New Zealand. IPOs are not all alike and the collective wisdom on IPOs has grown among small retail investors. Some IPOs may represent good investments but are often out of reach for the general public. Mom and Dad investors are generally at a disadvantage compared with informed institutional investors. It is not easy for small retail investors to gain footholds in IPOs which offer attractive return potential. As such, offers are more likely to be oversubscribed by institutional investors and influential high-net-worth investors. Mom and Dad investors often end up with less desirable IPOs or "lemons". Avoiding buying a lemon requires a

⁴ Adjusted price retrieved from Yahoo Finance

thorough analysis of the forecast information available at offer time and a strong understanding of the valuation metrics often used in the IPO process. Previous studies (Campbell & Shiller, 2001; Philips, 1999; Rapach & Wohar, 2005) suggest that differences in price and enterprise valuation multiples may be related to differences in long run average returns. Chan and Lakonishok (2004) and O'Shaughnessy (2005) provide empirical evidence of superior returns from value investments. Inspired by these studies, we also examine the relative performance of IPO groups categorised by different valuation multiples.

We focus on a long term investment strategy for the unsophisticated Mum and Dad investors in question. A long term perspective allows investors to better deal with financial downturns and poor economic performance as they are less likely to trade during a downturn and realise the losses made. Short term portfolio strategies implemented by unsophisticated retail investors tend to underperform long term strategies with less trading. Barber and Odean (2000) find that households that trade the most earn an average annual return of 11.4 percent compared to the average household earning 16.4 percent per annum, and state that “trading is hazardous to your wealth”. Thus, a long term buy and hold strategy is what Mum and Dad retail investors should be implementing, and is the key focus of our analysis in this study.

The rest of this chapter is organised as follows. Section 2 presents the literature review on IPO performance. Section 3 describes the data, the criteria to select matched firms, and the construction of the IPO and peers samples. Section 4 discusses the method. Section 5 summarises the results, and Section 6 concludes.

2. Literature Review

Research on IPO returns within New Zealand is sparse when compared to the number of studies which have been conducted worldwide. The majority of studies in this area find similar results however: IPOs outperform the market and their peers in the short term but their performance deteriorates and they perform poorly in the medium to long term. The following discussion offers a brief overview of the key studies conducted in major developed markets followed by a summary of the findings observed in New Zealand.

2.1. International Studies

Perhaps the most famous paper in the realm of IPO returns is that of Ritter (1991), who finds that the well documented phenomenon of IPO under-pricing and abnormal first day returns does not in fact make IPOs a good investment, and that IPO stocks tend to underperform their peers over a three year period. More than a decade later, Ritter (2003) examines the literature and concludes that in every

country with a stock exchange, under-pricing of IPOs exists, and that the long term trend observed in 1991 tends to persist across most markets and time periods. In fact, underperformance in long run IPO returns appears to pre-date all of the authors of this handbook: Schlag and Wodrich (2000) were certainly not the first to observe long run returns of IPOs lagging behind their peers, but may have used the oldest dataset; examining pre-war data on the German stock exchange from 1884 to 1914. They found that over a five year period, IPO stocks underperformed their industry indices, though the finding was only statistically significant if the stocks were purchased at the date of listing as opposed to at the offer. Gompers and Lerner (2003) study IPOs from the pre-NASDAQ era, examining firms listed in the U.S.A. from 1935 to 1972. They document long run underperformance when examining value-weighted event-time buy and hold excess returns. However, they do not observe any statistically significant results when examining equally-weighted event-time buy and hold abnormal returns. Their finding suggests that the outcome is not as clear cut as thought by some.

In the United Kingdom, Levis (1993) finds that on average a sample of 712 IPOs listed between 1980 and 1988 underperformed a range of benchmarks in the three years following their listing dates. Cumulative abnormal returns ranged from -11.38 percent to -22.96 percent depending on the index for which the IPO returns are compared to. A thorough review of German IPOs, analysing a sample of 189 firms listed from 1970 to 1993, finds underperformance of 12 percent over three years compared to the market (Ljungqvist, 1997). A study conducted in Italy produces similar outcomes: Arosio, Paleari, and Giudici (2001) investigate Italian IPOs between 1985 and 1999, finding that the mean buy and hold abnormal return is -23 percent after three years, though they do note that this underperformance is more significant in firms listed during the 90s. Keloharju (1993) investigates a small sample of issues listed in Finland between 1984 and 1989, and finds a cumulative abnormal return of -26.4 percent over 36 months when compared to the Helsinki Stock Exchange value-weighted index.

While IPO underperformance has been well documented across major markets and across time, variation exists among different IPO categories. Ritter (2015) finds that on average a buy and hold portfolio consisting of growth capital backed IPOs delivered a style-adjusted return of 25.2 percent over a three year period, compared to style-adjusted returns of approximately zero for other venture capital and buyout-backed IPOs. This intriguing result presents inspiration for new research into the performance of specific types of IPOs which we attempt to address in the second part of this chapter.

2.2 New Zealand Studies

The New Zealand market is not only small compared to large international stock markets but also small in terms of total market capitalisation to GDP. It is not uncommon to observe more IPOs within a year in U.S. markets than the total number of firms publicly listed in New Zealand. In the literature

review of Ritter and Welch (2002) it was found that between 1980 and 2001 there was more than one listing per business day in the U.S. on average, whilst this study covers IPOs from July 1991 to June 2015 in New Zealand and has a sample size of 96 firms in total. IPO research in New Zealand typically involves a small sample size. However, the findings on returns from international studies are largely mirrored in New Zealand, showing that on average IPOs do not make good investments over the long term.

Firth (1997) examines new issues listed on the NZSE from 1979 to 1987, comparing IPO returns with the returns of matched firms in the same industry with the closest market capitalisation. They find that cumulative abnormal return was negative from 12 to 60 months post-listing, with statistical significance beginning at 24 months, and a -17.91 percent cumulative abnormal return by month 60. Similar results are documented by Chi, McWha, and Young (2010). They study a sample of initial public offerings listed on the NZSE and NZX Alternative Market (NZAX) from 1991 to 2005: When compared to the NZX All Gross Index, they observe a -42.35 percent cumulative abnormal return over a three year period. Close (2011) investigates IPOs listed between 1990 and 2009. When compared to major market indices she documents cumulative abnormal returns of -4.54 percent and -26.99 percent over the one and three year horizon respectively, with a wealth relative measure decreasing from 1.01 to 0.90 over the same period.

There are marked differences between our work and Close's unpublished Masters thesis. Close focused on the extent to which underwriter prestige affects IPO returns and her sample ends in 2009. Our study places emphasis on whether IPOs represent good investments for small retail investors and what types of IPOs are worth investing in. We are the first to present empirical evidence on the relative performance of high-valued vs low-valued IPOs in New Zealand's context. Our study has the longest sample period (July 1991-June 2015) compared with Close and the two published works (Chi et al., 2010; Firth, 1997). We cover the post-GFC period up to June 2015, an eventful period when the Financial Markets Conduct Act was introduced and the mixed ownership model share offer program took place. This period provides an interesting background for our study. Close limits her analysis to a three year investment horizon whereas we conduct our analysis of IPO performance over the short term (one year), medium term (three years) and long term (five years) period. We place emphasis on the long term performance as for small unsophisticated investors a long term buy and hold strategy is easily implemented and cost-efficient.

According to Ritter (1998), IPOs typically have high market-to-book ratios and small capitalisation. Underperformance is less pronounced when IPOs are matched against peers selected based on market-to-book ratio and size, rather than size alone. It is thus important to account for the book-to-market ratio when examine the relative performance of IPOs. Previous studies on IPOs in New Zealand (Chi et al., 2010; Firth, 1997) select peers based on an index benchmark and/ or size measures, failing to

control for the high market-to-book ratio typically found among IPO firms (Loughran & Ritter, 1997). To our knowledge, this is the first study on IPO performance in New Zealand's context which selects matched firms based on book-to-market ratio.

3. Data

3.1. IPO Sample

The IPO sample for this study was constructed from the NZX Company Research database. We select firms present in the Security Listing Dates section which were listed on the New Zealand Stock Exchange during the period July 1991-June 2015. Eligible issues were required to fit five criteria: (i) The IPO was for ordinary shares, (ii) was issued by a New Zealand registered issuer and in New Zealand dollars, (iii) was not listed elsewhere prior to the date of IPO, (iv) was not a listing as a result of a de-merger or other similar scenario, (v) was not an instalment receipt listing or of another non-standard format. The resulting number of IPOs is 96. We apply more restrictive criteria than what has been employed in previous studies to maintain a higher degree of homogeneity among IPOs in our sample. This study sets rigorous standards to form the IPO sample: Whilst a larger sample could have been obtained by decreasing restrictions, for example, to accept firms listed on NZAX as in Chin *et al.* (2010), outliers in a small market study have substantial effects and introduce noise. Thus, the primary aim of our sample construction step is to obtain a sample of standard-type IPOs listed on NZSE.

Prospectuses were obtained manually from the New Zealand Government Companies Office website, and when not available were obtained directly from the companies or investment banks managing the offer. The small size of New Zealand's capital markets makes information relatively hard to come by, but simultaneously makes manual data collection possible: In several cases phone calls to past executives were made and physical copies of IPO prospectuses sent. The total number of prospectuses obtained was 72, with only 8 of those coming from the 35 firms in the sample listed before the year 2000.

3.2 Peer Selection

Peer selection for IPOs in New Zealand is challenging: As the market is comprised of such a limited number of firms, the selection criteria must be reasonably broad. Peer selection methods used by international academic studies with tight ranges for selection metrics are not viable in New Zealand as they would lead to a lack of comparable firms.

For each IPO firm in the sample, three peer (benchmark) samples were constructed as follows.

For the first sample (sales forecast peers), the IPO firm is compared with all firms listed on the NZSE with the same sector classification as defined by S&P Capital IQ. The firm with the closest sales forecast to the IPO firm at market close on the last trading day of the year prior to the IPO listing is chosen as the comparable firm. If the comparable sales forecast is not between 50 percent below and 150 percent above the sales forecast of the IPO firm it is deemed unsuitable. If no suitable match is found, a similar method is applied except that the comparable firm must match the industry classification group as defined by S&P Capital IQ. In our view, sales forecast is a better measure to capture the size of IPO firms than either market capitalisation or total assets. The significant degree of under-pricing present in IPOs (Ritter & Welch, 2002) makes their at-the-offer market capitalisation less comparable to that of seasoned listed firms. Total assets are recorded on a historical basis and are subject to accounting rules (for example, firms may apply different methods to record depreciation). This measure does not reflect the level of asset utilisation, nor the age of the assets. We use sales forecast data available at the offer time to select matched firms, thereby introducing a forward looking perspective on IPO firms in our analysis. The use of sales forecast is more relevant than the use of trailing sales as the influx of capital from the listing is often used to generate a significantly different level of sales and most IPOs generate positive sales.

For the second sample (book-to-market peers), the IPO firm is compared with all firms listed on the NZSE with the same sector classification as defined by S&P Capital IQ. The firm with the closest book-to-market ratio to the IPO firm at market close on the last trading day of the year prior to the IPO listing is chosen as the comparable firm. The book-to-market ratio of the matched firm must be between 50 percent below and 150 percent above the book-to-market ratio of the IPO firm. If no suitable match is found, a similar method is applied except that the comparable firm must match the industry classification group as defined by S&P Capital IQ.

Peers selected in sample one and sample two must be seasoned firms which have been listed on the NZSE for at least five years to avoid IPO firms being compared to other IPO firms. The peer selection is run using the stock screener function available in S&P Capital IQ. If no suitable peer firm can be found for either sample one or sample two, the NZX All Gross Index is used as a benchmark. The use of book-to-market and size measures to select matched peers controls for the differences in returns driven by book-to-market and size (Fama & French, 1996), thereby providing a greater degree of robustness in our analysis.

The third benchmark sample is the NZX All Gross Index. This index is selected as it covers the entire period of our analysis, and includes smaller firms more comparable to the IPO sample than those in a major market index such as the NZX50.

3.3 Data

IPO price, enterprise value, and book-to-market ratio at the offer time were obtained through S&P Capital IQ, Bloomberg, an IPO database maintained by Forsyth Barr, and through direct contacts with IPO firms, in order of first to last approach. Sales forecast, EBITDA forecast, and net profit after tax (earnings) forecast for the financial year immediately following the IPO year were obtained through the firm's prospectus, S&P Capital IQ, Bloomberg, an IPO database maintained by Forsyth Barr, and through direct contact with IPO firms, in order of first to last approach. The firm-specific IPO data includes only data which was available before the date of the IPO in order to replicate information available to investors at the offer time.

Pricing data to calculate returns was obtained from the NZX Company Research Adjusted Share Price Tool for both IPO and peer firms. The prices are fully adjusted for corporate actions and gross dividends, assuming reinvestment of gross dividends. If a peer is delisted during the five years following the IPO, the subsequent peer prices are replaced by a scaled value of the NZX All Gross Index.

4. Method

4.1. Portfolio Construction

We employ an approach as in Ritter and Welch (2002) to construct an equally-weighted portfolio of IPO firms alongside matched peer portfolios. The aim is to replicate a low-cost buy and hold simple investment strategy as would be implemented by small retail investors. Transactions costs in New Zealand are typically high as a result of brokerage fees and relatively large bid-ask spreads, especially on smaller firms. It is not economically sound for retail investors to regularly rebalance their portfolios given the high transaction costs. The employed approach to construct equally-weighted portfolios of IPOs and peers without rebalancing (i.e. a buy-and-hold strategy) is likely to be the best representation of strategies used by Mum and Dad retail investors in New Zealand. This low-cost strategy is often recommended for unsophisticated retail investors as it can be implemented easily and avoids excessive brokerage fees.

4.2. Peer Adjusted IPO Performance

We employ four performance measures to evaluate the short term (one year), intermediate term (three year), and long term (five year) returns of the IPO portfolio relative to each of the three peer portfolios. These measures are: (i) Average peer adjusted return, (ii) cumulative average peer adjusted return, (iii) average holding period return differential, and (iv) wealth relative.

Returns on firm i at time t are given by:

$$r_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} \quad (1)$$

Where P_{it} is the adjusted price of the firm i at time t , P_{it-1} is the adjusted price of the firm i at time $(t-1)$.

Peer adjusted abnormal returns for firm i at time t are given by:

$$ar_{it} = r_{it} - r_{bt} \quad (2)$$

Where r_{it} is the return on IPO firm i on day t and r_{bt} is the return on IPO firm i 's peer b on day t .

The equation is performed for each IPO firm i and peer firm b .

The average peer adjusted returns for the IPO portfolio at time t can be estimated by:

$$AR_t = \frac{1}{N} \sum_{i=1}^N ar_{it} \quad (3)$$

Where N is the number of firms in the IPO portfolio.

Cumulative average peer adjusted return, commonly known as cumulative abnormal returns, over the investment horizon T ($T=1, 3, 5$ years) are estimated by:

$$CAR_T = \sum_{t=1}^T AR_t \quad (4)$$

The holding period returns for an IPO firm i and its peer firm b over the investment horizon T are calculated as follows:

$$R_i = \prod_{t=1}^T (1 + r_{it}) - 1 \quad (5a)$$

And

$$R_b = \prod_{t=1}^T (1 + r_{b,t}) - 1 \quad (5b)$$

The average holding period returns for the IPO portfolio and a matched peer portfolio over the investment horizon T are estimated as follows:

$$R_{i,N} = \frac{\sum_{i=1}^N (\prod_{t=1}^T (1 + r_{it}) - 1)}{N} \quad (5c)$$

And

$$R_{b,N} = \frac{\sum_{i=1}^N (\prod_{t=1}^T (1 + r_{b,t}) - 1)}{N} \quad (5d)$$

The difference between the holding period returns of the IPO portfolio and a peer portfolio over the investment horizon T is estimated by:

$$R_{i,N} - R_{b,N} = \frac{\sum_{i=1}^N [\prod_{t=1}^T (1 + r_{i,t}) - 1]}{N} - \frac{\sum_{b=1}^N [\prod_{t=1}^T (1 + r_{b,t}) - 1]}{N} \quad (6)$$

The wealth relative between the IPO portfolio and a peer portfolio over the investment horizon T is computed as:

$$WR = \frac{1 + R_{i,N}}{1 + R_{b,N}} \quad (7)$$

The wealth relative can be interpreted as follows: A wealth relative of greater than 1.00 indicates that the IPO portfolio has outperformed the peer portfolio over the period T , and a wealth relative of less than 1.00 indicates that the IPO portfolio has underperformed the peer portfolio over the period examined.

4.3. Sub-sample Analysis: Low-valued Investments vs. High-valued Investments

We examine the relative performance of IPOs with different valuation multiples, and employ three valuation metrics: (i) Forward earnings to price (E/P), (ii) forward price to sales (P/S), and (iii) forward earnings before interest, tax, depreciation and amortisation to enterprise value (EBITDA/EV). For each valuation metric, the median value is calculated⁵ and IPO firms are split into two groups: An above median and a below median sub-sample. For example, for forward earnings to price ratio (E/P) there is one portfolio constructed with above or equal to median forward E/P (above median sub-sample) and one with below median forward E/P (below median sub-sample). Performance analysis is then conducted for three pairs of IPO sub-samples benchmarked against their respective peers as presented in section 4.2.

The three valuation multiples P/E, P/S and EV/EBITDA are widely used by both academics and practitioners for the purpose of valuing IPOs and listed firms (Asquith, Mikhail, & Au, 2005; Berkman, Bradbury, & Ferguson, 2000; Kim & Ritter, 1999). Paleari, Signori, and Vismara (2014) document the use of two of these multiples by investment banks in valuing IPOs: They find that P/E and EV/EBITDA were used to value 76.1 percent and 48.9 percent of the IPOs in their sample

⁵ The median E/P, P/S, and EBITDA/EV of IPOs in the sample is respectively 4.15, 1.5, and 0.099.

respectively. A firm's P/E ratio is most frequently the primary valuation method of equity analysts (Bradshaw, 2002). However, earnings can be subject to distortions through accounting practices or manipulation, and it is not uncommon that IPOs generate negative, zero or very small earnings (net profit after tax). We use P/S in our analysis for several reasons. Sales are more stable than earnings and less subject to distortions which may affect the comparability of multiples. All IPO firms in our sample have positive sales forecasts but more than a fifth of the sample have negative earnings forecasts⁶. According to Martin (1998) P/S is appropriate for valuing stocks of cyclical and zero income companies. We also employ EV/EBITDA as it is the most widely used enterprise value multiple and values the entire company, debt included. EV/EBITDA is useful for comparing companies with different capital structures. It also accounts for differences in depreciation and amortization among firms.

In this study the two earnings multiples (E/P and EBITDA/EV) are inverted from their more commonly used form (P/E and EV/EBITDA respectively) so as to maintain the correct rankings when the earnings (net profit after tax) forecast and EBITDA forecast are negative, which is typical for IPOs⁷.

5. Results

Four performance measures are employed to assess the returns of the IPO portfolio matched against the NZX All Gross Index and two peer portfolios constructed based on either sales forecasts or book-to-market ratio. It is found that within one year post-listing, IPOs outperform their benchmarks but their performance deteriorates as time passes. In the medium to long term investment horizon (3-5 years) IPO firms exhibit poor performance compared with all three benchmarks. The results are robust across analysis. In the following discussion, the results of the analysis are first presented on the whole

⁶ 20 out of 96 firms in the sample have negative earnings (net profit after tax) forecasts while 17 out of 96 firms have negative EBITDA forecasts.

⁷ A small (positive) P/E, EV/EBITDA ratio indicates a cheap investment. However, when the denominator is negative, a small (negative) ratio represents an expensive investment. An invert ratio E/P, EBITDA/EV correctly ranks negative earnings firms as expensive investments, more highly valued than firms with low positive earnings. For example, consider 3 firms with P/E ratio equals to -2 (firm A), 2 (firm B) and 10 (firm C). The P/E would rank three firms in the order of most to least expensive as follows: firm C, firm B, and firm A. In fact, firm A is more expensive than firm B and firm C as firm A generates negative earnings. Using the earning price E/P, we obtain the correct rankings in the order of most to least expensive as follows: Firm A (E/P=-0.5), firm C (E/P=0.1), and firm B (E/P=0.5).

sample of 96 IPO firms followed by a summary of the relative performance of sub-samples of IPOs categorised by price and enterprise valuation multiples.

5.1. Average benchmark-adjusted return and cumulative average benchmark-adjusted return

Table 1 includes the descriptive statistics of the daily average benchmark-adjusted returns of the IPO portfolio, estimated as in equation (3), over one-, three-, and five-year investment horizons. Across horizons and analysis, the average adjusted returns exhibits non-normal distribution with positive skewness. The mean and median adjusted returns consistently show that IPOs perform better in the first year post listing but underperform all three benchmarks in the medium to long term. At the end of year one, investors investing in the IPO portfolio, on average, earn between 2.9 percent and 6.2 percent higher than if they invest in any benchmark portfolios⁸. However, over a five year investment horizon the annualised return of the IPO portfolio is about 1 percent to 4 percent lower than the annualised returns of the benchmark portfolios. The evidence of underperformance is more pronounced when IPOs are compared to peer firms constructed based on either sales forecasts or book-to-market. The performance of IPO firms deteriorates over time as evidenced by negative mean and median adjusted returns in the medium to long run and a declining positive skewness.

⁸ We assume that each year has 252 business days. The annualised mean (median) average adjusted return is obtained by multiply the respective daily mean (median) return in Table 1 by 252.

Table 1**Descriptive statistics for average benchmark-adjusted returns of the IPO portfolio**

This table presents the statistics of the daily average benchmark adjusted returns for the IPO portfolio measured over 1, 3, and 5 years horizon. The IPO portfolio consists of 96 issues ($N=96$) listed on the New Zealand Stock Exchange during the period July 1991-June 2015. The IPO portfolio is benchmarked against three portfolios: (i) A portfolio of peers of comparable sales forecast; a portfolio of peers of comparable book-to-market ratio; and (iii) the NZX All Gross Index. The benchmark-adjusted return for day t , $ar_{i,t}$, is computed as $ar_{i,t} = r_{i,t} - r_{b,t}$ where $r_{i,t}$ is the daily return for the IPO firm i and $r_{b,t}$ is the daily return for the benchmark b . AR_t is the average benchmark adjusted return of the IPO portfolio for day t , computed as $AR_t = \frac{1}{N} \sum_{i=1}^N ar_{it}$

Panel A: IPO vs Peer portfolio constructed based on sales forecast			
Years after IPO	1	3	5
No of observations	254	759	1261
Mean	0.000246	-0.00014	-0.00009
Median	0.000061	-0.00018	-0.00017
Std Dev	0.00362	0.00347	0.00382
Skewness	4.6121	1.8008	0.7896
Kurtosis	48.0441	20.2486	9.3285
Min	-0.00819	-0.0133	-0.0185
Max	0.0384	0.0384	0.0384
Panel B: IPOs vs Peers constructed based on book-to-market ratio			
Years after IPO	1	3	5
No of observations	254	759	1261
Mean	0.000114	-0.00011	-0.00016
Median	0.00007	-0.00021	-0.00022
Std Dev	0.00431	0.00378	0.00419
Skewness	3.6133	1.8157	0.5148
Kurtosis	34.4304	19.7327	11.3403
Min	-0.0127	-0.013	-0.0321
Max	0.0418	0.0418	0.0418
Panel C: IPOs vs NZX All Index			
Years after IPO	1	3	5
No of observations	254	759	1261
Mean	0.000242	-0.00007	-0.00004
Median	0.000057	-0.0002	-0.00012
Std Dev	0.00339	0.00305	0.00347
Skewness	5.5444	2.6084	1.1271
Kurtosis	61.014	31.7781	13.2108
Min	-0.00582	-0.00944	-0.0184
Max	0.0381	0.0381	0.0381

Figure 1 depicts the cumulative average benchmark adjusted returns, estimated as in equation 4, over a five year investment horizon. This measure represents the aggregate average abnormal return investors would have earned over the examined horizon if they had invested in the IPO portfolio instead of a peer portfolio. As featured in Figure 1, the aggregate abnormal return of the IPO portfolio benchmarked against three peer portfolios exhibits a sharp decline from the end of year one to the end of year four post-listing. The observed underperformance becomes more pronounced the longer the time horizon when IPOs are compared with matched firms constructed based on sales forecast (year two to year four) and peers selected based on book-to-market ratio (year five). The cumulative abnormal returns benchmarked against the NZX All Gross Index exhibit the “best” performance albeit negative in the medium to long run.

Figure 1

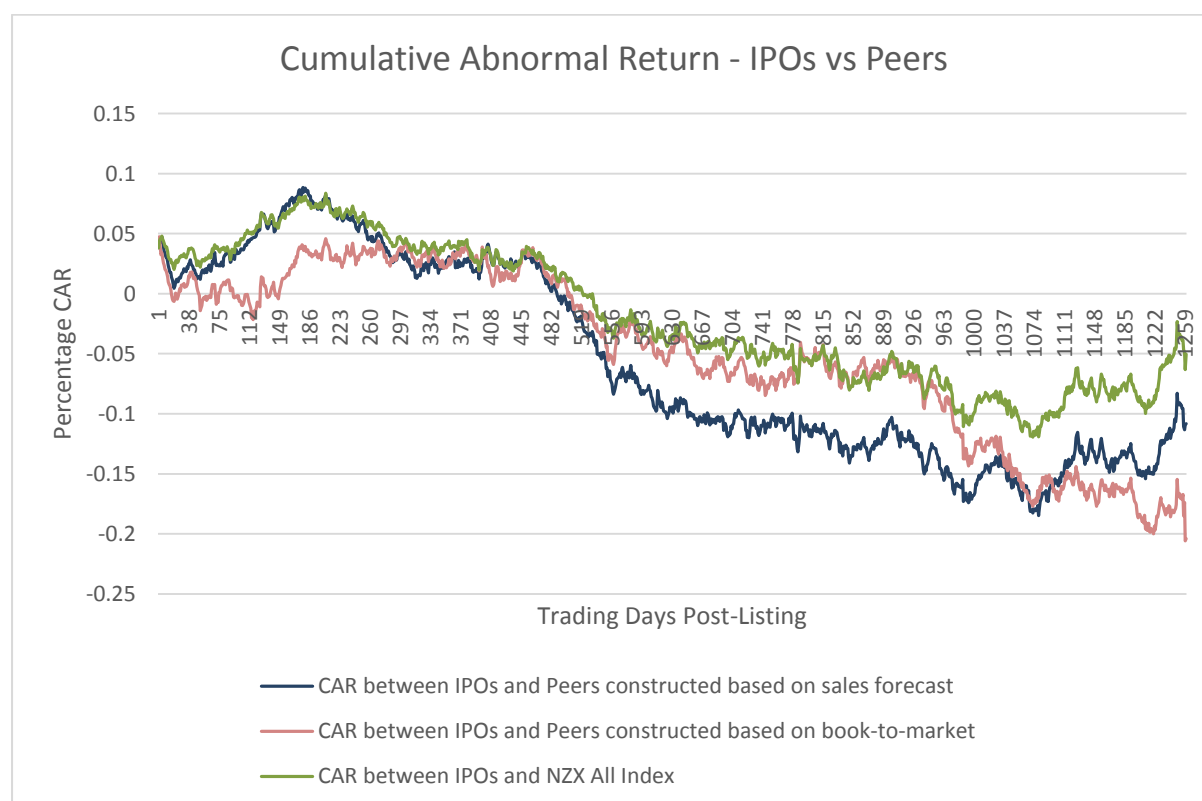


Table 2 includes the cumulative average adjusted returns of the IPO portfolio benchmarked against three peer portfolios over one, three and five years following the listing. The one-year cumulative abnormal return ranges between 2.9 percent to 6.24 percent. However, investors investing in the IPO portfolio earn a cumulative abnormal return of between -5.6 percent and -10.8 percent at the end of year three and between -5 percent and -20.4 percent over a five year horizon. The peer portfolio constructed based on book-to-market ratio seems to perform exceptionally well in year five, resulting in the worst aggregate abnormal return of -20.4 percent. This observed trend is in contrast to the

expectations derived from prior literature. Loughran and Ritter (1997) document that most IPOs are characterised by a high market-to-book ratio and a relatively small market capitalisation. By constructing peers based on book-to-market ratio and accounting for the same characteristic common in IPOs, we expect an underperformance to a lesser degree than that observed when benchmarked against peers of comparable sizes. However, that expectation does not hold over a five year horizon, suggesting a markedly different trend in the long run relative performance of IPOs in New Zealand compared to other countries.

Table 2

Cumulative average benchmark adjusted return (CAR) of the IPO portfolio

This table presents the cumulative average benchmark-adjusted returns (CAR_T) of the IPO portfolio measured over three investment horizons $T=1, 3$, and 5 years. The CAR_T is computed as $CAR_T = \sum_{t=1}^T AR_t$ where AR_t is the average benchmark adjusted return for the day t , computed as $AR_t = \frac{1}{N} \sum_{i=1}^N ar_{i,t}$. The daily abnormal return $ar_{i,t}$ is computed as $ar_{i,t} = r_{i,t} - r_{b,t}$ where $r_{i,t}$ is the daily return for the IPO firm i and $r_{b,t}$ is the daily return for the benchmark b . The IPO portfolio consists of 96 issues ($N=96$) of common equity listed on the New Zealand Stock Exchange during the period July 1991-June 2015.

Years after issue	No of daily observations	IPOs vs Peers based on sales forecast	IPOs vs Peers based on book-to-market	IPOs vs NZX All Index
1	254	6.24%	2.90%	6.15%
3	759	-10.8%	-8.2%	-5.6%
5	1261	-10.8%	-20.4%	-5.0%

5.2. Average holding period return differential and wealth relative.

Table 3 displays the descriptive statistics of the average holding period returns of the IPO portfolio and three peer portfolios for the one, three and five year investment horizons. The average holding period returns of IPOs and their benchmarks, estimated as in equation (5c) and (5d), all exhibit non-normal distribution with positive skewness (excluding one exception). As reported in Table 3, the mean and median average holding period returns of all examined portfolios are positive with the means statistically significant from zero at the 1 percent level. A smaller mean return and a smaller median return (with one exception) suggest that the IPO portfolio underperforms the benchmarks in the medium and long term. Of all peers, those constructed based on book-to-market ratio have the lowest median average holding period returns.

Table 3**Descriptive statistics for the holding period returns of IPO firms and peers**

This table presents the descriptive statistics for the holding period returns of IPO firms and their peers measured over 1, 3 and 5 years investment horizon. The holding period return for an IPO firm i is computed as $R_i = \prod_{t=1}^T (1 + r_{i,t}) - 1$, and the holding period returns for a peer b is $R_b = \prod_{t=1}^T (1 + r_{b,t}) - 1$. The IPO portfolio includes 96 issues listed on the New Zealand Stock Exchange for the period July 1991-June 2015 while the benchmarks include the NZX All Gross Index and two portfolios of seasoned equity firms matched on (i) sales forecast; (ii) book to market ratio.

	1 year post IPO				3 years post IPO				5 years post IPO			
	IPO	Peers based on			IPO	Peers based on			IPO	Peers based on		
		Sales forecast	Book-to- market	NZX All Index		Sales forecast	Book-to- market	NZX All Index		Sales forecast	Book- to- market	NZX All Index
Mean	0.2612***	0.1432***	0.2227***	0.1353***	0.343***	0.4618***	0.4649***	0.3871***	0.4973***	0.6231***	0.698***	0.5241***
Median	0.1468	0.1266	0.0889	0.1326	0.2979	0.3915	0.294	0.3735	0.2817	0.4363	0.3372	0.4398
Std Dev	0.6179	0.3029	0.8019	0.1397	0.7629	0.6385	1.4341	0.2513	1.1614	0.9345	1.6409	0.4064
Skewness	1.2591	1.039	4.9294	0.0872	0.584	1.7792	6.6743	-0.6357	1.2411	2.3372	4.7304	0.7415
Kurtosis	1.9948	4.2226	30.6521	3.6273	-0.0685	6.8004	55.6163	0.7387	1.8952	9.0595	30.3599	0.2585
Min	-0.7115	-0.5464	-0.9204	-0.3434	-0.9799	-0.7652	-0.8508	-0.3109	-0.9832	-0.7945	-0.9738	-0.2362
Max	2.5341	1.4054	5.8713	0.6576	2.4452	3.6081	12.6471	0.9621	5.0101	5.6532	12.6471	1.675

*** Significant at 1 percent

Table 4 presents the difference in the average holding period returns, estimated as in equation (6), and the wealth relative, estimated as in equation (7), between the IPO portfolio and three constructed benchmarks.

Table 4

The average holding period return (HPR) differential and the wealth relative (WR) between the IPO portfolio and peer portfolios

This table presents the average holding period return differential and the wealth relative between the IPO portfolio and three peer portfolios. The average holding period returns for

the IPO portfolio of N stocks at time t is computed as $R_{i,N} = \frac{\sum_{i=1}^N (\prod_{t=1}^T (1 + r_{it}) - 1)}{N}$ where

$r_{i,t}$ is the daily return for the IPO firm i . The average holding period returns for a peer portfolio of N stocks is $R_{b,N} = \frac{\sum_{b=1}^N (\prod_{t=1}^T (1 + r_{b,t}) - 1)}{N}$ where $r_{b,t}$ is the daily return for the

benchmark b . The difference in the average holding period returns between the IPO portfolio and a peer portfolio is computed as $R_{i,N} - R_{b,N}$. The wealth relative is computed as

$WR = \frac{1 + R_{i,N}}{1 + R_{b,N}}$. A wealth relative of less than 1 means that the IPO portfolio

underperforms the benchmark portfolio.

Years post IPO	<u>IPO vs Peer portfolio based on:</u>					
	Sales forecast		Book-to-market		NZX All Index	
	Mean HPR differential	Weath Relative	Mean HPR differential	Weath Relative	Mean HPR differential	Weath Relative
1	11.80%	1.103	3.85%	1.0315	12.58%	1.11
3	-11.88%	0.919	-12.19%	0.917	-4.41%	0.968
5	-12.58%	0.922	-20.07%	0.882	-2.68%	0.982

The mean holding period return differential represents the return differential investors would have earned over the examined horizon if they had invested in the IPO portfolio instead of a peer portfolio. Consistent with the previous analysis, the difference in mean holding period returns for the IPO portfolio and their benchmarks are positive in year one, and negative as year three unfolds. As reported in Table 4, by year three an investor who invested in IPO firms instead of their peers would have earned an average holding period return differential of between -4.4 percent and -12.19 percent. At the end of year five, they would have earned between -2.7 percent and -20.07 percent. The mean holding period return differential between the IPO portfolio and NZX All Gross Index is smaller in the medium to long term while the differential is most pronounced when IPOs are compared with peers based on book-to-market ratio over a five year horizon.

A wealth relative above 1 indicates that IPO firms generate a higher average holding period return than their peers. As reported in Table 4, the wealth relatives ranging between 1.03 and 1.11 calculated at the end of year one suggest outperformance. The values plunge below 1 at the end of the third and the fifth year post listing, representing underperformance. The peer portfolio constructed based on book-to-market exhibits decreasing wealth relative from year one to year five, recording the worst wealth relative of 0.88 in year five. The other two benchmarks experience improving wealth relatives of 0.92 and 0.98 in year five.

Overall, the results suggest that IPO firms perform better than their peers in the first year following the listing. However, IPOs perform poorly compared with their selected peers in the medium to long term (3-5 years). The main finding is consistent with previous studies conducted in other markets. When IPOs are compared to the NZX All Gross Index a rather mute underperformance is observed whereas when compared to firms matched on book-to-market ratio the underperformance over the five year investment horizon is very significant.

5.3. Sub-sample Analysis: Low-valued Investments vs. High-valued Investments

For brevity reasons, this section presents the cumulative average abnormal returns, estimated as in equation (4), between sub-samples of IPOs benchmarked against peers of comparable sales forecasts. Three pairs of sub-samples are created based on the three valuation metrics employed. Each IPO is categorised into a sub-sample based on its valuation metric in relation to the median valuation metric of all IPOs in the sample.

As depicted in Figure 2, IPOs with above median E/P and EBITDA/EV and below median P/S perform better with higher cumulative average abnormal returns than IPOs with below median E/P and EBITDA/EV and above median P/S. This finding is consistent with Chan and Lakonishok (2004)

and O'Shaughnessy (2005) who present empirical evidence of superior returns to long term value investing. It is worth noting that IPOs with below median E/P suffer negative cumulative abnormal returns most of the time and their relative performance deteriorates sharply as time passes while IPOs with above median E/P consistently generate positive cumulative abnormal return over the five year horizon. IPO sub-samples categorised by E/P and EBITDA/EV exhibit markedly different relative performance. The difference in the cumulative abnormal returns of the two IPO groups categorised by P/S is not as pronounced, except in year five. This is not a surprise as sales (forecasts) do not account for differences in cost structures and the effect of debt financing among firms.

Figure 2: Cumulative Abnormal Return (CAR)
IPO vs Sales Forecast Peers – Subsample Analysis

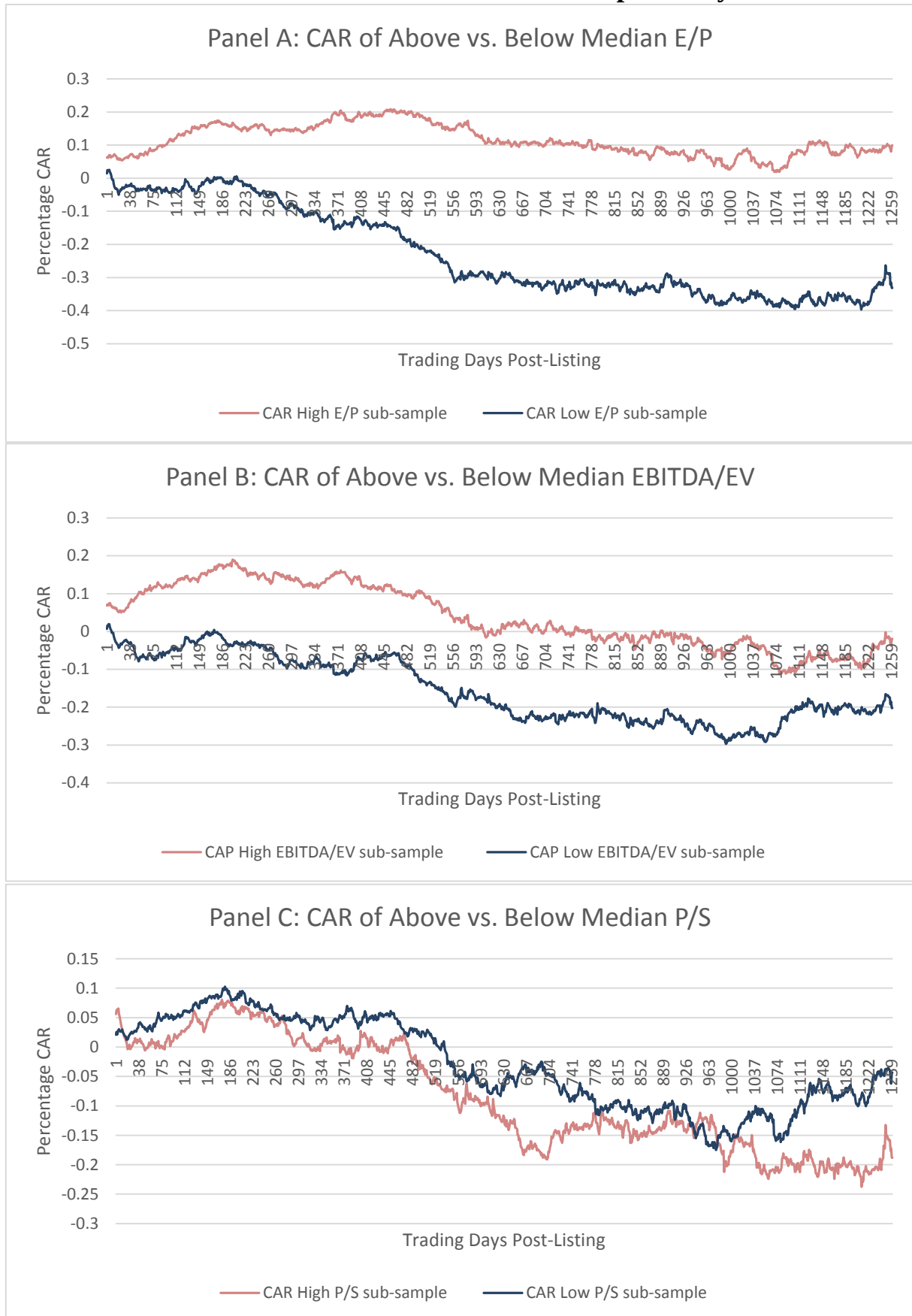


Table 5 presents the cumulative average abnormal returns of IPO sub-samples categorised based on three valuation metrics measured over 1, 3, and 5 years. Over a five year horizon, investors who purchased shares issued by IPOs with high E/P, EBITDA/EV and low P/S respectively earn a cumulative abnormal return of 43.08 percent, 18.32 percent, 14.49 percent higher than that achieved by investors who invested in IPOs with low E/P, EBITDA/EV, and high P/S. As observed in Figure 2, of low-valued (cheap) IPOs, only those with high E/P consistently outperform peers, achieving a solid cumulative abnormal return of 9.92 percent at the end of year five.

Table 5

Cumulative Abnormal Return (CAR):

IPO vs Sales Forecast Peers – Subsample Analysis

This table presents the cumulative average benchmark-adjusted returns (CAR) of the three pairs of IPO subsamples categorised based on three valuation multiples: (i) Forward earnings to price (E/P), (ii) forward price to sales (P/S), and (iii) forward earnings before interest, tax, depreciation and amortisation to enterprise value (EBITDA/EV). For each valuation metric, the median value is calculated and IPO firms are split into two groups: An above median and a below median sub-sample. The CAR_T is computed as $CAR_T = \sum_{t=1}^T AR_t$ where AR_t is the average benchmark adjusted return of the IPO portfolio on day t , computed as $AR_t = \frac{1}{N} \sum_{i=1}^N ar_{i,t}$. The daily abnormal return $ar_{i,t}$ is computed as $ar_{i,t} = r_{i,t} - r_{b,t}$ where $r_{i,t}$ is the daily return for the IPO firm i and $r_{b,t}$ is the daily return for the benchmark b . The IPO portfolio consists of 96 issues ($N=96$) of common equity listed on the New Zealand Stock Exchange during the period July 1991-June 2015.

Years Post IPO	IPOs vs Peers: High vs Low E/P Sub-samples		IPOs vs Peers: High vs Low EBITDA/EV Sub-samples		IPOs vs Peers: High vs Low P/S Sub-samples	
	High E/P	Low E/P	High EBITDA/EV	Low EBITDA/EV	High P/S	Low P/S
1	15.33%	-2.98%	14.70%	-2.59%	5.97%	6.30%
3	10.38%	-30.95%	0.50%	-21.55%	-15.04%	-5.50%
5	9.92%	-33.16%	-1.91%	-20.22%	-18.83%	-4.34%

Overall, the results of the sub-sample analysis discussed above enrich the empirical evidence that differences in price and enterprise valuation multiples are associated with different returns for IPOs benchmarked against matched peers. Consistent with previous studies, we observe that low-valued IPOs outperform high-valued IPOs. The evidence is stronger for IPOs with solid earnings multiples. Our finding is statistically significant at five year horizon for IPO sub-samples categorised based on E/P.

6. Conclusion

This study examines the performance of 96 IPOs listed on the New Zealand Stock Exchange between July 1991 and June 2015. The aim of this chapter is to provide empirical evidence as to whether small retail Mom and Dad investors should buy IPOs at the offer, such as in the government mixed ownership model share offer program. The IPO firms are benchmarked against the NZX All Gross Index and two samples of peers selected based off sales forecast and book-to-market ratio. This is the first study on IPO performance in New Zealand which utilises book-to-market and sales forecast to construct peer samples. This study has the longest sample period for any published work on IPO performance in New Zealand. All forecast parameters used in determining peer selection were available before or at the offer of each IPO. We design our research in a way that replicates the low-cost buy and hold strategies that small retail Mum and Dad investors are likely to employ. Our results represent realistic investment outcomes which retail investors are likely to experience in real life.

We find consistent results across analyses that IPO firms outperform their benchmarks at one year but underperform in the medium to long term (three to five years). Investors whom invest in the IPO portfolio instead of a benchmark portfolio and hold it for three years earn a cumulative average abnormal return (CAR) of between -5.6 percent and -10.8 percent and an average holding period return (HPR) differential of between -4.4 percent and -12.19 percent. Over a five year period, investors earn a CAR of between -5 percent and -20.4 percent and an average HPR differential of between -2.7 percent and -20.07 percent.

We conduct three sub-sample analyses of IPOs categorised off three valuation multiples E/P, P/S and EBITDA/EV to explore the association between differences in valuation metrics and long term average returns. The findings are consistent with the general consensus that value investments yield superior returns: Compared with their respective peers selected based on sales forecasts, IPOs with above median E/P and EBITDA/EV and below median P/S exhibit higher cumulative average abnormal returns than IPOs with below median earnings ratio (E/P and EBITDA/EV) and above median P/S. The evidence of superior returns from value investments is more pronounced in the subsamples categorised based off E/P and EBITDA/EV. IPOs with high E/P outperform their sales forecast peers across horizons, achieving a CAR of 9.92 percent over a five-year period whereas IPOs

with low E/P underperform their respective counterparts every year with a five-year CAR of -33.16 percent.

The results of this study suggest that small unsophisticated investors who pursue a long term, low-cost investment strategy are generally better off to invest in either a smartshare ETF, which mimics the performance of a market index⁹, or a diversified portfolio of seasoned listed firms as opposed to investing in a portfolio consisting of IPO firms. Our results enrich the evidence of superior returns from value investments. Of all IPOs in our sample, issues with strong earnings to price ratio are worth investing in the long run. The implication of this study is that investors should shy away from high-tech growth IPOs and when screening investment opportunities, investors should examine an IPO firm's potential to generate strong earnings within the first year following the listing.

⁹ For example, the NZ Top 50 Fund (FNZ) invests in securities listed on the NZSE and is designed to track the return on the S&P/NZX 50 Portfolio Index which includes shares issued by 50 of the largest firms traded on the NZSE, with a 5 percent cap on the weight of each firm.

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