Penny Stocks in India

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This is to certify that the thesis titled “Penny Stocks in India” by Kanishka Gaggar has been revised in light of the comments made by the examiners. I recommend that the thesis should be considered for the award of the degree of Master of Philosophy.

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I, Kanishka Gaggar hereby declare that the thesis titled “Penny Stocks in India” has been revised in light of the comments made by the examiners. This is my original contribution carried out at Indira Gandhi Institute of Development Research and has not been submitted elsewhere for any other degree.

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ABSTRACT

This thesis explores the characteristics of Indian stocks when categorized on the basis of nominal prices. Special focus is on the Penny Stocks which are the least price category. We find that penny stocks in India are categorized by higher raw returns, very low share of market capitalization and turnover and generally suffer from inadequate corporate governance. However, when adjusted for extreme 1%ile returns, penny stocks generate less return at lower risk compared to high denomination stocks. Penny stock returns are well explained by the standard empirical asset pricing models. However, when adjusted for corporate governance, they exhibit extra abnormal returns. Absence of a negative alpha for penny stocks in asset pricing returns models is consistent with the stubborn survival of this investment class despite the lack of clarity regarding their function in asset markets.

JEL Classification: *G12; G14; G39; G41*

Keywords: *Listed Penny Stocks; Empirical Asset Pricing Models; Nominal Stock Prices; Liquidity; Corporate Governance; Stock Splits; Alpha; Fama-French regressions*

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1 INTRODUCTION

1.1 Background

Equity markets are a very important financial intermediary in any economy. They play an extremely important role in channeling capital from those with savings to those in deficit. Their performance also affects the sentiment of economic agents, including those who are not even actively participating in it. This is why they have been explored so extensively in economics and finance literature. However, most of the literature in this area concerns with large, liquid and frequently traded stocks. At one level this is reasonable as well, given large-cap stocks account for disproportionately high share of market capitalization and trading activity. (For example, in India as of November 2014, BSE 500 – the largest 500 of 5,000+ companies listed on BSE accounted for 94% of the total market capitalization of BSE.) This results in a large number of stocks listed not getting the required attention from an academic perspective. Their lack of coverage might owe to higher uncertainty associated with them due to infrequent trading, or bare minimum compliance of disclosure requirements.

Even within this ignored category are very small capitalization stocks called micro-cap or 'penny-stocks'. Though a formal definition does not exist, US Securities & Exchanges Commission defines a penny stock as the one with <$5 price. As per this definition, 25% of the stocks listed in the US are penny stocks. However, this definition only gives us an anchor point and has to be adjusted according to the context of the research. In India for instance, almost 90% stocks will be considered penny stock as per this definition (with a nominal price of INR64.81 as per USDINR on March 31, 2017). As they have such a large presence on the bourses, it is worth examining whether they represent an unexplored investment opportunity, or they are rightfully ignored. Although the equity markets analyst community might bring up the case of an individual penny stock they perceive to be a good prospect, a more encompassing analysis of this asset class is missing.

Moreover, there is no known tradition of looking at asset classes from the perspective of nominal trading price of a single unit. This is so because the required exposure in an efficient portfolio is taken on the basis of total amount which should be invested in the security. The number of individual units or the price of those units is only an incidental issue. However, to the less sophisticated investors, a low nominal price means a lower maximum loss which could

be incurred on that security. Even, to the more sophisticated investors, if transaction costs are levied on per unit of asset exchanged, then the nominal price becomes an important consideration.

A reasonable question may arise regarding the financial and managerial materiality of studying penny stocks. More so in a top-heavy market like India, where penny stocks constitute just 1.33% share of the market cap. This 1.33% however translates to INR1.6 lakh crore or USD 24.7bn (as per USDINR = 64.81 on March 31, 2017). Compared to this, the AUM of Indian Mutual Fund Industry as on March 31, 2017 (after witnessing a 42% jump in FY17), was ~INR20 lakh crore, or USD 309bn. Therefore, penny stocks as an asset class forms approximately 8% of the Mutual Fund AUM in India. We believe that this is a reasonable size for an asset class or an investment opportunity to be explored.

Moreover, studying small stocks became important from a regulatory point of view after October 2016, when the Indian securities market regulator *Securities & Exchange Board of India* (SEBI) made it mandatory for mutual fund management companies to uniformly classify stocks into large cap, mid cap and small cap to ensure consistency in the security selection universe of schemes run by different asset managers. This adds to the reasonability of studying any class of equities which might not form a significant portion of overall equity markets.

Another reason for which we posit that nominal prices could be important for Indian markets is after a preliminary investigation of data which shows that disproportionate numbers of penny-stocks are in BSE 'Z' category. There is no theoretical reason for low-prices to be associated with poor corporate governance factors, but nonetheless we find this phenomenon present in Indian market as we show later in this paper. Also, stock market related studies in India do warrant some analysis from the ownership point of view. Here as well, on studying the data we find that penny-stocks are more likely to be standalone companies rather than group companies. The inverse relation also holds as we show later in the section documenting characteristics of Indian penny stocks.

1.2 Objective

We explore the nature of Indian Penny Stocks as per a definition ascribed on the basis of nominal price. We document their presence on the Indian stock markets. This documentation includes characteristics relating to trading, returns, ownership and age. Penny stocks pose a risk because of the lower liquidity, negative perception in the market and compliance issues.

We investigate whether they generate enough returns to cover those risks. We use the widely applied Fama-French time-series regressions to achieve this objective. We also explore what effects nominal trading prices have on the performance of stocks in an emerging market like India.

The rest of the thesis is organized as follows. Section 2 reviews the related literature. Section 3 and 4 describe the data and methodology respectively. Section 5 is dedicated to understanding the different characteristics of stocks classified on the basis of nominal trading prices. Section 6 covers summary statistics compiled for the entire data used in the study. Section 7 discusses the asset-pricing regression results. Section 8 summarizes conclusions and Section 9 proposes further areas of research.

2 LITERATURE REVIEW

This study draws from four strands of finance literature. The motivation comes from the very limited literature which explores the nominal prices phenomenon in the equity markets. The second strand which is the investigation of penny stocks in other markets, notably US and Japan. The third strand is the empirical asset pricing literature from where we draw most of our methodological foundations. The fourth and an important aspect of motivation for undertaking this work in the context of India is to document the Indian stocks along the dimensions of nominal prices and firm characteristics.

2.1 Nominal Share Prices

Value-Investing researchers Benjamin Graham and David Dodd in their seminal work published as *Security Analysis* in 1940 described the advantage of low-priced issues as follows, *"Low-priced common stocks appear to possess an inherent arithmetic advantage arising from the fact that they can advance so much more than they can decline."* They also cited a Journal of Business, 1936 paper by Louis Fritzemeier as follows, *"The study was devoted to the period 1926-1935 and revealed a continuous superiority of diversified low-priced issues over diversified, high-priced issues as speculative media"*

Fritzemeier himself favored low-price stocks to achieve speculative gains writing the following, *"(1) Low priced industrial stocks offer greater opportunities for speculative profits than*

high priced industrial stocks; (2) In case two or more issues of industrial stocks seem to offer equal prospective profits, the speculator should purchase the shares selling at the lowest price". Later a debate ensued with Clendenin (1951) and Heins, Allison (1966) countering Fritzemeier and Graham & Dodd's contention. They attributed stock variability to qualitative factors such as investment grade, PE Ratio et al. and found that adjusting for these factors, nominal price did not affect stock price variation.

These studies however contended with each other on the basis of less advanced statistical techniques compared to present, and with limited data owing to computing technology which was in a nascent stage. More recently, Elfakhani and Wei, (2003) found that the high-priced stocks generated more returns than low-priced stocks in Canadian markets during the 1975-1994 period. Weld, Thaler et al. (2009) found that average nominal share price in the US persisted around $35 from 1935-2007. They argued that it was the presence of some unobservable trading norms that enforced this behavior. Firms adhered to the traditions of the market when deciding their nominal price (effectuated through stock splits). However, they find that this norm is prevalent largely in US and not even in other advanced economies like the UK and Japan. This behavior is followed despite considerably increasing the trading costs for institutional investors in US, many of whom pay brokerage on the basis of units of stock traded or per trade.

Baker, Greenwood et al. (2009) proposed and empirically verified a Catering Theory of Nominal Share Prices where they stated that finance managers supplied more low-priced securities through stock splits when low-priced securities are trading at a premium to high-priced securities. They call this behavior *catering* because such corporate actions do not change the fundamental value of the security, but merely seem to conform to some feature for which the investors are currently paying premium. Lakonishok, Shleifer, and Vishny (1992) showed that individual investors hold low-priced stocks more than institutional investors. This according to them suggests some kind of segmentation in the market for investor type and nominal price of the stock. Schultz (2000) presented evidence that splits make a stock more attractive to small investors.

2.2 Penny Stocks

The work relating to listed-penny stocks is still in nascent stage. Liu, Rhee & Zhang (2015) look at the penny stocks returns in US from July 2001 to December 2010 (post-decimalization period). They find that Using CRSP and COMPUSTAT data they compile and quantify the characteristics of penny stocks on NASDAQ, AMEX and NYSE. They find out that penny stocks witness high raw returns, high BM ratio (low price/book ratio), and low liquidity. They also state that 23% of the ownership of listed penny stocks is vested with institutional investors. They also present stylized facts showcasing the stubborn survival of penny stocks despite arguably suffering from neglect from investors which becomes for them the key motivation to study penny-stocks more carefully. They find that while on an average penny stocks do not earn abnormal positive profits in the five-factor asset pricing model framework (which includes the factors of size, book-to-market, momentum, and liquidity). However, penny stocks with high level of institutional ownership do earn abnormally higher return than those without it.

Pavabutr, Rhee, Sirodom & Tian (2014) investigate the nature of Asian penny stocks and benchmark it to NASDAQ penny stocks. They study data for 2007 belonging to following countries in Asia Pacific: Australia, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, Singapore, Taiwan and Thailand. A key finding of this study is that unlike NASDAQ, liquidity does not decline monotonically with price in Asian markets. In other words, liquidity always increases among NASDAQ penny stocks when we move higher up on price quintiles. That is however, not the case with Asian penny stocks.

Another interesting dimension to the literature is the survival and performance of penny stocks listings on bourses. Bradley et al (2006) state, "*IPO researchers routinely screen out lower-priced issues and, as a consequence, penny stock IPOs have been largely ignored in the IPO literature*". Using a sample of 251 penny stock IPOs and 2,707 ordinary IPOs from 1990-1998, they find that higher initial returns for penny stock IPOs are primarily related to their low offer price. Also, in the long-run penny stocks IPOs underperform ordinary IPOs.

2.3 Empirical Asset Pricing Framework

A part of this paper is also derived from very rich literature available on the variation in cross-section of returns. The Efficient Markets Hypothesis (EMH) by Fama (1970) suggests that stock prices reflect all the available information. Therefore, investors should not be able to

generate abnormal returns for a long period of time. Asset pricing models test the EMH, and the test results are a reflection on both the pricing model and the EMH. If nominal prices do not affect the trading in stocks markets, then a portfolio formed on its basis should not generate any abnormal profits or losses in the markets.

Sharpe (1964), Lintner (1965) and Black (1972) proposed that stock returns are explained by the stock's beta (β) that is the stock return's regression coefficient with that of the equity markets. However, Banz (1981) found that market capitalization also explained the variation considerably i.e. small cap stocks outperformed large cap stocks given their β which was a size invariant measure. Bhandari (1988) found that in addition to size and β, leverage explains the return as well. Then there were studies that the ratio of book-value to market value considerably helped in explaining the stock returns (Stattman 1980, Rosenberg et al 1985, chan et al 1991). Basu (1983) identified P/E ratios as another substantial explanatory factor. Fama & French (1992) in their seminal work showed that size and book-to market value combined to capture the cross-sectional variation in average stock returns. Fama & French (1993) showed that stock returns could be well explained using a three-factor model where three factors were market returns, size and book-value. Carhart (1994) added a momentum factor to this as well. Fama & French (2015) added two more factors namely investment and profitability to their model.

2.4 Indian Equity Market Studies

The fourth strand of literature from which this dissertation draws from is the research on application of empirical asset pricing models on Indian markets. The Fama-French methodology has inspired a few studies for India as well. Connor & Sehgal (2001) and Bahl (2006) test the Fama-French model, albeit with limited data. They report their findings to be in consonance with the Fama-French model to some extent. Agarwalla, Jacob and Varma (2013) have compiled a data library for Fama-French factors and Carhart momentum factor for India.

This thesis contributes to the literature by documenting the Indian equity markets from the perspective of nominal stock prices and identifying the characteristics of Indian listed firms along this variable. It also seeks to show that despite the neglect which penny stock category is subject to, it has survived over the last two decades and maintains a significant presence in the markets. Using standard empirical asset pricing models, this thesis makes an attempt to

understand whether Indian penny stocks generate enough returns to compensate for the standard risk factors. It also augments of these standard models to explore other factors which might be significant in explaining penny stock returns.

3 DATA

The data for this paper has been sources from CMIE Prowess database (thereafter referred to as Prowess). We use Prowess for both market data and the accounting data. We use the data starting from April 1996 to March 2017. Data prior to April 1996 has too many missing values for prices and market capitalization, therefore we do not include that in the study period. This gives us 252 months of data.

3.1 Data Cleaning Process

Step 1- At the onset we extract the data for variable 'monthly prices' for the entire BSE/NSE universe of 7,820 stocks. This is the number of stocks to have been ever listed on BSE/NSE according to CMIE Prowess database as on the date of extracting this data. Since this is an end-of-month data, we get 252 trading days for each stock. Not all the stocks trade every day, especially the less liquid ones and those belonging to our interest category – Penny stocks. Therefore, we download the latest available data as on the last trading day of all the months from April 1996 to March 2017. This however creates the problem of carrying along the stocks which have been long delisted in the time series of prices. This is taken care of in the next step of data cleaning process.

Step 2 - Next we remove the entries where the particular share was got delisted before our sample period that is before March 31, 1996, or got listed after our sample period, that is March 31, 2017. This gives us data for 7,519 stocks. Certain stocks, from time to time are also suspended by the stock exchanges for violation of trading norms. On the successful rectification, they are allowed to be traded again. However, after cross-checking from the BSE website, we find that the data relating to the suspension date and resumption date is not of very high quality on Prowess. There are 2,916 such stocks which on Prowess show beginning of suspension period. However, only 200 show ending of suspension date. On cross-checking with BSE website, we find that some of the stocks had resumed trading, but were still showing as

suspended on Prowess. Some had multiple suspension period whereas Prowess only reports the latest beginning of suspension date. Since we work with '*latest available*' prices rather than '*exact*' date prices, our dataset contains the last traded values of these stocks. Considering all this, we include these stocks in a usual manner, allowing our monthly return calculation to assign 0% returns to them. Though it is difficult to quantify how much it affects the average returns of penny stock portfolios, we can be assured that the direction is towards conservative estimation, which is more critical for us to gain confidence about our asset pricing results.

Step 3 - Afterwards, we remove the stocks where there is absolutely no information on prices and end up with data for 7,392 stocks. Following is the number of stocks we have as on each year ending during April 1996 to March 2017. These are the number of total stocks, and not just those which had a positive trading turnover during the year.

Table 1 – Nominal price-wise distribution of all listed stocks at year-end

FY	P<=30	%	30<P <=50	%	50<P <=100	%	100<P <=500	%	P>500	%	Total
1997	4,768	*82.66%*	353	*6.12%*	299	*5.18%*	290	*5.03%*	58	*1.01%*	**5,768**
1998	4,757	*84.52%*	291	*5.17%*	248	*4.41%*	272	*4.83%*	60	*1.07%*	**5,628**
1999	4,759	*84.74%*	262	*4.67%*	245	*4.36%*	270	*4.81%*	80	*1.42%*	**5,616**
2000	4,578	*81.17%*	317	*5.62%*	303	*5.37%*	341	*6.05%*	101	*1.79%*	**5,640**
2001	4,869	*85.38%*	272	*4.77%*	274	*4.80%*	251	*4.40%*	37	*0.65%*	**5,703**
2002	4,887	*85.84%*	253	*4.44%*	241	*4.23%*	278	*4.88%*	34	*0.60%*	**5,693**
2003	4,915	*86.33%*	249	*4.37%*	239	*4.20%*	260	*4.57%*	30	*0.53%*	**5,693**
2004	4,560	*82.01%*	277	*4.98%*	278	*5.00%*	370	*6.65%*	75	*1.35%*	**5,560**
2005	4,098	*74.79%*	348	*6.35%*	387	*7.06%*	533	*9.73%*	113	*2.06%*	**5,479**
2006	3,149	*65.92%*	321	*6.72%*	376	*7.87%*	717	*15.01%*	214	*4.48%*	**4,777**
2007	3,145	*64.82%*	352	*7.25%*	447	*9.21%*	721	*14.86%*	187	*3.85%*	**4,852**
2008	3,074	*62.53%*	411	*8.36%*	500	*10.17%*	702	*14.28%*	229	*4.66%*	**4,916**
2009	3,631	*73.67%*	414	*8.40%*	389	*7.89%*	404	*8.20%*	91	*1.85%*	**4,929**
2010	3,069	*61.95%*	431	*8.70%*	490	*9.89%*	763	*15.40%*	201	*4.06%*	**4,954**
2011	3,104	*61.83%*	451	*8.98%*	517	*10.30%*	758	*15.10%*	190	*3.78%*	**5,020**
012	3,316	*65.60%*	421	*8.33%*	490	*9.69%*	652	*12.90%*	176	*3.48%*	**5,055**
2013	3,474	*68.31%*	413	*8.12%*	439	*8.63%*	594	*11.68%*	166	*3.26%*	**5,086**
2014	3,536	*68.67%*	359	*6.97%*	433	*8.41%*	626	*12.16%*	195	*3.79%*	**5,149**
2015	3,413	*64.57%*	405	*7.66%*	429	*8.12%*	722	*13.66%*	317	*6.00%*	**5,286**
2016	3,493	*64.07%*	437	*8.02%*	483	*8.86%*	736	*13.50%*	303	*5.56%*	**5,452**
2017	3,357	*60.56%*	439	*7.92%*	526	*9.49%*	826	*14.90%*	395	*7.13%*	**5,543**

Source: Prowess Data, Author's Calculations

Step 4 - Next we generate the monthly stock returns, using the closing adjusted prices as given by CMIE Prowess. We restrict the returns for top and bottom 1%ile of values. This gave us a benchmark of restricting these values where returns either exceeded 88.3% or fell short of 43% (below negative 43%). This is except for those entries where stocks delisting due to distress are ascribed -100% returns to correct for survivorship bias.

Restricting excess returns observations is a standard practice for cleaning the data in studies relating to analysis of asset returns. We notice that the mean returns for penny-stocks are drastically affected as a result of this step. However, we still restrict the data because a few non-penny stocks also exhibit such extreme returns. We also run the data after excluding the '*zero*' returns days on restricted sample. Zero returns are the days when a given stock did not trade. Since, we use the latest data available as on the month end, the stock in question would not have traded during the entire month. Following are the equally-weighted monthly returns for April 1996 – March 2017

Table 2 - Summary Statistics of monthly stock returns

Monthly stock returns					
Variable	**Observations**	**EW Mean(%)**	**Std. Dev.(%)**	**Min(%)**	**Max(%)**
Monthly returns (Full sample)	1,315,382	2.6433	120.72	(-100.0)	89,900.0
Monthly returns (Restricted sample, adjusted for survivorship bias)	1,315,382	1.2124	18.12	(-100.0)	88.3
Monthly returns (Restricted sample - excluding '0' returns, adjusted for survivorship bias)	744,527	2.1421	24.05	(-100.0)	88.3

Source: Prowess Data; Author's Calculations

For the purpose of asset-pricing regressions, we use the 'restricted sample' observations.

3.2 Variable Definitions

i. **Closing Prices -** as defined above, end of the month closing prices of a single share of a company

ii. **Market Capitalization –** end of the month, market capitalization of a stock i.e closing price *x* shares outstanding. We download market capitalization directly.

iii. **Turnover –** Turnover is the total traded value of shares for a given duration. For each trade, turnover is the *"price x number of shares traded"*. This data is available on a daily basis. Thus for a given day, turnover is the sum total of traded value of the stocks across all the trades executed in a day. We download daily turnover from Prowess and sum it over each month to calculate the monthly turnover.

iv. **Liquidity** – We calculate the ratio of monthly turnover to the end of month market capitalization. We call this as "trade-ratio" and use it as a proxy for liquidity. The higher the trade ratio, the more liquid a stock is considered to be.

v. **BSE Group Code –** BSE classifies the equity shares in the categories "A", "B", "T" and "Z". We get this data for 3,616 stocks. Category A and B are considered as companies complying with the trading norms (thereafter called good governance stocks), and category T and Z are companies not in compliance with the trading norms (thereafter called bad governance stocks). We use this data for the construction of regression factor quantifying corporate governance risk. Distribution of number of stocks in a price category and BSE-group is given in the following table.

Table 3 - BSE Group and Nominal Price Categories (as on FY2017)

BSE Group	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
A	13	17	41	127	116	**314**
B	463	146	256	501	206	**1,572**
T	175	19	17	16	5	**232**
Z	1,379	24	28	31	0	**1,462**
Total	**2,030**	**206**	**342**	**675**	**327**	**3,580**
chi-square stat	1.9+e3***					

Source: Prowess data

3.3 Fama-French Factors Construction Methodology

The Fama–French (hereafter known as FF) 3-factors and the Carhart momentum factor has been sourced from IIM-A data library. Nonetheless, we discuss the methodology used by the authors to better understand the interpretation of these factors. Thereafter, we discuss the methodology for our own FF risk factors related to Liquidity and Corporate Governance. The following section draws heavily from *Fama-French (1993)* and *Agarwalla, Jacob & Varma, 2014*.

For the entire exercise of construction FF factors, the authors divide the market across two dimensions: size (proxied by market-cap) and book-to-market (hereafter referred to as B/M) ratio. Fama-French (1993) divided the US market into large and small-cap based on the median market value as a break-point. However, for Indian market, this is not appropriate as a disproportionate share of market-cap is concentrated at the top end. Therefore, the cut-off for

Indian market is at 90%ile. Stocks greater (smaller) than 90%ile market cap are called "big" ("small") stocks denoted as "B" ("S").

On the B/M dimension, market is divided into B/M is the ratio of book value of equity to market-cap. The break-points here are at 30%ile and 70%ile. A high B/M (>70%ile of B/M) means "Value" stocks (denoted by "V") whereas a low B/M (<30%ile) means a "Growth" stock (denoted by "G"). The middle(30-70%ile) ones are called "Neutral" stocks (denoted by "N"). The rationale for this attribution is as follows: ceteris paribus, if the actual invested equity of the company is high (low) compared to market value, then the expected profits to be generated from each unit of capital are lower (higher). Such stocks are therefore expected to witness less (more) growth and are called "Value" ("Growth") stocks. Another paradigm to understand this is for value (growth) stocks, historically invested capital is more (less) important for generating returns, whereas future profits are less (more) important for generating returns. Thus the market segmentation looks as follows:

		B/M		
		Value (V)	**Neutral (N)**	**Growth (G)**
Size	**Big (B)**	BV	BN	BG
	Small (S)	SV	SN	SG

The following variable definition shows us the importance of this 'orthogonalization' of return factors using size metric.

SMB – Small minus Big is the portfolio which accounts for the excess returns generated by small-cap stocks over large-cap stocks. This is calculated as follows: *SMB = 1/3 (Small Value + Small Neutral + Small Growth) - 1/3 (Big Value + Big Neutral + Big Growth)*. This calculation is done to capture as close as possible, the effect of only size on the stock returns. To quote Fama-French on this calculation - *"The SMB is the difference between the returns on small- and big-stock portfolios with about the same weighted-average book-to-market equity. This difference should be largely free of the influence of BE/ME, focusing instead on the different return behaviors of small and big stocks."*

VMG – is the excess returns generated by "value" stocks over "growth" stocks. This is the same as standard HML term which means high minus low. This is calculated as follows: *VMG = 1/2 (Small Value + Big Value) - 1/2 (Small Growth + Big Growth)*. Similar to *SMB,* this

calculation is done to capture as close as possible, the effect of only B/M on the stock returns. To quote Fama-French on this calculation - *"The two components of HML are returns on high- and low-BE/ME portfolios with about the same weighted-average size. Thus the difference between the two returns should be largely free of the size factor in returns, focusing instead on the different return behaviors of high- and low-BE/ME firms."*

WML - is the excess return generated by past "winners" ("W") over past "losers" ("L"). This momentum factor is credited to Carhart (1997) who posits that stock prices tend to follow a momentum. That is, they continue to rise if they have witnessed a rise in past time period, and continue to fall if they have witnessed a fall in past time periods. This is calculated for Indian market as: *WML = 1/2 (Small Winners +Big Winners) - 1/2 (Small Losers+ Big Losers)*. Here as well, winners and loser effects are being captured while reducing the influence of size. All the FF portfolio returns are value-weighted returns with market caps used as weights.

We now discuss the factors constructed by us specifically for this paper. Here we also introduce the stock screening and filtering criteria employed by us throughout this paper before generating returns, and sorting stocks into portfolios. We construct FF factors for corporate governance and liquidity because Fama-French regressions warrant that the regressors should be the 'difference between returns generated by two portfolios'.

Fama-French Liquidity Factor (FF_Liquidity) – We construct a FF liquidity factor in keeping with the spirit of Rhee et al. (2013) who find that excess returns generated on penny-stocks vanish when accounted for liquidity. They construct liquidity factor by dividing the market in to quintiles of liquidity, and taking the excess returns generated by least liquid portfolio over the most liquid portfolio. However, we adopt a different approach for the construction of this factor. In the beginning of each year, we sort the stocks into quartiles according to the trading ratio (defined in Section 3 - Data). We retain the quartiles for these stocks for the entire year. Quartiles 1 and 2 (lower quartiles) are considered less liquid, and quartiles 3 and 4 (higher quartiles) are considered more liquid. We orthogonalize the more liquid and less liquid of quartiles with the size factor, and calculate the FF-liquidity factor as follows: *FF-Liquidity = 1/2 (Small, less liquid +Big, less liquid) - 1/2 (Small, more liquid + Big, more liquid)*.

Fama-French Corporate Governance Factor(FF_BMG)– We construct a FF Corporate Governance factor considering that we are doing the entire analysis in the context of an

emerging market country like India, where corporate governance factors are likely to play an important role in explaining market returns. Though, quantifying a company on corporate governance is a very expansive exercise, we consider the BSE Group as a proxy for corporate governance practices. As discussed earlier, category A and B are considered as "good corporate governance stocks" ("G"), and category T and Z considered as "bad corporate governance stocks" ("B"). An issue with this data is that it is available only for the latest time period. Therefore, we are compelled to retain this classification is the entire study period for every stock. While, this time-invariance goes against the spirit of Fama-French factor creation, we find that BSE Groups do not change that much frequently. Again, we orthogonalize the "B" & "G" stocks with the size factor, and calculate the FF_BMG factor as follows: *FF_BMG = 1/2 (Small B + Big B) - 1/2 (Small G + Big G)*.

The regressions involving corporate governance factors which are discussed later, include a more limited data set as BSE categorization is available for only 3,616 stocks. While, we acknowledge that this categorization of corporate governance quality on the basis of mere BSE categorization is rather too simplistic, we do this as to the best of our knowledge, any corporate governance ranking of this much large list of companies is missing for India. Another limitation of using this factor is that Prowess database gives us only static categorization, that is the latest data. This takes away the element of time-variance which would be better for running Fama French regressions. However, this concern is mitigated to some extent as BSE categorization does not fluctuate frequently.

4 METHODOLOGY

4.1 Penny Stock Classification

We define a stock as a penny stock if it's previous month closing price is less than INR30. We classify low price non-penny's stocks as those priced between 30 and 50. Other categories are defined as 50-100, 100-500 and 500+.These thresholds are set in order to retain an essential character of penny stocks that the maximum possible loss is a small amount. In US, SEC defines a penny stock as a stock with P<=$5[1]. However, no such definition has been set in

[1] https://www.sec.gov/fast-answers/answerspennyhtm.html

India. Singhal & Tayal (2015) for their study of nominal price effect use relative benchmarks by dividing stocks in quantiles. However, in our dataset, as summarized in Table 1, if we divide the stocks in quantiles, a substantial discrimination would be lost as ~60-80% stocks currently falling under penny category would then be distributed across different quantiles. Likewise, other price-categories worth discriminating would get clubbed together under same categories. Hence, we retain the spirit of Rhee et al. (2013) and put absolute benchmarks for classification of stocks. We later carry out some robustness checks by changing the penny threshold and find that our initial results are retained.

At the close of each month, we categorize stocks into these classes and sort them in five portfolios. We hold this portfolio for one month, record monthly returns for these portfolios. At the end of the next month, again the stocks are sorted into different portfolios and this process is repeated for all the 252 financial months which comprise of our study period. The returns for each stock are calculated using the end of month closing adjusted prices. This is because we consider historical unadjusted traded price for this study, which is a little unconventional as normally, adjusted prices are taken into consideration for calculating time-series of returns. However, if we consider adjusted trading price, it will historically adjust the prices for any kinds of stock-splits and reverse-splits. In our filtered sample of 7,392 stocks, 1,440 had done a stock split during the study period. This would mean that we cannot form portfolios on the basis of nominal prices as prevalent on the date of portfolio formation.

After calculating the individual stock returns, we filter the data further by restricting observations where monthly returns either exceed 88.3% or fall short of -43%. This winsorization is done to restrict the extreme 1% values which is a standard practice in these kind of studies. Following this we adjust for survivorship bias. During the time period considered from FY1996-FY2017, 2,061 companies were delisted from our sample. Following two treatments are given to these companies

1 From the entire sample, 514 companies were merged. The return for a company which was merged is taken as usual for the respective month as the shareholders would have received the prevailing price. Obviously, these companies are removed for the portfolio construction over the following months.
2 Next we identified companies which were distressed at the time of delisting. This is done by calculating the ratio of their closing price to face value. Using Aggarwala et al. (2013),

we put a threshold of 0.5 on this ratio to classify companies as distressed. We find 1,013 such companies. 29 out of these companies were merged and their returns were kept as usual as in Step 1. For the other companies, we make an assumption of them going out of business and assign -100% return for the next month. This assumption is conservative because the company might have sought a voluntary delisting with promoters buying out the public stake at depressed stock prices, in which case returns would have been greater than -100%.

4.2 Portfolio formation

Next we calculate the monthly returns for each portfolio. This is done by taking the simple average of monthly returns of stocks belonging to the respective portfolio. This process generates returns which are henceforth called *"equally-weighted one-month formation, one-month holding period"* returns. This process can be modified in two ways. First is by taking value-weighted returns which take the portfolio returns as the weighted average of stock returns with the market value of the company as weights. The other method is to construct the portfolio and hold it for different durations like 1-month, 3-months, 6-months and so on. At last we subtract the risk-free rate prevalent for the given month from the portfolio returns to calculate the 'excess returns' generated by the portfolio. We subtract the risk free-rate because otherwise it would get included in the intercept term.

4.3 Regression equations

The time-series of these excess returns obtained from this process become our dependent variable which are then regressed against other FF factors.

We estimate the following regression equations. These are all OLS time-series regressions.

1) CAPM model
2) FF model
3) Carhart four-factor
4) Carhart four factor + corporate governance
5) Carhart four factor + corporate governance + Liquidity.

5 CHARACTERISTICS OF PENNY STOCKS

5.1 Return Characteristics

In this section we look at the return generated by penny stocks over the years.

Table 4 - EW 1-month holding period returns

i) Raw returns for the entire sample

Price range	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
P<= 30	*251*	*3.2201*	*6.6504*	*-11.0486*	*39.5707*
30<P<=50	*251*	*1.4548*	*7.9435*	*-24.9996*	*35.8012*
50<P<=100	*251*	*1.5783*	*8.2611*	*-28.7275*	*41.7466*
100<P<=500	*251*	*1.5049*	*7.4412*	*-28.3592*	*35.4096*
P>500	*251*	*1.5425*	*7.0724*	*-25.0675*	*24.6700*

ii) Raw returns –restricted at top and bottom 1%ile

Price range	Obs	Mean	Std. Dev.	Min	Max
P<= 30	251	1.2332	4.8597	-11.4078	21.2134
30<P<=50	251	1.2123	7.6342	-23.9855	34.8170
50<P<=100	251	1.4518	8.0313	-26.8974	40.4230
100<P<=500	251	1.4848	7.2902	-25.9658	34.1191
P>500	251	1.5207	6.9141	-23.94318	24.5140

iii) Raw returns - restrictedat top and bottom 1%ile (excluding '0' returns)

Price range	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
P<= 30	*251*	*2.5359*	*11.0014*	*-22.8626*	*54.0866*
30<P<=50	*251*	*0.9497*	*9.6039*	*-28.5999*	*40.2044*
50<P<=100	*251*	*1.1353*	*9.5660*	*-30.4332*	*44.7432*
100<P<=500	*251*	*1.1085*	*8.2998*	*-28.8990*	*37.6451*
P>500	*251*	*1.0364*	*7.4584*	*-25.9795*	*25.7743*

Source: Prowess data, Author's calculations

Above table shows equally-weighted monthly returns generated by monthly constructed portfolios of different nominal pricing categories. The second section of this table exhibits data has been restricted at bottom and top 1 percentile. We observe that penny category generates least returns, and there is an almost monotonic relationship between higher categories and the returns. However, this relationship is completely reversed when we look at the unrestricted data where penny stocks generate the maximum returns. This shows us that the tail activity in penny stocks is very volatile. The last section of the table considers only those stocks which traded during a given year. Penny stocks often remain untraded because of

various reasons including exchange imposed penalties or suspension period. However, with this data as well, we see that they generate maximum returns.

5.2 Trading Characteristics

We analyze the trading characteristics of penny stocks using different criteria.

Table 5 - Annual Turnover (INRbn and respective %)

FY	P<=30	% share	30<P<=50	% share	50<P=100	% share	100<P<=500	% share	P>500	% share	Total
1997	47	*1.1%*	30	*0.7%*	89	*2.2%*	3,770	*91.8%*	170	*4.1%*	4,106
1998	38	*0.7%*	60	*1.1%*	122	*2.1%*	3,181	*55.4%*	2,344	*40.8%*	5,745
1999	85	*1.2%*	96	*1.3%*	161	*2.2%*	2,489	*34.5%*	4,385	*60.8%*	7,217
2000	122	*0.8%*	129	*0.9%*	407	*2.7%*	4,041	*26.9%*	10,300	*68.7%*	14,999
2001	222	*1.0%*	300	*1.3%*	3,661	*16.4%*	13,700	*61.5%*	4,398	*19.7%*	22,280
2002	129	*1.6%*	213	*2.7%*	586	*7.3%*	4,374	*54.5%*	2,719	*33.9%*	8,021
2003	427	*4.6%*	120	*1.3%*	1,315	*14.2%*	4,663	*50.2%*	2,766	*29.8%*	9,291
2004	471	*3.0%*	693	*4.4%*	828	*5.2%*	8,454	*53.0%*	5,491	*34.5%*	15,938
2005	506	*3.1%*	498	*3.0%*	1,773	*10.8%*	8,212	*50.1%*	5,398	*32.9%*	16,387
2006	625	*2.7%*	638	*2.8%*	1,807	*7.9%*	8,525	*37.4%*	11,200	*49.1%*	22,796
2007	483	*1.7%*	867	*3.1%*	1,834	*6.5%*	12,800	*45.3%*	12,300	*43.5%*	28,284
2008	1,114	*2.2%*	3,181	*6.3%*	5,304	*10.5%*	18,000	*35.8%*	22,700	*45.1%*	50,299
2009	2,144	*5.7%*	3,946	*10.4%*	6,237	*16.4%*	13,100	*34.5%*	12,500	*33.0%*	37,927
2010	947	*1.7%*	1,744	*3.2%*	7,759	*14.2%*	20,400	*37.3%*	23,800	*43.6%*	54,650
2011	1,582	*3.4%*	2,448	*5.3%*	4,744	*10.3%*	18,800	*41.0%*	18,300	*39.9%*	45,874
2012	1,458	*4.3%*	969	*2.9%*	3,938	*11.6%*	14,200	*41.9%*	13,300	*39.3%*	33,864
2013	1,897	*6.0%*	1,243	*3.9%*	3,534	*11.1%*	12,100	*38.0%*	13,100	*41.1%*	31,874
2014	925	*2.9%*	302	*0.9%*	2,479	*7.6%*	13,400	*41.4%*	15,300	*47.2%*	32,405
2015	2,206	*4.4%*	1,059	*2.1%*	3,318	*6.7%*	22,500	*45.2%*	20,700	*41.6%*	49,782
2016	1,273	*2.6%*	1,800	*3.7%*	4,369	*9.1%*	18,000	*37.4%*	22,700	*47.2%*	48,142
2017	1,064	*1.8%*	1,159	*2.0%*	4,143	*7.1%*	23,900	*40.8%*	28,300	*48.3%*	58,567
CAGR	**16.9%**		**20.1%**		**21.2%**		**9.7%**		**29.1%**		**14.2%**

It can be seen that the penny stock category, has witnessed a turnover increase at almost the same rate as that of overall market even as the share of their turnover in the total market remains a low 1.8%. Overall, the trading activity in Indian markets is heavily loaded in favor of high-priced stocks.

Next we look at the trading-ratio, which we define as the total turnover in fiscal year as a ratio of the market capitalization at year-end (Baker, Stein, 2004). The turnover is the combined turnover at BSE and NSE for all the stocks. This data is also the source for our *ff_liquidity* factor.

Table 6 - Trading ratios(%)((Annual turnover / Year - end market cap)*100)

FY	P<=30	30<P<=50	50<P=100	100<P<=500	P>500
1997	4.0	9.1	13.1	12.6	6.7
1998	2.6	9.6	12.8	23.2	16.8
1999	2.5	14.4	15.3	36.0	50.3
2000	5.7	22.8	28.2	48.0	62.0
2001	3.8	26.1	23.4	36.2	59.2
2002	1.9	14.8	20.4	25.4	58.2
2003	5.7	27.8	30.4	29.9	36.4
2004	7.8	42.6	53.4	54.1	53.3
2005	7.9	43.2	63.8	58.2	36.4
2006	13.2	51.5	68.3	77.1	45.2
2007	7.9	41.6	58.8	63.2	54.1
2008	12.4	54.6	67.6	68.9	59.8
2009	13.3	39.6	49.7	37.8	42.2
2010	8.2	32.2	52.8	59.3	49.0
2011	12.8	48.6	63.3	66.9	41.2
2012	8.1	24.4	37.3	37.1	34.1
2013	9.9	22.0	38.0	37.1	35.3
2014	5.4	13.1	25.4	29.0	32.0
2015	8.4	31.5	42.6	49.2	35.8
2016	7.0	30.1	47.9	48.3	39.2
2017	9.4	33.7	56.2	60.9	49.3
Average	**7.5**	**30.2**	**41.4**	**45.7**	**42.7**

Source: Prowess Data, Author's calculations

In line with our expectations, low-priced stocks have a much lower trading ratio compared to other categories. This confirms that these stocks have less liquidity compared to high-priced categories. Next we look at the number of days, for which stocks belonging to different categories traded in a given year. Here we observe that penny-stocks trade for much fewer days in a year. Typically, empirical asset pricing literature excludes stocks which do not trade for more than 50 days in a year. This shows us why penny-stocks remain unexplored. Also, we see an almost monotonic relation between the stock price and trading days. As we go higher up the prices, more is the trading frequency.

Table 7 - Trading days per year

FY	Total trading days	P<=30	30<P<=50	50<P=100	100<P<=500	P>500
1997	252	70	136	149	167	171
1998	247	37	120	125	158	177
1999	250	31	113	125	164	212
2000	254	51	135	144	176	214
2001	251	38	120	131	158	189
2002	247	26	116	124	157	203
2003	251	39	122	146	165	177
2004	254	46	153	168	199	221
2005	253	48	172	189	208	221
2006	251	81	186	204	216	232
2007	249	73	182	203	213	220
2008	251	82	194	209	218	223
2009	243	84	176	195	192	203
2010	244	76	172	202	211	226
2011	254	93	192	208	223	231
2012	249	83	170	197	213	226
2013	249	83	164	189	209	217
2014	251	60	141	174	202	216
2015	243	74	166	179	210	227
2016	247	61	164	186	209	225
2017	248	54	155	192	213	234

Source: Prowess Data, Author's calculations

Next we look at the market cap statistics. We see that penny stocks market capitalization has grown much slower compared to the overall average growth witnessed by the Indian equities market. From 12% in 1997, penny stocks command only 1% of the share of total market cap. However, they form 59% in terms of number of listed companies.

Table 8 - FY ending market cap (INR bn)

FY	P<=30	% share	30<P<=50	% share	50<P=100	% share	100<P<=500	% share	P>500	% share	Total
1997	522	*12.2%*	311	*7.3%*	385	*9.0%*	2,142	*50.1%*	913	*21.4%*	**4,274**
1998	528	*10.6%*	211	*4.2%*	422	*8.5%*	2,375	*47.6%*	1,449	*29.1%*	**4,985**
1999	548	*11.1%*	170	*3.4%*	326	*6.6%*	1,700	*34.4%*	2,202	*44.5%*	**4,945**
2000	516	*5.4%*	216	*2.3%*	723	*7.6%*	2,541	*26.7%*	5,508	*58.0%*	**9,505**
2001	505	*8.9%*	443	*7.8%*	529	*9.3%*	2,920	*51.3%*	1,296	*22.8%*	**5,692**
2002	641	*10.4%*	298	*4.8%*	507	*8.2%*	3,312	*53.6%*	1,427	*23.1%*	**6,185**
2003	772	*12.9%*	188	*3.1%*	626	*10.4%*	3,262	*54.4%*	1,147	*19.1%*	**5,996**
2004	495	*4.1%*	415	*3.4%*	746	*6.1%*	5,100	*41.8%*	5,428	*44.5%*	**12,200**
2005	549	*3.2%*	517	*3.0%*	1,958	*11.3%*	6,692	*38.7%*	7,551	*43.6%*	**17,300**
2006	559	*1.8%*	665	*2.2%*	1,526	*5.0%*	10,700	*35.0%*	17,100	*55.9%*	**30,600**
2007	613	*1.7%*	802	*2.2%*	2,136	*6.0%*	13,800	*38.4%*	18,600	*51.8%*	**35,900**

2008	613	*1.2%*	956	*1.8%*	2,468	*4.8%*	19,200	*37.0%*	28,700	*55.3%*	**51,900**
2009	1,017	*3.3%*	1,240	*4.0%*	3,783	*12.2%*	11,900	*38.5%*	13,000	*42.1%*	**30,900**
2010	758	*1.2%*	1,250	*2.0%*	3,430	*5.5%*	24,500	*39.1%*	32,700	*52.2%*	**62,600**
2011	1,477	*2.1%*	1,413	*2.0%*	3,728	*5.4%*	32,500	*47.1%*	29,800	*43.2%*	**69,000**
2012	1,664	*2.7%*	1,205	*1.9%*	4,348	*6.9%*	29,700	*47.4%*	25,700	*41.1%*	**62,600**
2013	2,079	*3.2%*	1,126	*1.8%*	4,295	*6.7%*	28,900	*45.1%*	27,700	*43.2%*	**64,100**
2014	2,027	*2.7%*	1,166	*1.6%*	4,150	*5.5%*	30,100	*40.1%*	37,600	*50.1%*	**75,100**
2015	1,908	*1.9%*	1,464	*1.4%*	3,504	*3.4%*	38,100	*37.4%*	56,800	*55.7%*	**102,000**
2016	1,985	*2.1%*	2,302	*2.4%*	4,512	*4.7%*	35,100	*36.4%*	52,400	*54.4%*	**96,300**
2017	1,621	*1.3%*	2,060	*1.7%*	4,694	*3.9%*	47,900	*39.6%*	65,200	*53.9%*	**121,000**
CAGR	**5.8%**		**9.9%**		**13.3%**		**16.8%**		**23.8%**		**18.2%**

5.3 Ownership Characteristics

We divide the entire sample according to ownership type. CMIE Prowess gives us following ten broad categories of ownership, which we re-classify into six categories.

Table 9 - Ownership categories

Prowess Ownership Code	Owner Types	Our Classification
10101	Central Govt. - Commercial Enterprises	PSU
10201	State Govt. - Commercial Enterprises	PSU
10203	State Govt. - Statutory Bodies	PSU
20101	Torrent Group	Indian Group
20102	Private (Indian)	Private Indian
20201	Asea Brown Boveri (F) Group	Foreign Group
20202	Private (Foreign)	Private Foreign
20400	Joint Sector	Joint Sector
20401	Central and Private sector	Joint Sector
20402	State and Private sector	Joint Sector

For each year we construct a two-way tabulation of these ownership categories and nominal price classes. For each year, we perform a simple chi-square test of degree of association, and are sufficiently able to reject null hypothesis of independence. Thereafter, we remove other categories of ownership and only consider 'Indian Group' and 'Private Indian' which are our categories of interest because both Government owned and foreign-owned stocks do not reflect the behavior of Indian promoter groups. Again for each year we construct the two-way tables and carry out chi-square test and get the same results. For 'Indian Group' ownership type firms, we find that observed frequencies are smaller compared to expected

frequencies in the penny-stock category, in all the years. Similarly, for 'Private Indian' category we find that observed frequencies are higher than expected frequencies for all the years. Therefore, we find a significant association between the ownership type of Indian promoter owned stocks and whether they belong to penny category or not. The tables showing the year-wise tabulation and chi-square statistics are produced as an appendix.

5.4 Age Characteristics

We define the age of the stock as the *FY-Incorporation year*. Because there is a strong association between nominal price and market values, in the cross-section of the stocks, we do this to figure out whether such a heavy presence of penny stocks is because of new stocks getting listed in the market. Following are the age characteristics of the stocks over the years.

Table 10 - Firm age (years) of different nominal price categories over the years

FY	P<=30	30<P<=50	50<P=100	100<P<=500	P>500
1997	12.2	24.9	28.1	35.0	45.0
1998	13.6	26.2	29.6	36.3	42.1
1999	14.9	27.8	29.4	32.9	38.8
2000	16.0	26.3	27.8	30.3	29.9
2001	17.0	28.8	28.7	34.9	43.3
2002	18.1	28.4	31.3	35.0	42.2
2003	19.1	29.8	34.2	37.0	48.0
2004	19.3	29.1	34.5	37.1	46.1
2005	19.9	27.2	30.9	36.8	42.9
2006	20.6	26.7	29.8	32.6	43.6
2007	21.5	29.5	29.3	33.5	39.4
2008	22.5	27.7	29.3	33.7	37.9
2009	24.0	31.6	30.6	40.3	41.8
2010	24.4	27.4	29.8	35.4	43.3
2011	25.2	29.3	31.3	35.1	46.8
2012	26.2	30.6	32.8	36.5	48.3
2013	27.1	31.3	35.3	37.8	47.6
2014	28.1	32.4	36.0	37.6	45.0
2015	28.8	32.1	35.9	36.4	43.8
2016	29.6	32.2	37.4	36.1	44.0
2017	30.3	31.5	35.9	36.7	44.0

Source: Prowess data, Author's calculations

We find that the age of highest priced stocks has stayed around the same level from 1997 to 2017. However, as we move to lower priced stocks, the age keeps increasing alongside the time frame. For penny-stocks, the age has increased by 18 years, almost equal to the 21 years

which form our sample. There could be many reasons for it which can be explored. The last two categories have much more interval-width for the stocks to move and still stay in the same category. However, in the first three categories, for stocks to keep advancing in age and stay in the same price category is an interesting observation. It could be the case that the companies in this category were incorporated earlier and made stock market debuts after more time had elapsed since incorporation. We also find that for almost all the years, there is an increasingly monotonic relation between the age of the stock and nominal price category.

6 SUMMARY STATISTICS

Table 11–Excess returns, Fama-French Factors and factor-wise correlations

Excess returns (Over Risk free rate) –restricted at top and bottom 1%ile					
Price range	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
P<= 30	251	0.6675	4.8843	-12.3433	20.6669
30<P<=50	251	0.6466	7.6649	-24.6237	34.5610
50<P<=100	251	0.8861	8.0619	-23.5356	40.1670
100<P<=500	251	0.9190	7.3173	-26.6039	33.8631
P>500	251	0.9550	6.9376	-24.5813	24.2580
Fama-French Factors					
Price range	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
rmrf	251	0.7958	7.7585	-28.5968	35.4324
smb	251	0.2453	5.1412	-15.0991	18.9740
vmg	251	1.0636	6.9089	-14.6452	32.5991
wml	251	1.7187	7.7846	-25.8240	34.1631
ff_bmg	251	-1.1121	5.0332	-19.8383	15.1192
ff_liquidity	251	-0.1307	4.2384	-21.5150	11.078

Correlations	**rmrf**	**smb**	**vmg**	**wml**	**ff_bmg**	**ff_liquidity**
rmrf	1.0000					
smb	0.1324	1.0000				
vmg	0.2533	0.3602	1.0000			
wml	-0.1539	-0.0396	-0.1838	1.0000		
ff_bmg	-0.2561	0.1970	0.1039	0.0071	1.0000	
ff_liquidity	-0.2888	-0.1542	0.1371	-0.0710	-0.0038	1.0000

Source: Prowess data, Author's calculations

The previous section discusses the returns characteristics of penny vs non-penny stocks. In this section therefore, we only present the data which has been used to run the asset pricing regressions. We consider excess returns for all portfolios, that is *portfolio return – risk free return*. The statistics remain the same as earlier with penny-stocks generating the least returns for therestricted-sample. The corporate governance factor and liquidity factor give an average negative value, unlike the standard FF and momentum factors. However, we still use these factors are FF factors warrant subtracting the returns generated by less risky asset from those generated by the riskier asset. Bad corporate governance stocks are riskier compared to good corporate governance ones, so are the less liquid compared to more liquid. Like all the other FF factors, *ff_liquidity* and *ff_bmg* are also value-weighted.

We note earlier in this paper, very high level of intersection between penny-stocks and BSE 'Z' category. Of the 1,462 BSE 'Z' category stocks, 1,379 are also in penny category as of FY2017. This might make *ff_bmg* almost the same as returns generated on penny category *minus* returns generated on good governance stocks. However, we find that the correlation between excess returns on 'P<=30' stocks and *ff_bmg* category is only 0.0906, and it is not significant at 10% level. Therefore, we proceed with the asset pricing regressions.

7 ASSET PRICING REGRESSION RESULT

Table 12 - Regression Results

P<=30	Model 1	Model 2	Model 3	Model 4	Model 5
rmrf	0.409***	0.317***	0.313***	0.335***	0.337***
	(0.0350)	(0.0222)	(0.0222)	(0.0234)	(0.0228)
smb		0.390***	0.392***	0.370***	0.371***
		(0.0333)	(0.0344)	(0.0324)	(0.0308)
vmg		0.253***	0.246***	0.237***	0.236***
		(0.0240)	(0.0230)	(0.0235)	(0.0230)
wml			-0.0415	-0.0406*	-0.0403*
			(0.0271)	(0.0239)	(0.0232)
ff_bmg				0.112***	0.113***
				(0.0335)	(0.0326)
ff_liquidity					0.00642
					(0.0456)
Constant	0.342	0.0497	0.133	0.253**	0.254**
	(0.2220)	(0.1310)	(0.1260)	(0.1280)	(0.1280)
R-squared	0.422	0.803	0.807	0.819	0.819

30<P<=50	Model 1	Model 2	Model 3	Model 4	Model 5
rmrf	0.794***	0.681***	0.669***	0.690***	0.708***
	(0.0445)	(0.0309)	(0.0272)	(0.0282)	(0.0294)
smb		0.513***	0.518***	0.498***	0.513***
		(0.0448)	(0.0392)	(0.0403)	(0.0402)
vmg		0.302***	0.283***	0.275***	0.259***
		(0.0379)	(0.0363)	(0.0370)	(0.0373)
wml			-0.101***	-0.0998***	-0.0959***
			(0.0261)	(0.0276)	(0.0256)
ff_bmg				0.102***	0.109***
				(0.0376)	(0.0353)
ff_liquidity					0.0889*
					(0.0484)
Constant	0.0145	-0.342**	-0.141	-0.0316	-0.0198
	(0.2770)	(0.1500)	(0.1510)	(0.1590)	(0.1580)
R-squared	0.646	0.893	0.903	0.907	0.909

50<P<=100	Model 1	Model 2	Model 3	Model 4	Model 5
rmrf	0.867***	0.763***	0.751***	0.768***	0.791***
	(0.0474)	(0.0362)	(0.0309)	(0.0335)	(0.0337)
smb		0.493***	0.498***	0.481***	0.500***
		(0.0454)	(0.0400)	(0.0411)	(0.0411)
vmg		0.271***	0.250***	0.243***	0.223***
		(0.0364)	(0.0349)	(0.0355)	(0.0354)
wml			-0.109***	-0.108***	-0.103***
			(0.0302)	(0.0317)	(0.0287)
ff_bmg				0.0876*	0.0962**
				(0.0457)	(0.0425)
ff_liquidity					0.112**
					(0.0515)
Constant	0.196	-0.13	0.0873	0.181	0.196
	(0.2700)	(0.1590)	(0.1640)	(0.1690)	(0.1660)
R-squared	0.697	0.892	0.902	0.905	0.908

100<P<=500	Model 1	Model 2	Model 3	Model 4	Model 5
rmrf	0.849***	0.788***	0.783***	0.789***	0.800***
	(0.0305)	(0.0226)	(0.0225)	(0.0280)	(0.0262)
smb		0.356***	0.359***	0.353***	0.362***
		(0.0361)	(0.0334)	(0.0330)	(0.0318)
vmg		0.133***	0.125***	0.123***	0.112***
		(0.0277)	(0.0261)	(0.0269)	(0.0266)
wml			-0.0444	-0.0441	-0.0416
			(0.0279)	(0.0290)	(0.0271)
ff_bmg				0.0307	0.0349
				(0.0475)	(0.0447)
ff_liquidity					0.0557
					(0.0507)
Constant	0.243	0.0627	0.151	0.184	0.192
	(0.1960)	(0.1410)	(0.1390)	(0.1450)	(0.1430)
R-squared	0.811	0.908	0.91	0.91	0.911

P>500	Model 1	Model 2	Model 3	Model 4	Model 5
rmrf	0.825***	0.800***	0.808***	0.803***	0.795***
	(0.0248)	(0.0241)	(0.0225)	(0.0274)	(0.0267)
smb		0.260***	0.256***	0.262***	0.256***
		(0.0314)	(0.0320)	(0.0330)	(0.0334)
vmg		0.00789	0.0216	0.0238	0.0305
		(0.0267)	(0.0261)	(0.0275)	(0.0279)
wml			0.0726***	0.0724***	0.0708***
			(0.0278)	(0.0273)	(0.0272)
ff_bmg				-0.0273	-0.0302
				(0.0504)	(0.0499)
ff_liquidity					-0.037
					(0.0502)
Constant	0.299*	0.246*	0.101	0.0717	0.0668
	(0.1650)	(0.1470)	(0.1390)	(0.1440)	(0.1430)
R-squared	0.85	0.888	0.894	0.895	0.895
Observations	251	251	251	251	251

Source: Prowess data, Author's calculations

Model 1 = CAPM
Model 2 = FF- 3 factor
Model 3 = Carhart 4- factor
Model 4 = Carhart 4-factor augmented with Corporate Governance factor
Model 5 = Carhart 4-factor augmented with Corporate Governance factor and liquidity

We find that standard asset-pricing models work well towards explaining the results for penny-stocks as well as other categories. Based on the Fama-French 3-factor model, the highest priced stocks generate a premium as indicated by a significant intercept term. The low-priced non-penny stocks, as per this model generate a significant negative alpha. This is interpreted in finance literature as consistent overpricing.

Liquidity is coming out to be a significant factor in explaining asset returns only for portfolio in prices 30-50 and 50-100 categories. This is in contrast to the US market where liquidity is found to be a significant pricing factor for all portfolios except the highest priced ones. Excess returns for penny stocks in US vanish after controlling for liquidity *(Rhee et al., 2013)*.

Corporate governance is observed to be a significant explanatory variable for penny-stocks, low-priced non-penny stocks and category 3, that is stocks priced between INR50-100. However, an interesting result is that controlling for corporate governance risk factor, penny stocks are generating excess returns or premium. We observe an increase in alpha, rise in its significance, and other coefficients remaining largely unchanged. This is an anomalistic behavior as these risk factors when properly priced for, should decrease the excess returns. We

find therefore, that *ff_bmg* is a significant factor for pricing penny-stocks and low priced non-penny stocks. Value vs growth risk, captured by *vmg* is significant for all portfolios except the largest denomination one. Similarly, momentum factor *wml* is found to be not significant only for mid-price portfolio, that is the stocks priced in the range INR100-500.

While, the higher denomination stocks generated excess raw returns in our sample restricted for extreme values, these extra returns vanish when we account for standard asset pricing risk factors. This result is very similar to the one obtained in US market *(Rhee et al., 2013)*. It is interesting to observe that the third nominal price category that is priced between 50 and 100 fits the standard models perfectly. It has all the standard coefficients as significant and the intercept is not significant in any of the models. Across, all the price categories, in some cases the intercepts are significant, and other cases augmenting factors are significant. But in this price category, the standard models fit very well. We cannot identify the reason for this, but it does indicate that stocks in this category are most efficiently priced.

We observe that the penny stock portfolio generates a non-negative alpha for all the models. This is consistent with the stubborn survival of penny stock category in the markets. There are two treatments which we give to our data series. First is adjusting for the survivorship bias, where we attribute negative 100% returns to the stocks which get delisted because of distress. The second, is where rather than excluding the suspended category, we assign 0% return to those stocks. Both these treatments disproportionately affect the penny stock category return series. Despite this, not only do penny stocks generate enough returns to compensate for the standard risk factors, they generate a significant alpha when controlled for corporate governance factor. Thus, we find that penny stocks as a portfolio category sufficiently overcome the higher *mortality rate* suffered by its constituent stocks.

We change the penny-stock definition to INR20 and do a re-run of these regressions as a means to check robustness. Our results remain qualitatively the same. The tables for those regressions are produced in the appendix.

8: CONCLUSIONS

Nominal share prices, while being unexplained by conventional finance theories, pose an interesting finance problem. In this paper, we explore this phenomenon by characterizing

stocks on the basis of their nominal prices. We impose our break-points on the prices to categorize stocks and define penny stocks as the ones belonging to the least price category.

We find penny stocks, despite having a very small share of market capitalization and turnover still continue to exist. They exhibit lower average returns when adjusted for the tails of the returns distribution, but much higher returns otherwise. They trade much infrequently compared to even low-priced non-penny stocks. They generate extra returns when controlled for FF-regressors and corporate governance factors. We find these results robust to different break-points being used to define penny stocks.

Apart from the investment management perspective, we study the firm characteristics of penny stocks. We find they form the large chunk of BSE 'Z' category stocks. They are also disproportionately less within group ownership category of stocks. Also, they have been ageing almost simultaneously along with the time-frame of this study. We find that while in the US, where this problem has been largely approached from only behavioral aspect induced by trading-prices, in India there is scope to study this from a corporate governance perspective as well.

We think this study paves way for further research in the following ways. One possible channel to identify whether nominal price makes a stock special is to study the stock-splits. Stock-splits effectuate a change in only the trading price of the stock and not the fundamentals. There have been studies examining the effect of stock-splits on returns. However, this can be taken to a more granular level by looking at whether stock-splits which result in the new share price to be in low-priced category result in higher returns compared to those which result in high-price category. Our sample of 7,392 listed companies has 1,440 stock-splits. This is a rich enough data-set to conduct this research.

Second, if the companies are indeed following some cue from the market regarding prices, then there should be industry-wise norms. On looking at the age characteristics, there is a possibility that new-age firms like technology, professional services et al. supply their stocks at higher prices whereas traditional business continue to supply them at lower prices.

Another area for exploration is looking at the effect of share-price while controlling for the firm size. Thus, we can orthogonalize the share-price characteristics with the firm size in the same spirit as that of FF regressors.

Last, we find that group companies are disproportionately in lesser number in the penny-stock category for all the years. This poses an interesting problem. Group companies are typically more influential in 'managing' their share prices. Therefore, it can be explored whether finance managers in the group companies are implementing some catering theory à la American style, and supplying stocks which do not fall in the much maligned penny category.

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APPENDIX

Appendix A - Robustness checks for asset pricing regression results

Table 13 - Robustness checks: different break-points for penny and low-priced non-penny stocks

P<=20	Model 1	Model 2	Model 3	Model 4	Model 5
rmrf	0.375***	0.288***	0.284***	0.305***	0.304***
	(0.0343)	(0.0223)	(0.0230)	(0.0248)	(0.0235)
smb		0.374***	0.376***	0.355***	0.354***
		(0.0358)	(0.0368)	(0.0341)	(0.0319)
vmg		0.242***	0.235***	0.226***	0.227***
		(0.0243)	(0.0229)	(0.0234)	(0.0228)
wml			-0.0372	-0.0363	-0.0366
			(0.0293)	(0.0262)	(0.0249)
ff_bmg				0.107***	0.107***
				(0.0359)	(0.0346)
ff_liquidity					-0.00551
					(0.0495)
Constant	0.366*	0.087	0.161	0.276**	0.275**
	(0.2190)	(0.1360)	(0.1290)	(0.1320)	(0.1320)
R-squared	0.388	0.77	0.774	0.785	0.785

20<P<=50	Model 1	Model 2	Model 3	Model 4	Model 5
rmrf	0.764***	0.644***	0.633***	0.654***	0.676***
	(0.0461)	(0.0316)	(0.0272)	(0.0280)	(0.0299)
smb		0.529***	0.534***	0.513***	0.531***
		(0.0417)	(0.0369)	(0.0387)	(0.0384)
vmg		0.327***	0.309***	0.301***	0.281***
		(0.0372)	(0.0363)	(0.0372)	(0.0376)
wml			-0.0945***	-0.0937***	-0.0888***
			(0.0265)	(0.0274)	(0.0248)
ff_bmg				0.104***	0.113***
				(0.0350)	(0.0324)
ff_liquidity					0.110**
					(0.0484)
Constant	0.0344	-0.348**	-0.159	-0.0469	-0.0323
	(0.2820)	(0.1430)	(0.1480)	(0.1560)	(0.1540)
R-squared	0.617	0.898	0.907	0.912	0.915
Observations	251	251	251	251	251

We use different break-point for penny stock (INR20) and find that the results are the same as we got with breakpoint of INR30. Only the low-price non-penny category is now changed to *20<P<=50* and we find that *ff_bmg* has now become a significant factor in explaining asset returns for this category as well. Intercept terms continue to remain insignificant for standard

models. However, as in the main regression results, the penny stock category generates an alpha when controlled for *ff_bmg*.

Appendix B–Ownership categories and nominal-price categories

(A)- Actual observed frequencies (E) – Expected frequencies

1997

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	1,031	154	141	155	26	**1,507**
(E)	1,270	91	71	64	11	**1,507**
Private Indian (A)	3,164	147	95	55	10	**3,471**
(E)	2,925	210	165	146	25	**3,471**
Total	**4,195**	**301**	**236**	**210**	**36**	**4,978**
	Pearson x2	442.405***				

1998

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	1,096	127	109	136	26	**1,494**
(E)	1,297	72	59	57	10	**1,494**
Private Indian (A)	3,234	112	87	55	7	**3,495**
(E)	3,033	167	137	134	23	**3,495**
Total	**4,330**	**239**	**196**	**191**	**33**	**4,989**
	Pearson x2	359.6611***				

1999

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	1,099	106	108	130	40	**1,483**
(E)	1,288	66	59	57	14	**1,483**
Private Indian (A)	3,242	115	92	61	6	**3,516**
(E)	3,053	155	141	134	32	**3,516**
Total	**4,341**	**221**	**200**	**191**	**46**	**4,999**
	Pearson x2	338.8943***				

2000

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	1,029	122	133	147	64	**1,495**
(E)	1,241	79	74	78	23	**1,495**
Private Indian (A)	3,153	145	116	115	14	**3,543**
(E)	2,941	188	175	184	55	**3,543**
Total	**4,182**	**267**	**249**	**262**	**78**	**5,038**
	Pearson x2	341.8134***				

2001

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	1,129	114	120	125	20	**1,508**
(E)	1,316	67	63	54	8	**1,508**
Private Indian (A)	3,345	114	93	60	7	**3,619**
(E)	3,158	161	150	131	19	**3,619**
Total	**4,474**	**228**	**213**	**185**	**27**	**5,127**
	Pearson x2	314.1977***				

2002

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	1,131	103	110	127	22	**1,493**
(E)	1,311	60	56	59	7	**1,493**
Private Indian (A)	3,358	103	81	74	2	**3,618**
(E)	3,178	146	135	142	17	**3,618**
Total	**4,489**	**206**	**191**	**201**	**24**	**5,111**
	Pearson x2	309.9276***				

2003

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	1,129	99	110	117	16	**1,471**
(E)	1,301	60	52	52	6	**1,471**
Private Indian (A)	3,305	106	68	60	4	**3,543**
(E)	3,133	145	126	125	14	**3,543**
Total	**4,434**	**205**	**178**	**177**	**20**	**5,014**
	Pearson x2	298.2825***				

2004

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	992	114	127	194	36	**1,463**
(E)	1,235	71	64	80	13	**1,463**
Private Indian (A)	3,173	124	89	77	8	**3,471**
(E)	2,930	167	152	191	31	**3,471**
Total	**4,165**	**238**	**216**	**271**	**44**	**4,934**
	Pearson x2	479.7803***				

2005

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	721	138	168	279	58	**1,364**
(E)	1,003	99	106	132	24	**1,364**
Private Indian (A)	2,394	168	162	131	16	**2,871**
(E)	2,112	207	224	278	50	**2,871**
Total	**3,115**	**306**	**330**	**410**	**74**	**4,235**
	Pearson x2	506.7559***				

2006

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	647	108	157	350	124	**1,386**
(E)	946	92	106	195	48	**1386**
Private Indian (A)	2,290	177	171	255	26	**2,919**
(E)	1,991	193	222	410	102	**2,919**
Total	**2,937**	**285**	**328**	**605**	**150**	**4,305**
	Pearson x2	537.6432***				

2007

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	658	129	193	328	97	**1,405**
(E)	941	102	127	192	43	**1405**
Private Indian (A)	2,278	190	204	272	36	**2,980**
(E)	1,995	217	270	408	90	**2,980**
Total	**2,936**	**319**	**397**	**600**	**133**	**4,385**
	Pearson x2	428.6336***				

2008

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	643	156	182	316	116	**1,413**
(E)	913	118	141	188	54	**1413**
Private Indian (A)	2,241	218	264	277	53	**3,053**
(E)	1,972	256	305	405	116	**3,053**
Total	**2,884**	**374**	**446**	**593**	**169**	**4,466**
	Pearson x2	386.7578***				

2009

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	857	152	181	181	42	**1,413**
(E)	1,071	117	108	98	19	**1,413**
Private Indian (A)	2,562	222	163	132	18	**3,097**
(E)	2,348	257	236	215	41	**3,097**
Total	**3,419**	**374**	**344**	**313**	**60**	**4,510**
	Pearson x2	293.7298***				

2010

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	636	126	195	362	97	**1,416**
(E)	905	125	140	205	41	**1416**
Private Indian (A)	2,266	274	253	296	35	**3,124**
(E)	1,997	275	308	453	91	**3,124**
Total	**2,902**	**400**	**448**	**658**	**132**	**4,540**
	Pearson x2	432.1458***				

2011

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	641	152	204	355	85	**1,437**
(E)	917	134	149	202	37	**1437**
Private Indian (A)	2,298	276	272	292	32	**3,170**
(E)	2,022	295	328	445	81	**3,170**
Total	**2,939**	**428**	**476**	**647**	**117**	**4,607**
	Pearson x2	417.1208***				

2012

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	720	141	195	309	79	**1,444**
(E)	977	124	138	171	34	**1444**
Private Indian (A)	2,429	258	249	242	31	**3,209**
(E)	2,172	275	306	380	76	**3,209**
Total	**3,149**	**399**	**444**	**551**	**110**	**4,653**
	Pearson x2	383.0737***				

2013

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	781	134	180	268	78	**1,441**
(E)	1,014	118	123	152	34	**1,441**
Private Indian (A)	2,529	252	222	229	32	**3,264**
(E)	2,296	268	279	345	76	**3,264**
Total	**3,310**	**386**	**402**	**497**	**110**	**4,705**
	Pearson x2	328.9079***				

2014

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	781	114	176	285	89	**1,445**
(E)	1,024	101	118	161	41	**1,445**
Private Indian (A)	2,602	221	215	246	47	**3,331**
(E)	2,360	234	273	370	95	**3,331**
Total	**3,383**	**335**	**391**	**531**	**136**	**4,776**
	Pearson x2	342.7995***				

2015

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	717	119	150	313	147	**1,446**
(E)	964	111	115	186	69	**1446**
Private Indian (A)	2,560	259	242	320	87	**3,468**
(E)	2,313	267	277	447	165	**3,468**
Total	**3,277**	**378**	**392**	**633**	**234**	**4,914**
	Pearson x2	353.2141***				

2016

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	707	118	189	303	136	**1,453**
(E)	959	117	127	185	64	**1453**
Private Indian (A)	2,650	292	257	346	87	**3,632**
(E)	2,398	293	319	464	159	**3,632**
Total	**3,357**	**410**	**446**	**649**	**223**	**5,085**
	Pearson x2	353.6156***				

2017

Ownership Type	P<=30	30<P<=50	50<P=100	100<P<=500	P>500	Total
Indian Group (A)	614	113	175	329	191	**1,422**
(E)	870	116	138	211	88	**1422**
Private Indian (A)	2,454	297	310	415	118	**3,594**
(E)	2,198	294	348	533	221	**3,594**
Total	**3,068**	**410**	**485**	**744**	**309**	**5,016**
	Pearson x2	381.9733***				