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Using Pre-Listing Information to Mitigate Initial Public Offerings' Long Run Underperformance: Evidence from Sri Lanka

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Abstract

The main channel of information dissemination for initial public offerings (IPO) in the pre-listing stage is the prospectus. Auditor fee and director emoluments are two types of information that investors know about in advance through the prospectus. Industry and media publicity are also in the focus of investors in the pre IPO stage. This study inquires whether such information can be used to form successful trading strategies in the long run. IPO stock portfolios have been constructed based on the above four types of information and their returns have been tested using four popular asset pricing models to answer the above question. The findings confirm that long only strategies are successful with regard to all four types of information while long and short strategies are proved to be a failure. The findings also reveal that portfolios consisting of non-finance stocks, stocks with high media coverage, high audit fees and high director fees tend to provide the highest returns compared to other IPO stock portfolios. Hence, this study provides useful insights to investors, regulators and other professionals in the Sri Lankan capital market.

***Keywords*:** Initial Public Offerings, Colombo Stock Exchange, Asset Pricing, Media Coverage, Audit Fees, Director Fees

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Introduction

The main channel of information dissemination for initial public offerings (IPO) in the pre listing stage is the prospectus which typically includes valuable information such as details of the issue, overview on business operations and industry, management discussion and analysis, and corporate structure and past financial statements together with the auditor's report. Investors have to use this pre IPO information wisely in order to avoid IPO long run underperformance documented by Ritter (1991) in United States of America, which was subsequently reported in many parts of the world including Levis (1993), Kooli and Suret (2004), and Sahoo and Rajib (2010). Peter (2007) conducted a study on the long run performance of Sri Lankan IPOs. The general trend of IPOs identified by many scholars including Ritter (1991) is that the long run excess returns diminish by the end of three years. However, according to Peter (2007), positive excess buy and hold returns were recorded for first two years (21.35% in the first post issue year and 30.92% in the second post issue year) and it turned to -12.96% only in the third post issue year in Sri Lanka. This study intends to examine the effectiveness of long only as well as long and short trading strategies based on pre IPO information as a remedy to the long run underperformance of IPO stocks.

Signaling theory provides some useful clues to investors to select long run survivors from all the IPOs listed. Some of them are cited in IPO literature: Allen and Faulhaber (1989) using IPO underpricing, Carter, Dark, and Singh (1998) using reputed underwriting firms, Feltham, Hughes, and Simunic (1991) using reputed audit firms, Leland and Pyle (1977) selecting high pre IPO equity firms, and Brav and Gompers (1997) using venture capitalists. In this study, four types of pre IPO information are selected to form trading strategies and subsequently to evaluate their effectiveness which are pre IPO media coverage, industry to which the IPO belongs to, pre IPO director fees, and pre IPO audit fees. These four types of information were given little or no attention in the IPO context even though there are studies on the relationship with normal stocks shown in studies such as Fang and Peress (2009) for media coverage, Simunic (1980) for audit fees, Malmendier and Tate (2009) for director fees and Chou, Ho, and Ko (2012) for industry. Some of the exceptions that studied the impact to IPO stocks are Dong and Michel (2012) for industry and Liu, Sherman, and Zhang (2014) for media coverage.

This study expects to reveal whether trading strategies formed on the above four types of information are able to generate an abnormal return using four asset pricing models which are three moment capital asset pricing model (3MCAPM) by Kraus

and Litzenberger (1976), three factor model (FF3) by Fama and French (1993), four factor model (C4F) by Carhart (1997) and five factor model (FF5) by Fama and French (2015). In other words, this study specifically looks at whether trading strategies formed are outperforming the market index after pricing for well known risk factors such as size, book to market ratio, momentum, profitability and investment. Selected asset pricing models act as the main criteria that determine the excess returns of IPO trading strategies after accounting for popular risk factors and their use in this study is justified by the role played by them to filter excess returns from risk factors. Further, this study fills an empirical gap existing in IPO literature by suggesting strategies to overcome IPO long run underperformance. Therefore, the objective of this study is to explore the possibility of mitigating IPO long run underperformance by forming strategies based on the above four types of pre listing information. It is found that long only strategies were able to result in positive alpha (intercept) while long and short strategies are not successful for all four types of pre IPO information. Further, it is also found that IPOs that belong to non-finance industries, IPOs with high pre IPO media coverage, IPOs with high pre IPO director fees and high auditor fees tend to earn slightly higher long run excess returns compared to IPOs in financial services industry, IPOs with low pre IPO media coverage, IPOs with low director fees and low auditor fees. The rest of the paper is organized as follows. The next section discusses relevant literature followed by a section on data and methodology. Then there are two sections comprising data analysis and results, respectively. The final section presents conclusions of the study.

Literature Review

At the outset, theories that have a profound influence to the study are discussed. Two such theories are market efficiency and information asymmetry. Further, a brief introduction to asset pricing models used in the study is given. Then, empirical studies consisting of the four subsections industry, pre IPO media coverage, pre IPO director fees and pre IPO auditor fees are presented.

Theories of Market Efficiency and Information Asymmetry

Efficient market theory is the centrepiece of modern finance. Efficient market hypothesis has been tested extensively all over the world. Efficient market can be defined as the market in which it is impossible to earn an abnormal return by trading on the basis of publicly available information. Samuelson (1965) argued that unexpected price changes in stocks reflect that new information has been supplied to the market. New information can be defined as information that cannot be

deduced from previous information and new information must be independent over time. If capital markets are efficient, market value of the firm should be equaled to the present value of firms' future net cash flows. According to Fama (1970) efficient markets are characterised by competition among profit maximizing firms who attempt to estimate the value of securities in the future relying on the information they have. In an ideal world where assumptions of efficient market theory exists, there cannot be any anomalous behaviours such as IPO underpricing and subsequent lower returns in the long run. Even though efficient market theory is widely accepted among academics and professionals, it has many criticisms. One of those is that stock prices seem to be very much volatile and therefore difficult to be consistent with the efficient market theory. According to this theory, there will be no value of predictive signals of past information. However, technical analysis is widely accepted among stock market analysts as a method of forecasting stock prices. Most importantly, there are deviations or puzzles in capital markets which originates largely due to psychological biases. Even though there are lots of critics to efficient market theory, it should be noted that still no single theory has emerged so far to replace it.

Information asymmetry has been explained by Akerlof (1970) as one party possessing superior information about the fair value of any asset (IPO share in this instance) compared to other party. Key parties in an IPO process are issuing firm, their underwriters and investors. In IPO literature, different academics assumed different parties have better information compared to others. Baron (1982) argued that underwriters have better information compared to issuing firms and investors since they know the market conditions better. However, Welch (1989) argued that the issuing firm has better information since they know about their own firm very well. Rock (1986) model, better known as winner's curse model or adverse selection model assumes that a certain fraction of investors have better information compared to their peer investors, issuing firms and underwriters.

Asset Pricing Models

As described in the introduction, there are four asset pricing models used in this study. The first one is three moment capital asset pricing model (3MCAPM) proposed by Kraus and Litzenberger (1976). It is an extension to the standard capital asset pricing model (CAPM) where a skewness premium has been introduced. The standard capital asset pricing model predicts the relationship between the risk of an asset and its expected returns which was independently

developed by Sharpe (1964), Lintner (1965), and Mossin (1966). Fama and French (1993) added two more risk factors to the CAPM to represent size (measured by market capitalization) and value (measured by book-to-market ratio). Size anomaly is that small companies can earn higher risk adjusted returns compared their large counterparts. Value anomaly is a tendency of value stocks (stocks with low prices relative to their fundamentals) to outperform growth stocks (stocks with high prices relative to fundamentals). Carhart (1997) added a fourth factor to the three factor model which is momentum. Momentum is the continuation of stocks that have performed well recently to do well over the subsequent 1 to 12 months. Fama and French (2015) added two more factors which are investment and profitability to their seminal three factor model.

Empirical Studies

Industry

Industry refers to a group of companies that produce similar products and services or close substitutes, even though sometimes it is very complex in the real world. It was found that traditional asset pricing models are unable to explain returns for industry groups (Hou & Robinson, 2006; Lewellen, Nagel, & Shanken, 2010). Industry has a strong effect to traditional risk based factors such as size, book to market ratio and momentum. Chou et al. (2012) found several important implications which are, small firm effect is a below industry median phenomenon, value effect is an intra-industry phenomenon, and short run momentum is an inter industry phenomenon. Dong and Michel (2012) analysed industry's impact to stock returns in IPO context. They explained that if investors are underreacting to a new issue, it will lead to set the IPO initial trading price too low. Thereafter, the price will correct itself based on good prospects of the relevant IPO. When investors are overreacting to an IPO, the opposite mechanism would happen. Ritter (1991) analyzed 14 industries during years 1975–1984 and only three industries over performed. These included financial services, pharmaceuticals and airlines. Analysing Australian IPOs by dividing them into four industries that include consumer discretionary and staples, information technology, industrial and resources it was found that consumer industry is underperforming in both measures of cumulative abnormal returns as well as buy and hold abnormal returns while other industries displayed a mixed behavior (Perera, 2014).

Pre IPO Media Coverage

According to market efficiency theory, mass media coverage doesn't have an impact on stock returns unless they reveal new information which was not available

before. But there are many studies that found significant relationships between media coverage and stock returns (e.g.,Fang & Peress, 2009; Tetlock, 2011). They documented that there is a negative relationship between media coverage and stock returns. The main reason for this can be explained using investor recognition hypothesis by Merton (1987). Further, Easley, Hvidkjaer, and O'Hara (2002) explained it using information asymmetry theory. Their argument is stocks with lesser information will result in lesser awareness among investors. So, high stock returns are needed to compensate those stocks with lesser information. This argument is questioned by the finding of Van Nieuwerburgh and Veldkamp (2009) that assumed that higher awareness backed by higher investor attention has a cost. Hence, high stock returns need to recover that cost involved with higher awareness.

The main channel of information dissemination for IPOs is 'prospectus' which is issued in the pre IPO stage. The relationship between media coverage and IPO stock returns was analysed by Liu et al. (2014) and they found a similar negative relationship in confirmation with findings of Fang and Peress (2009) and Tetlock (2011). Further, contrary to investor recognition hypothesis (Merton, 1987), Barber and Odean (2008) mentioned that stocks with higher attention will be selected by investors when there are large numbers of stocks available to choose from. Therefore, it can be argued that more popular stocks will grab investor attention in an IPO context too and media coverage will play a role in this process.

Pre IPO Director Fees

There are a number of studies which recommend executive compensation and firm performance should be connected with each other in order to mitigate agency conflict (e.g., Grossman & Hart, 1983; Holmstrom, 1979; Jensen & Meckling, 1976; Jensen & Murphy, 1990). Further, there are a number of studies which had found a positive or strong relationship between executive pay and firm performance (e.g. Espenlaub, Walker, & Stathopoulos, 2004; Main, Bruce, & Buck, 1996; Merhebi, Pattenden, Swan, & Zhou, 2006). However, Grima, Thomson, and Wright (2007) found weak relationships between these executive pay and firm performance. However, it should be noted that most of the above studies defined firm performance in accounting measures but not the appreciation of firms' stock value. The relationship between future stock returns and executive pay is studied by several papers (e.g., Cooper, Gulen, & Rau, 2009; Lewellen, Loderer, Martin, & Blum, 1992; Malmendier & Tate, 2009; Masson, 1971; McConaughy & Mishra, 1996) while most of them found a positive relationship between executive pay and future stock returns. Cooper et al. (2009) documented that both total and cash

compensation is unrelated or insignificantly related to stock returns[1]. Further, they identified that increased executive pay related information will not be quickly incorporated to stock returns due to several reasons. Some of them are existence of unobservable elements of executive compensation to outside investors, requirement of special skills and knowledge to identify such information, and tendency of increased pay leading to shareholder wealth destruction by executives such as empire building. Empirical evidence for the relationship between executive pay and stock returns in IPO context is very limited. One such study is by Nikbakht, Shahrokhi, and Martin (2007) where they discovered that if an executive remains in the firm in post IPO period that stock is undervalued and the firm's prospects are bright in the future. Further, Cooper et al. (2009) found an effective trading strategy which yielded positive returns by selling the highest executive compensation firms and buying the lowest executive compensation payers.

Pre IPO Auditor Fees

Auditors have the benefit to access confidential details such as accounting reports, strategic plans, and internal records of their clients. Audit risk is the probability that auditors issue a qualified opinion on clients' financial statements and engagement risk is auditors' vulnerability to litigation risk or loss of reputation due to the audit job they have undertaken. Picconi and Reynolds (2013) explained that there is a positive relationship between engagement risk and audit risk. Simunic (1980) pointed out that both audit risk and engagement risk should be considered by an auditor when they determine the price of the audit. Therefore, it can be concluded that there is a risk element hidden in audit fees which is not explicit to outside investors. Hence, audit fee can be a determinant of future stock returns. In IPO context, information such as auditor type, pre IPO audit opinion and audit fees are available to investors through prospectus. Investors can use this information to decide whether they invest in a respective IPO or not. On auditor type, Palmrose (1988) reported that reputed big audit firms tend to avoid future audit failures which would result in litigation activities than small and less reputed peers. Thus, there is a certification that accounting reports audited by big and reputed audit firms are true and fair compared to small audit firms. Further, Craswell, Francis, and Taylor (1995) and Beatty (1993) mentioned that large audit firms do charge fee premium for their work compared to small auditors. Accordingly, if large auditors avoid audit failures and they charge high audit fees, it would mean that the fee premium acts as a certification of the clients' business. Therefore, this information can be used by

[1] Focus of this study is cash compensation but not the stock based incentives such as executive share option schemes.

investors to select high quality firms and execute their trading strategies. Finally, when big auditors issue a pre IPO clean opinion for a client, these firms tend to earn higher post IPO return compared to firms with qualified opinions by the same auditors as revealed by Weber and Willenborg (2003).

Data and Methodology

The first sub-section describes data used followed by a section on the methodology used in this study.

Data

The data used in this study consist of 63 IPOs listed in Colombo Stock Exchange (CSE) from January 2003 to December 2016. The issue dates and offering prices of IPOs are taken from CSE and listing prospectuses. Monthly stock prices are taken from CSE and adjusted by authors to dividends and other corporate actions. All share price index (ASPI) data is obtained from the CSE and is considered as the market index. Factor data such as size (market capitalization of firms), book to market ratio, momentum (past returns in short run), profitability (return on equity) and investment (total asset growth) were mainly obtained from CSE and individual company annual reports. The risk free rate is taken as three month Treasury Bill rate published by the Central Bank of Sri Lanka (CBSL). Media search results were obtained by counting news items which carried IPO Company's name in the headlines or text or both on website archives of leading newspapers and online news portals in Sri Lanka. These include Daily FT, Lanka Business On line (LBO), Daily News, Daily Mirror, Sunday Times and Sunday Observer. Further, this count is taken for three (03) months prior to the IPO up to IPO listing date. Industry classification was based on the CSE sector classification. The companies that belong to Bank, Finance and Insurance sector were classified as finance industry and all other stocks were classified as non-finance industry. Director fees and audit fees are taken from prospectuses.

Methodology

This study intends to examine the effectiveness of long only as well as long and short trading strategies of IPO stocks in CSE. For this purpose, it needs to construct IPO stock portfolios based on widely available pre IPO information which are industry, media coverage, director fees and audit fees. Two portfolios were created based on the industry to which the IPO firm belongs to. They are finance (FIN) and non-finance (NONFIN) portfolios. Further, six portfolios were created as low media

search results (LMSR) and high media search results (HMSR) based on media coverage three months prior to the issue, low director fees (LDF) and high director fees (HDF) based on director fees paid by the company immediately prior to IPO, and low auditor fees (LAF) and high auditor fees (HAF) based on auditor fees paid by the company immediately prior to IPO. These low and high portfolios were segregated based on the median of the respective variable. It will result in eight portfolios together with two industry portfolios which are FIN, NONFIN, LMSR, HMSR, LDF, HDF, LAF and HAF that have monthly returns for 168 months from January, 2003 and December, 2016. Further, four more additional portfolios were created by subtracting NONFIN, LMSR, LDF and LAF from FIN, HMSR, HDF and HAF respectively. Those four portfolios are FIN-NONFIN, HMSR-LMSR, HDF-LDF and HAF-LAF. As a result, there are 12 portfolios all together. IPO companies were included to construct IPO portfolio return from listing to five years or delisting where earlier of the two situations was taken. When there are missing prices (when there is no trading) for IPO firms, last traded price was taken to compute the return. Stock returns of these monthly portfolios are calculated on equal weighted basis. Single IPO firm monthly return is calculated as follows.

$$R_{im} = Ln\left[\frac{P_{icpm}}{P_{icpm-1}}\right]$$

where R_{im} is the single IPO firm *i* monthly return for month *m*, P_{icpm} is closing price of IPO firm for month *m* and P_{icpm-1} is closing price of IPO firm for month *m-1*.

Next step would be to run weighted least square regression with Newey and West (1987) adjustment to the standard errors of estimated values in order to mitigate auto correlation and heteroscedasticity. The four asset pricing models used for this step are three moment capital asset pricing model (3MCAPM), Fama and French three factor model (FF3), Carhart four factor model (C4F) and Fama and French five factor model (FF5). Table 1 shows variables and equations for the above asset pricing models.

Analysis

A brief descriptive analysis will be presented first before estimating the weighted least square regression on IPO trading strategies.

Table 1: Variables and equations for asset pricing models

Panel A: Variables

Variable	Description
RF	Risk free (RF) rate which is three month treasury bill rate published by Central Bank of Sri Lanka.
RM	Market rate of return (RM) which is monthly ASPI change of CSE.
MRP	Market Risk Premium (MRP) which is obtained by deducting RF from RM. MRP = RM – RF
SMB	Return difference between small stocks and big stocks based on market capitalization. 1/3 (Small Value + Small Neutral + Small Growth) – 1/3 (Big Value + Big Neutral + Big Growth)* 1/3{[1/3(Small Value + Small Neutral + Small Growth) – 1/3 (Big Value + Big Neutral + Big Growth)] + [1/3(Small Robust + Small Neutral + Small Weak) – 1/3 (Big Robust + Big Neutral + Big Weak)] + [1/3(Small Conservative + Small Neutral + Small Aggressive) –1/3 (Big Conservative + Big Neutral + Big Aggressive)]}**
HML	Return difference between value (high book to market) stocks and growth (low book to market) stocks. HML = ½ (Small Value + Big Value) – ½ (Small Growth + Big Growth)
WML	Return difference between past eleven month (t-2 to t-12) winner stocks and past eleven month loser stocks. WML = ½ (Small Winners + Big Winners) – ½ (Small Losers + Big Losers)
RMW	Return difference between robust profitability stocks and weak profitability stocks. RMW = ½ (Small Robust + Big Robust) – ½ (Small Weak + Big Weak)
CMA	Return difference between conservative investment stocks and aggressive investment stocks. CMA = ½ (Small Conservative + Big Conservative) – ½ (Small Aggressive + Big Aggressive)

Panel B: Equations

Asset pricing model and source	Equation
Three moment Capital Asset Pricing Model (3MCAPM) –Kraus and Litzenberger (1976)	$R_{it} - RF_t = \alpha + \beta(MRP_t) + \varphi(MRP_t - \overline{MRP_t})^2 + \varepsilon_t$
Fama & French 3 factor model (FF3) – Fama and French (1993)	$R_{it} - RF_t = \alpha + \beta(RM_t - RF_t) + sSMB_t + hHML_t + \varepsilon_t$
Carhart 4 factor model (C4F) – Carhart (1997)	$R_{it} - RF_t = \alpha + \beta(RM_t - RF_t) + sSMB_t + hHML_t + wWML_t + \varepsilon_t$
Fama & French 5 factor model (FF5) – Fama and French (2015)	$R_{it} - RF_t = \alpha + \beta(RM_t - RF_t) + sSMB_t + hHML_t + rRMW_t + cCMA_t + \varepsilon_t$

Note: Researcher's construction based on Fama and French (1993, 2015) and Carhart (1997). * equation denotes SMB formula for FF3 model and ** equation represents SMB formula for FF5 model. Factor construction for asset pricing models is described in detail in Appendix 1.

Descriptive Statistics

Descriptive statistics on returns of IPO portfolios are presented in Table 2. When analysing means and medians of FIN and NONFIN portfolios, FIN is slightly higher than NONFIN IPOs. Means and medians of LMSR are also higher than means and medians of HMSR. Further, HDF and HAF exhibited higher means and medians compared to their peer portfolios, LDF and LAF respectively. Minimums and maximums express that there is evidence of higher statistical range for all variables indicating the presence of extreme values in the data set. However, the author did not attempt to winsorize or truncate the data because it is already a small data set compared to similar studies. Standard deviations for all variables exhibit similar values between 8.43% and 9.66%. This shows that all these IPO portfolios carry risk in a similar range.

Table 2: Descriptive Statistics on IPO Portfolio Returns

Portfolio	Mean (%)	Median (%)	Maximum (%)	Minimum (%)	Standard Deviation (%)	Observations
FIN	0.18	-0.29	38.68	-33.51	9.21	168
NONFIN	0.11	-0.32	30.50	-28.37	8.49	168
LMSR	0.75	-0.1	24.69	-34.63	8.97	168
HMSR	-0.34	-0.78	36.22	-24.24	8.43	168
LDF	-0.35	-0.77	35.39	-34.84	9.11	168
HDF	0.51	0.36	31.96	-26.73	9.01	168
LAF	-0.01	-1.26	35.39	-34.2	9.66	168
HAF	0.17	0.01	38.87	-26.73	8.64	168

Note: Computed using E-views software

Weighted Least Square Regression Analysis

Weighted least square (WLS) regression analysis has been performed for portfolio returns of all four types of pre IPO information.

Industry Based IPO Portfolios

Table 3 presents the WLS regression results on trading strategies based on industry. Coefficients of alpha of FIN as well as NONFIN portfolios are positive indicating that they are able to generate slight but positive premium after pricing for

Table 3: IPO Trading Strategies Based on Industry Portfolios

	Finance (FIN)				Non Finance (NONFIN)				FIN – NONFIN			
	3MCAPM	**FF3**	**C4F**	**FF5**	**3MCAPM**	**FF3**	**C4F**	**FF5**	**3MCAPM**	**FF3**	**C4F**	**FF5**
Constant	0.062***	0.051***	0.049***	0.052***	0.059***	0.053***	0.053***	0.059***	0.003	-0.002	-0.004	-0.007
	(5.698)	(5.550)	(5.550)	(6.032)	(6.414)	(7.229)	(6.764)	(9.021)	(0.279)	(-0.212)	(-0.498)	(-0.894)
MRP	0.660***	0.588***	0.584***	0.601***	0.698***	0.629***	0.630***	0.679***	-0.038	-0.041	-0.046	-0.078
	(6.025)	(6.909)	(7.115)	(7.360)	(6.872)	(7.548)	(7.308)	(8.066)	(-0.460)	(-0.561)	(-0.659)	(-1.248)
$(MRP - \overline{MRP})^2$	-0.464				0.361				-0.825**			
	(-0.779)				(0.530)				(-1.989)			
SMB (FF3)		0.469***	0.472***			0.324***	0.323***			0.146	0.149	
		(4.464)	(4.868)			(3.483)	(3.480)			(0.948)	(1.032)	
HML		0.058	0.075	0.009		0.178**	0.174**	0.170**		-0.120	-0.100	-0.161
		(0.484)	(0.623)	(0.081)		(2.394)	(2.441)	(2.193)		(-0.856)	(-0.712)	(-1.223)
WML			0.101				-0.025				0.127	
			(1.436)				(-0.251)				(1.097)	
SMB (FF5)				0.486***				0.233**				0.253**
				(6.144)				(2.305)				(2.116)
RMW				-0.084				-0.187**				0.103
				(-0.997)				(-2.551)				(0.983)
CMA				0.034				-0.300***				0.334***
				(0.340)				(-2.882)				(3.713)
Adjusted R^2	0.345	0.459	0.466	0.478	0.432	0.505	0.502	0.539	0.012	0.014	0.031	0.133
F statistic	44.896***	48.217***	37.464***	31.565***	64.622***	57.701***	43.144***	40.026***	0.998	1.794	2.350*	6.119***
Observations	168	168	168	168	168	168	168	168	168	168	168	168

Notes: 1. Computed using E-views software.
2. ***, **,* denote statistical significance at the 0.01, 0.05 and 0.10 levels respectively.

well known risk factors. However, FIN-NONFIN portfolio trading strategy didn't earn a statistically significant alpha. This indicates that long only strategy based on industry is successful in the Sri Lankan context even though long and short strategy based on industry is proved to be a failure. Positive alphas were generated from three asset pricing models out of four except 3MCAPM where alpha was slightly higher for NONFIN compared to FIN. Therefore, it would be ideal for investors to select NONFIN IPOs even though it yields a slightly higher return than FIN. Further, coefficient of MRP (Market risk premium) exhibits a positive relationship with returns of both FIN and NONFIN portfolios but not for FIN-NONFIN. SMB indicates a positive size premium for both FIN and NONFIN portfolios. Coefficients of HML show a valid value premium only for NONFIN portfolio but not for others. New factors added to the FF5 model by Fama and French (2015) exhibit statistically significant coefficients for NONFIN and FIN-NONFIN portfolios but not for the FIN portfolio. Adjusted R squared is increasing for both FIN and NONFIN portfolios from 3MCAPM to FF5. It should be noted that adjusted R squared is high for NONFIN in all the asset pricing models compared to FIN. Further, F statistics are highly significant for both FIN and NONFIN portfolios indicating all the factors in the asset pricing models jointly explaining the variation of portfolio returns. However, adjusted R squared is very low for FIN-NONFIN portfolio indicating statistical model explains very few about the return variation of FIN-NONFIN. F statistics are not statistically significant for FIN-NONFIN except C4F and FF5.

Portfolios Based on Pre IPO Media Coverage

Table 4 presents the WLS regression results for trading strategies based on pre IPO media coverage. Coefficient of alpha is positively significant for both LMSR and HMSR but not for HMSR-LMSR. This indicates that both LMSR and HMSR outperformed HMSR-LMSR after controlling for well known risk factors. However, HMSR exhibit slightly higher alpha compared to LMSR (except for 3MCAPM) hence signaling to investors that IPOs with heavy pre listing media coverage would result higher return even though the difference of alpha between the two portfolios is marginal. This result is consistent with Barber and Odean (2008); Van Nieuwerburgh and Veldcamp (2009). However, it is contradicted with the findings of Fang and Peress (2009); Liu et al. (2014) which postulates a negative relationship between stock returns and media coverage. MRP reflects a statistically significant beta for all three portfolios except HMSR-LMSR under 3MCAPM.

Table 4: IPO Trading Strategies for Portfolios Based on Pre IPO Media Coverage

	LMSR				HMSR				HMSR – LMSR			
	3MCAPM	**FF3**	**C4F**	**FF5**	**3MCAPM**	**FF3**	**C4F**	**FF5**	**3MCAPM**	**FF3**	**C4F**	**FF5**
Constant	0.064***	0.049***	0.047***	0.054***	0.060***	0.058***	0.059***	0.064***	-0.004	0.009	0.013*	0.010
	(5.148)	(7.576)	(6.839)	(8.570)	(8.338)	(7.718)	(7.330)	(8.715)	(-0.338)	(1.242)	(1.933)	(1.504)
MRP	0.637***	0.519***	0.513***	0.568***	0.763***	0.732***	0.736***	0.763***	0.126	0.213***	0.223***	0.195***
	(5.150)	(6.258)	(6.405)	(6.750)	(8.997)	(9.752)	(9.338)	(10.356)	(1.416)	(3.908)	(4.371)	(4.108)
$(MRP - \overline{MRP})^2$	-0.219				0.345				0.564			
	(-0.314)				(0.585)				(1.220)			
SMB (FF3)		0.699***	0.703***			0.105	0.103*			-0.594***	-0.600***	
		(9.292)	(9.897)			(1.623)	(1.672)			(-6.936)	(-8.429)	
HML		0.098	0.122	0.057		0.157**	0.144**	0.152*		0.059	0.022	0.095
		(1.259)	(1.539)	(0.756)		(2.095)	(2.094)	(1.888)		(0.612)	(0.242)	(1.144)
WML			0.145**				-0.078				-0.224***	
			(1.977)				(-0.993)				(-4.917)	
SMB (FF5)				0.674***				0.020				-0.654***
				(8.098)				(0.262)				(-8.079)
RMW				-0.118*				-0.197***				-0.079
				(-1.699)				(-2.809)				(-1.115)
CMA				-0.163**				-0.232*				-0.069
				(-2.312)				(-1.869)				(-0.892)
Adjusted R^2	0.331	0.610	0.630	0.613	0.527	0.542	0.547	0.578	0.014	0.387	0.479	0.449
F statistic	42.313***	87.915***	72.105***	53.824***	94.093***	66.916***	51.397***	46.669***	2.209	36.082***	39.368***	28.206***
Observations	168	168	168	168	168	168	168	168	168	168	168	168

Notes: 1. Computed using E-views software
2. ***, **,* denote statistical significance at the 0.01, 0.05 and 0.10 levels respectively

SMB shows a positive size premium for LMSR and inverted size premium for HMSR-LMSR Valid value premium can be observed only for HMSR. Coefficient of WML indicates a positive momentum effect for LMSR and a negative momentum for HMSR-LMSR. Both coefficients of RMW and CMA are negatively significant for both LMSR and HMSR. Adjusted R squared lies in healthy levels for LMSR and HMSR but it is very low for the portfolio HMSR-LMSR. However F statistics are highly significant for all three portfolios except for HMSR-LMSR under 3MCAPM.

Portfolios Based on Pre IPO Director Fees

Table 5 presents WLS regression results of trading strategies based on pre IPO director fees. Alpha exhibits statistical significance for LDF and HDF while alpha of HDF-LDF indicates a marginal significance at 10% except for 3MCAPM. Even though all three portfolios yield a positive alpha, HDF appeared as the portfolio with the highest alpha exceeding those of the other two portfolios. This is against the findings of Cooper et al. (2009) which exhibited an unrelated association between stock returns and executive cash compensation. Positive coefficients for MRP are reported for both LDF and HDF but not for HDF-LDF. The significant size premium is reported for both LDF and HDF but it has been reversed for HDF-LDF. Coefficient of RMW is significantly positive for HDF-LDF while it is significantly negative for LDF. Reverse premium for CMA has also been reported for HDF and HDF-LDF. Adjusted R squared is at healthy levels for LDF and HDF while it is very low for HDF-LDF. F statistics are highly significant for all the regressions except HDF-LDF under 3MCAPM indicating all factors are jointly explaining the return variation.

Portfolios Based on Pre IPO Auditor Fees

Table 6 presents WLS regression results of trading strategies based on pre IPO audit fees. Coefficients of alpha are significantly positive for both LAF and HAF. However, HAF's alpha is slightly higher than alpha of LAF except for 3MCAPM. So it gives the message that firms that pay high pre IPO audit fees would result in higher returns even after pricing for risk factors such as size, book to market ratio, momentum, investment and profitability. Similar to the above results with the other three types of pre IPO information, significantly positive coefficients are reported on MRP for both LAF and HAF. Valid size premium can be observed for LAF and HAF while it has been reversed for HAF-LAF. No significant premiums for HML, WML, RMW and CMA can be observed. Adjusted R squared is at high levels for HAF and LAF compared to very low adjusted R squared reported for HAF-LAF.

Table 5: IPO Trading Strategies for Portfolios Based on Pre IPO Director Fees

	LDF				HDF				HDF – LDF			
	3MCAPM	**FF3**	**C4F**	**FF5**	**3MCAPM**	**FF3**	**C4F**	**FF5**	**3MCAPM**	**FF3**	**C4F**	**FF5**
Constant	0.057***	0.044***	0.043***	0.049***	0.066***	0.060***	0.059***	0.062***	0.009	0.016*	0.015*	0.013*
	(5.266)	(5.878)	(5.604)	(6.306)	(5.457)	(6.104)	(5.681)	(6.832)	(1.047)	(1.901)	(1.923)	(1.730)
MRP	0.674***	0.580***	0.578***	0.611***	0.714***	0.651***	0.648***	0.696***	0.040	0.071	0.070	0.085
	(5.943)	(7.258)	(7.213)	(7.754)	(6.510)	(6.886)	(6.827)	(7.855)	(0.522)	(1.030)	(1.021)	(1.492)
$(MRP - \overline{MRP})^2$	-0.422				0.045				0.467			
	(-0.660)				(0.071)				(0.990)			
SMB (FF3)		0.590***	0.591***			0.357***	0.359***			-0.233*	-0.232*	
		(6.888)	(6.730)			(2.952)	(3.050)			(-1.892)	(-1.899)	
HML		0.091	0.098	0.039		0.021	0.031	0.048		-0.070	-0.066	0.008
		(1.172)	(1.233)	(0.445)		(0.197)	(0.301)	(0.553)		(-0.685)	(-0.640)	(0.094)
WML			0.038				0.064				0.025	
			(0.458)				(0.864)				(0.316)	
SMB (FF5)				0.586***				0.392***				-0.193*
				(6.011)				(3.915)				(-1.768)
RMW				-0.220**				0.030				0.250***
				(-2.559)				(0.353)				(2.991)
CMA				-0.120				-0.272**				-0.152*
				(-0.946)				(-2.370)				(-1.666)
Adjusted R^2	0.367	0.556	0.555	0.601	0.407	0.478	0.479	0.558	0.006	0.040	0.036	0.249
F statistic	49.383***	70.733***	53.052***	51.311***	58.360***	51.899***	39.355***	43.087***	0.519	3.337**	2.544**	12.103***
Observations	168	168	168	168	168	168	168	168	168	168	168	168

Notes: 1. Computed using E-views software
2. ***, **,* denote statistical significance at the 0.01, 0.05 and 0.10 levels respectively

Table 6: IPO Trading Strategies for Portfolios Based on Pre IPO Auditor Fees

	LAF				HAF				HAF – LAF			
	3MCAPM	**FF3**	**C4F**	**FF5**	**3MCAPM**	**FF3**	**C4F**	**FF5**	**3MCAPM**	**FF3**	**C4F**	**FF5**
Constant	0.063***	0.049***	0.048***	0.051***	0.061***	0.055***	0.055***	0.060***	-0.002	0.006	0.007	0.009
	(5.284)	(6.143)	(6.043)	(7.823)	(5.526)	(5.887)	(5.342)	(5.648)	(-0.293)	(0.775)	(0.888)	(1.021)
MRP	0.683***	0.587***	0.584***	0.626***	0.708***	0.646***	0.645***	0.682***	0.025	0.059	0.060	0.056
	(5.878)	(7.368)	(7.490)	(8.493)	(6.617)	(6.708)	(6.566)	(6.855)	(0.328)	(0.808)	(0.848)	(0.771)
$(MRP - \overline{MRP})^2$	-0.644				0.314				0.959			
	(-1.038)				(0.480)				(2.131)			
SMB (FF3)		0.648***	0.650***			0.297***	0.298***			-	-	
		(5.740)	(5.746)			(3.406)	(3.438)			0.350***	0.351***	
										(-3.223)	(-3.171)	
HML		-0.013	-0.001	-0.033		0.135	0.140	0.127		0.148	0.141	0.160
		(-0.123)	(-0.013)	(-0.359)		(1.427)	(1.547)	(1.288)		(1.195)	(1.111)	(1.359)
WML			0.069				0.028				-0.041	
			(0.809)				(0.359)				(-0.459)	
SMB (FF5)				0.715***				0.257**				-
				(8.496)				(2.239)				0.458***
												(-4.092)
RMW				-0.057				-0.138				-0.081
				(-0.750)				(-1.391)				(-0.892)
CMA				-0.165*				-0.219				-0.053
				(-1.811)				(-1.369)				(-0.440)
Adjusted R^2	0.341	0.549	0.550	0.608	0.430	0.485	0.482	0.504	0.006	0.126	0.124	0.191
F statistic	44.257***	68.718***	52.131***	52.728***	63.974***	53.356***	39.914***	34.912***	1.499	9.061***	6.905***	8.871***
Observations	168	168	168	168	168	168	168	168	168	168	168	168

Notes: 1. Computed using E-views software
2. ***, **,* denote statistical significance at the 0.01, 0.05 and 0.10 levels respectively

F statistics are highly significant for all the regressions except for HAF-LAF under 3MCAPM.

Results

This study examined the effectiveness of trading strategies formed on pre IPO information such as industry to which the IPO belongs to, pre IPO media coverage, pre IPO director fees and pre IPO audit fees. The most highlighted fact from the study is that long only strategies produce significant excess returns while long and short strategies exhibit poor and mixed results in most occasions. Further, NONFIN, HMSR, HDF and HAF produce slightly higher alpha compared to FIN, LMSR, LDF and LAF respectively. Hence, these findings will be useful to investors where they can plan their investments accordingly. There can be several reasons for this finding. FIN portfolio is concentrated only for financial services (banks, finance and insurance companies) while NONFIN has better diversification across range of industries and this may be the reason why NONFIN yield better returns. However, similar results were not found in previous studies with special focus to financial and non-financial industries. HMSR portfolio would have higher awareness among investors compared to LMSR due to high media coverage. Therefore, investors may overreact to high HMSR stocks which push returns upwards. This is similar to the fact that familiar companies attract attention of investors as shown by Merton (1987). According to agency theory, HDF and HAF minimise agency costs which will lead to better operating performance. Ultimately, it will have a positive impact to stock returns. This supports the findings of Weber and Willenborg (2003) which mentioned that pre IPO audit opinions and fees forecast post IPO stock performance. Cooper et al. (2009) also found that executive pay is related to the future firm price performance which is similar to the findings of this study. Except alpha, it can be observed that positively significant beta coefficients and valid size premiums for many long only strategies. It can be interpreted as there are solid positive relationships between return variations of long only portfolios and well known risk factors like MRP and SMB. However, inconsistent mixed results were reported for other tested risk factors such as HML, WML, RMW and CMA. Further, long and short portfolios were proved as imprecise models where adjusted R squared is very low under each asset pricing model. In contrast to that adjusted R squared for long only portfolios are higher and it should be noted that when number of risk factors are more in a model, a higher adjusted R squared can be observed. For an example, C4F and FF5 had highest adjusted R squared figures for many occasions.

Conclusion

The main conclusion derived from the study is that long only strategies will be well preferred over long and short strategies for all the four information types considered in this study. NONFIN, HMSR, HDF and HAF emerged as highest return generating portfolios out of long only portfolios. Therefore, it can be concluded that investing in these portfolios would mitigate the IPO long run underperformance anomaly. However, there are several limitations and further research opportunities that can be identified from this study. Even though it is controlled for well known risk factors, there are many other risk factors which have not been taken into the consideration of this study. Some of them are liquidity, short term reversals, and idiosyncratic volatility. Thus, it is ideal, if those can also be incorporated to asset pricing models to assess the above IPO trading strategies. Similarly, there is much more information circulated in the pre IPO stage which can be used to apply the same methodology of portfolio construction and to form profitable trading strategies. Some of such information include profile of the management, corporate structure and capital structure which are not considered in this study. Further, it is possible to compare the viability of these trading strategies in other markets too covering both emerging and developed countries.

This study has many useful implications to investors, financial professionals, policy makers and academics. Investors can use the findings of this study where they can select the only viable IPOs from pre IPO information to earn a profit from their investment. Similarly financial professionals can effectively use these insights in advising their clients on IPO investment decisions. Further, the findings of this study will be useful for policy makers and regulators in setting up rules and regulations specifically pertaining to pre IPO listing disclosures. Finally academics can explore further research opportunities mentioned above to fill the empirical and conceptual gaps in the literature.

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The author declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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Appendix: Factor Construction for Asset Pricing Models

Stock returns for July of year *t* to June of year *t*+1 were used in this study for the period from January 2003 to December 2016. There are six risk factors used in this study to formulate asset pricing models as prescribed by Kraus and Litzenberger (1976); Fama and French (1993, 2015); Carhart (1997). These factors are market risk premium (MRP), small minus big (SMB) factor for size, high minus low factor (HML) factor for book to market ratio, winner minus loser (WML) factor for momentum, robust minus weak (RMW) factor for profitability and conservative minus aggressive (CMA) factor for investment. MRP is calculated by deducting risk free rate (three month Treasury bill rate published by Central Bank of Sri Lanka) from market rate of return which is calculated as the monthly All Share Price Index (ASPI) change of Colombo Stock Exchange.

Firm size is measured by market capitalisation of the firm by multiplying number of stocks outstanding in June of year *t* and market price of at that date. The book to market equity ratio is the division between book equity value at the fiscal year end in calendar year *t*-1 and the market value at December of year *t*-1. In June of each year *t*, all the stocks will be divided in to two portfolios called small (S) and big (B) based on firm size on 50:50 ratio. Independently same stocks will be divided in to three portfolios called value (V), Neutral (N) and growth (G) based on book to market ratio. The dividing ratio is top 30% for V, middle 40% for N and bottom 30% for G. Then six portfolios will be formed at the intersection of firm size and book to market ratio which are SG, SN, SV, BG, BN and BV. It is shown in below table.

		Firm size (Market capitalization)	
		Small (S)	**Big (B)**
Book to market ratio (BTM)	**Growth (G)**	Small Growth (SG)	Big Growth (BG)
	Neutral (N)	Small Neutral (SN)	Big Neutral (BN)
	Value (V)	Small Value (SV)	Big Value (BV)

Equal weighted monthly returns for these six portfolios are calculated each month over the next twelve months from July of year *t* to June of year *t*+1. Then it is possible to calculate SMB and HML using following equations. However, it should be noted that below SMB formula will be used only for Fama and French three factor model (FF3) only and SMB formula for Fama and French five factor model (FF5) will be presented at the last section of this appendix.

$$SMB(FF3) = \tfrac{1}{3}(SV + SN + SG) - \tfrac{1}{3}(BV + BN + BG)$$

$$HML = \tfrac{1}{2}(SV + BV) - \tfrac{1}{2}(SG + BG)$$

WML factor is also constructed using firm size and firm's prior stock price performance (momentum). Momentum is calculated by summing up prior returns of a particular stock from *t*-2 to *t*-12. Then all stocks will be sorted based on momentum in the ratio of top 30% for winners (W), middle 40% for neutral (N) and bottom 30% for losers (L). Independently, stocks will be sorted based on firm size in to small (S) and big (B) similar to the procedure followed in calculating SMB and HML factors. Then six portfolios will be formed at the intersection of firm size and momentum as follows.

		Firm size (Market capitalization)	
		Small (S)	**Big (B)**
Price Momentum	**Losers**	Small Losers (SL)	Big Losers (BL)
	Neutral	Small Neutral (SN)	Big Neutral (BN)
	Winners	Small Winners (SW)	Big Winners (BW)

Equal weighted monthly returns for these portfolios are calculated each month from July of year *t* to June of year *t*+1. Then it is possible to construct WML factor using following equation.

$$WML = \tfrac{1}{2}(SW + BW) - \tfrac{1}{2}(SL + BL)$$

Computation of RMW and CMA factors is also similar to the construction of other factors. Calculation of two size portfolios (S and B) is same for RMW and

CMA factors in FF5 model. For RMW factor, all the stocks will be sorted by return on equity ratio of each company in the proportion of highest 30% for robust (R) stocks, middle 40% for neutral (N) stocks and lowest 30% for weak (W) stocks in the perspective of profitability. Similarly for CMA factor, all the stocks will be sorted by total asset growth in the proportion of bottom 30% for conservative (C) stocks, middle 40% for neutral stocks (N) and top 30% for aggressive (A) stocks. Then six portfolios for RMW and CMA factors each can be formed independently. Equal weighted monthly returns for those portfolios are calculated for each month from July of year t to June of year *t*+1.

		Firm size (Market capitalization)	
		Small (S)	**Big (B)**
Operational Profitability (OP)	**Robust**	Small Robust (SR)	Big Robust (BR)
	Neutral	Small Neutral (SN)	Big Neutral (BN)
	Weak	Small Weak (SW)	Big Weak (BW)

$$RMW = \tfrac{1}{2}(SR + BR) - \tfrac{1}{2}(SW + BW)$$

		Firm size (Market capitalization)	
		Small (S)	**Big (B)**
Investment (INV)	**Conservative**	Small Conservative (SC)	Big Conservative (BC)
	Neutral	Small Neutral (SN)	Big Neutral (BN)
	Aggressive	Small Aggressive (SA)	Big Aggressive (BA)

$$CMA = \tfrac{1}{2}(SC + BC) - \tfrac{1}{2}(SA + BA)$$

However as mentioned above, SMB formula used for FF3 cannot be used for FF5. FF5 SMB formula should be the average return on the nine small stock portfolios minus the average return of nine big stock portfolios as follows.

$$SMB_{BTM} = \tfrac{1}{3}(SV + SN + SG) - \tfrac{1}{3}(BV + BN + BG)$$
$$SMB_{OP} = \tfrac{1}{3}(SR + SN + SW) - \tfrac{1}{3}(BR + BN + BW)$$
$$SMB_{INV} = \tfrac{1}{3}(SC + SN + SA) - \tfrac{1}{3}(BC + BN + BA)$$
$$SMB_{FF5} = \tfrac{1}{3}(SMB_{BTM} + SMB_{OP} + SMB_{INV})$$