

Tests Of Equity Market Anomalies For Select Emerging Markets

Sanjay Sehgal, Srividya Subramaniam, Florent Deisting

▶ **To cite this version:**

Sanjay Sehgal, Srividya Subramaniam, Florent Deisting. Tests Of Equity Market Anomalies For Select Emerging Markets. International Journal of Business and Finance Research, 2014, 8 (3), pp.27-46. hal-01881907

HAL Id: hal-01881907

https://univ-pau.hal.science/hal-01881907

Submitted on 6 Nov 2018

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The International Journal of
Business and Finance RESEARCH

VOLUME 8 **NUMBER 3** **2014**

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TESTS OF EQUITY MARKET ANOMALIES FOR SELECT EMERGING MARKETS

Sanjay Sehgal, University of Delhi
Srividya Subramaniam, University of Delhi
Florent Deisting, Group ESC Pau

ABSTRACT

The study tests prominent equity market anomalies for six emerging markets - Brazil, China, India, Indonesia, South Korea and South Africa. We find that using the Fama French model (FFM) as performance benchmark the size anomaly is present in India, South Korea and Brazil, value anomaly in South Korea and South Africa, momentum in India and South Africa, mild reversals in Brazil, liquidity anomaly in South Korea and South Africa, profitability anomaly in Brazil and South Africa, accruals anomaly in South Africa and stock repurchases anomaly in India and South Africa. Stock issues anomaly does not pose a challenge to asset pricing for sample markets. The four factor liquidity augmented FFM is a better descriptor of asset pricing compared to CAPM and FFM only in the Indian context. The Fama French model seems to be an appropriate performance benchmark for other sample emerging markets. South Africa seems to be the most exciting destination for portfolio managers followed by Brazil, South Korea and India. The research is relevant for global portfolio managers who indulge in international diversification as well as for policy makers who are looking for long-term economic cooperation and greater financial integration among these markets.

JEL: C51, C52, G12, G14, G15

KEYWORDS: CAPM, Fama French Model, Emerging Markets, Market Anomalies, International Diversification

INTRODUCTION

Schwert (2003) defines anomalies as empirical results that are incompatible with maintained theories of asset pricing behavior. The CAPM which has been the foundation of all asset pricing models indicates that the risk return relation is linear; the relevant risk is systematic in nature and measured by beta. Empirical work followed which observed that the CAPM beta fails to explain returns on various characteristic sorted portfolios. Major anomalies of the CAPM are firm size (Banz, 1981), book equity to market equity (Stattman, 1980), price earnings (Basu, 1983), firm leverage (Bhandari, 1988), reversal (De Bondt &Thaler, 1985, 1987) and Momentum returns (Jegadeesh & Titman, 1993).

Fama and French (1993) developed a three factor asset pricing model to explain the pricing anomalies not captured by CAPM. Their model uses two more risk factors viz. size and value in addition to market beta, which has proven to be very effective in explaining major anomalies of the CAPM. However, recent evidence confirms that even the FF model is not without limitations. For instance, the model fails to explain returns on portfolios sorted on momentum (Fama & French, 1996), liquidity (Hwang and Lu, 2007), accruals (Sloan, 1996), net stock issues (Loughran &Ritter, 1995, Ikenberry, Lakonishiok & Vermaelen, 1995) and profitability (Fama & French, 2008). Stock market anomalies that have gained attention in the literature over the past few years are size, value, prior return patterns, liquidity, accruals, profitability and net stock issues.

A fertile literature on these anomalies exists for the developed capital markets where many of these anomalies have been proved. To investigate whether these anomalies are universal and pervasive a

similar analysis for emerging markets should be conducted. Noeth and Sengupta (2012) define emerging markets as countries which experience significant growth in GDP and infrastructure and have adopted structural economic reforms to catch up with the developed world. Jim O'Neill, a Goldman Sacs executive coined the term 'BRIC' to refer to four fast growing emerging markets viz. Brazil (B), Russia(R), India (I) and China(C) where investors could put their money for high returns and proclaimed that these emerging markets would help drive global markets and world economic growth. Recently the investment banking industry has included Indonesia (I), South Korea (K) and South Africa(S) in the emerging markets group(see Global Development Horizon, World Bank, 2011(Indonesia and South Korea were added in 2010 and South Africa was added in 2011). "By 2025, six major emerging economies—Brazil, China, India, Indonesia, the Republic of Korea, and the Russian Federation—will collectively account for more than half of all global growth" (see Global development Horizon, 2011).

Many of these emerging countries during early 1990s transformed the financial system by opening the stock market to foreign investors. This led to increased capital flows into these countries leading to growth of capital markets in the form of greater stock listings, market capitalizations and trading volumes. These countries have gained significance in the context of international investment portfolios and diversification process. Portfolio managers and investment analysts who are continuously on the lookout for presence of stock market anomalies to earn abnormal returns would thus like to diversify their portfolios across mature as well as emerging markets. However, it should be kept in mind that although emerging markets offer a high potential of return to investors, they are highly risky. These securities are volatile, less liquid, subject to substantial currency fluctuations and sudden economic and political developments. This paper makes an important contribution to existing research by testing prominent asset pricing anomalies for the above-mentioned emerging markets viz. Brazil, China, India, Indonesia, South Korea and South Africa. Russia has been excluded owing to lack of adequate data. The objectives of the paper are three fold. We firstly study a range of asset pricing anomalies viz. size, value, prior return patterns, liquidity, profitability, accruals, and net stock issues for the sample markets. Existing literature either focuses on a single anomaly for a group of markets or a cluster of anomalies for a single market. Next if anomalies persist we examine if they could be absorbed by standard asset pricing models viz. single factor CAPM, multifactor framework including Fama French model and liquidity augmented Fama French model. Based on the results it can be suggested which markets are relatively more attractive to international investors for portfolio construction and diversification.

The paper is organized as follows. Section 1 gives the review of literature. Data and the methodology are explained in Section 2. Section 3 gives the empirical results for equity market anomalies and the power of standard asset pricing models in explaining them. The next section covers the role of liquidity factor in stock returns and the last section contains conclusions and policy implications.

LITERATURE REVIEW

Extensive literature exists confirming the presence of prominent stock market anomalies and the feasibility of exploiting them to earn abnormal returns for mature markets. The size effect means that small firms stocks provide higher risk adjusted returns than the stocks of large firms (Banz,1981). Following Banz (1981), numerous studies ((Roll (1981), Schultz (1983), Chan and Chen (1991), Perez Quiroz and Timmermann (2000), Lettau and Ludvigson (2001) have investigated the size effect for mature markets. The value effect implies that companies with relatively high distress (persistently low sales and earnings record) tend to outperform companies, which are relatively better performing (persistently high sales and earnings record) (Stattman, 1980). A risk based explanation for the value premium was given by Fama and French (1992, 1996), whereas an explanation using the overreaction hypothesis was given by DeBondt and Thaler (1987), Lakonishok et al. (1994), and Haugen (1995). Prior return patterns can be classified into momentum and contrarian. Momentum implies that trading strategies that buy stocks with high returns and sell stocks with low returns over the previous 3-12 months

generate significant profits (Jegadeesh & Titman, 1993). Contrarian strategies are based on price reversal i.e. past losers are future winners (De Bondt & Thaler, 1985, 1987). Empirical literature has been conclusive that momentum patters are short term whereas contrarian patterns are observed for long-term formations. Barberis, Shliefer and Vishny (1998), Daniel, Hirshleifer and Subrahmanyam (1998), Hong and Stien (1999) provide a behavioral explanation to momentum. Chordia and Shivkumar (2002) attribute momentum to macroeconomics factors, while Hong et al (2000) attribute it to size and Moshowitz and Grinblatt (1999) to industry momentum. Amihud and Mendelson (1986) show that investors demand a premium for less liquid stocks so expected returns should be negatively related to the level of liquidity. Although Fama and French(1992) argue that liquidity need not be specifically measured, recent studies show that liquidity needs to be accounted for individually(Amihud (2002), Lee and Swaminathan(2000) and Keene and Patterson(2007)). Sloan (1996) shows that low (high) accrual stocks generate positive (negative) abnormal future returns. Various reasons have been documented for existence of the accrual anomaly which consist of post earnings announcement drift(Collins and Hribar (2000), insider trading(Beneish and Vargus(2002), abnormal accruals(Xie(2001), distress risk(NG(2004),institutional and accounting structure(Pincus et al (2007)). Mashruwala (2006) explains why accrual anomaly is not arbitraged away. Haugen and Baker (1996) find that more profitable firms tend to have greater expected returns. Fama French (2008) and Cohen et al (2002) also find evidence of a positive relation between corporate profits and returns. The net stock issues anomaly refers to the negative relation between net changes in equity financing and future stock returns(Loughran & Ritter,1995)and Ikenberry, Lakonishiok &Vermaelen,1995)[1]. Eckbo, Masulis and Norli (2000) and Eckbo and Norli (2005) state that issuing firms are viewed as less risky by investors and hence are priced to yield lower expected returns. Daniel and Titman (2006) and Pontiff and Woodgate (2008) show a negative relation between net stock issues and equity returns. Ikenberry et al (1995) find that on average, market under reacts to open market share repurchase announcements, leading prices to adjust slowly overtime.

Literature on stock market anomalies for emerging markets is limited and more recent in origin. The study of stock market anomalies in these emerging markets has primarily focused on size, value, prior return patterns and accruals. Research on liquidity, profitability, stock issues and stock repurchases is very scarce. Patel (1988) and Rowenhorst (1999) find presence of size effect and value effect in emerging markets. Braga and Leal (2007) found abnormal returns were generated by the value strategy during 1987-2006 in Brazil. Wang and Xu (2004) find evidence of size effect but find B/M does not explain returns for China. Chui and Wei (1998) find presence of strong size effect in South Korea. Chen and Fang (2009) find that trading strategy based on size effect is more risky than value/growth strategy for South Korea and Indonesia. Goot and Verschoor(2002) study relation between expected stock returns and size and market to book ratio in five Asian emerging markets viz. India, Korea, Malaysia, Taiwan and Thailand and find that market to book variable has a stronger role in average returns than size effect. Patel (1988) employed one, three and five factor models and found that although P/E effect existed size effect did not exist in South African market. Pasaribu (2009) examines the FF model from 2003-2006 for Indonesian stock market. He finds significant relation between market size and book to market equity factors and expected returns in Indonesian market. Results confirm that FF model is more robust than CAPM for Indonesian market.

Rouwenhorst (1999) on examining 20 emerging markets concludes that these stocks exhibit momentum. Vu (2012) finds that momentum profits are large for emerging markets especially in the preliberalization period than in post liberalization period. Chui, Titman, and Kim (2000) document that momentum strategies are highly profitable when applied to eight Asian markets outside Japan. Griffin, Ji and Martin (2003) find negative momentum profits for South Korea and Indonesia. Lemos and Costa Jr (1997) conclude that reversal effect is present instead of momentum for Brazilian market as low momentum stocks displayed better performance than high momentum stocks. Bonomo and Dall'Agnol (2003) support a reversal trend in Brazilian market. Chen and Fang (2009) report negative momentum profits for

South Korea and Indonesia and find that Fama French model outperforms CAPM for Asian markets. Cupertino, Martinez and Costa Jr (2012) show that returns are lower for firms with low accruals and thus the occurrence of accrual anomaly is not favourable to the existence of arbitrage opportunities. Hameed and Kusnadi (2002) do not find evidence to support price momentum in six Asian markets. Chen, Kim, Yao and Yu (2010) find size effect, value effect and accruals have signs according to that observed for mature markets but trading on momentum is unprofitable in China. They show that firm size and turnover do not significantly predict stock performance. Naughton, Troung and Veeraraghavan (2008) do not support any relation between high volume and low volume portfolio controlling for momentum. Hoffman(2012) studies stock price anomalies on Johannesburg Stock Exchange(JSE) using market cap, book to market ratio, momentum, net share issue, yield to book equity, accruals as explanatory variables and finds that anomalous returns exists even after controlling for risk. Different types of anomalous behavior are present within different stock size categories.

DATA AND METHODOLOGY

Data

We study six emerging markets viz. Brazil, India, Indonesia, China, South Korea and South Africa from Jan 1994-Dec 2011. The study periods for sample countries are different based on availability of adequate data. For each country, the study uses month end closing adjusted share prices, adjusted for capitalization such as bonus, rights and stock splits. The month end share price series have been converted into percentage return series for further estimation.

Size is proxied by market capitalization. It is calculated as the natural log of price times shares outstanding. Value is proxied by price to book (inverse of BE/ME). Price to book value per share represents the security price over a company's book value. Trading volume is used as the liquidity proxy. Liquidity is proxied by the average daily turnover in percentage during the portfolio formation period (see Lee and Swaminathan (2000)). We use two alternative measures for profits viz. return on equity and return on assets. Return on equity is calculated as the income available to common stockholders for the most recent fiscal year divided by the average common equity. Return on assets is calculated as net income scaled by average total assets. Accruals have been calculated using the balance sheet method (Sloan (1996)) as follows.

$$\text{Accruals} = (\Delta\text{CA} - \Delta\text{Cash}) - (\Delta\text{CL} - \Delta\text{STD} - \Delta\text{TP}) - \text{Dep} \quad (1)$$

Where ΔCA is the change in current assets,
Δ Cash is the change in cash or cash equivalent,

ΔCL is the change in current liabilities,

ΔSTD is the change in short term debt, ΔTP is the change in tax payables, and Dep is the depreciation and amortization expense. The value of accruals obtained is deflated by average total assets.Net stock issues (in year t) is calculated as the natural log of ratio of split adjusted share outstanding at calendar year end t-1 divided by split adjusted shares outstanding at calendar year end in t-2.

Data on share prices, market index and all company characteristics for all sample countries has been obtained from the Thomson One database of Thomson Reuters. In case of Brazil, data on price to book was taken from Bloomberg since it provided data for the entire sample period. For Indonesia, data was inadequate to form liquidity-sorted portfolios and repurchases sorted portfolios. Exhibit 1 gives details on the number of securities used for analyses, market index used and its description for each country under

consideration. Risk free rate is proxied by the 91-day US t-bill rate, data on which has been obtained from Federal Bank of St.Louis website. All variables are measured in USD rather than local currency.

Exhibit1. Data Description for Sample Countries

Country	Sample period	No of securities	Market index	Index Description
Brazil	Jan 2001:April2011	195	ibx	The Brazil ibx index is a total return index which measures the return of a theoretical portfolio composed of the top 100 stocks traded on the Bovespa. These are the most actively traded stocks in terms of number of trades and financial value, weighted according to their number of outstanding shares.
India	Jan 1996:June 2010	493	BSE-200	BSE-200 index is a full market capitalization index which has 200 companies. Companies have been chosen based on current market capitalization, market activity as reflected by volumes of turnover and certain fundamental factors.
Indonesia	Jan 1999:Dec 2011	437	JK-composite	JK-composite is a capitalization weighted index of all stocks that trade on the Indonesian stock exchange.
China	Jan 2000:Dec 2011	600	Shanghai SE composite	The Shanghai stock exchange composite index is a capitalization weighted index which tracks the daily price performance of all A-shares and B-shares listed on the Shanghai stock exchange.
South Korea	Jan 1994-Dec 2010	500	Kospi composite index	It represents all common stocks traded on the Korean Exchange and is calculated on the market capitalization method.
South Africa	Jan 1999-Dec 2011	250	J-203-JO	J-203JO is the FTSE/JSE all share index. It is a market capitalization weighted index. Companies included in this index makeup the top 99% of all listed companies on the Johannesburg Stock Exchange (JSE).

This exhibit provides the data description for the sample countries.

METHODOLOGY

Single sorted portfolios are constructed based on each company characteristic. In December of year t-1, the securities are ranked based on the company characteristic under consideration into quintiles, P1 to P5 and equally-weighted monthly excess returns are estimated for these portfolios for the next 12 months (t). Portfolio, P1 consists of 20% of companies with lowest attribute while P5 consists of top 20% companies with highest attribute under consideration. P1 and P5 are referred henceforth as corner portfolios in the study. The portfolios are re-balanced at the end of December of year t. The process is repeated until we reach the end of the sample period. For prior return patterns, a 6/6 investment strategy is also formed where the formation and holding windows are kept as 6 months.

In the case of net stock issues, positive value implies share issues and negative value implies share repurchases. Stocks are sorted based on repurchases into two portfolios P1 (higher repurchases) and P2 (lower repurchases).

First, we observe the unadjusted mean excess returns across the portfolios created. In the next step, CAPM regressions are run on each of the five portfolios using the familiar "excess return" version of the market model equation.

$$R_{pt} - R_{ft} = a + b(R_{pt} - R_{ft}) + e_i \quad (2)$$

where $-R_{pt} - R_{ft}$ is the monthly excess return on the portfolio i.e. returns on portfolio P minus risk free return ($R_{Ft)}$,

$(R_{pt} - R_{ft})_t$is the excess market return i.e. return on market factor minus risk free return, et is the error term,

a (intercept) is a measure of abnormal profits and

b is the sensitivity coefficient of market factor.

The CAPM states that excess returns on a portfolio should be fully explained by excess market returns. A CAPM anomaly would exists if there is a significant positive or negative intercept in the CAPM specification.

In the next step, we evaluate if the excess returns of the stylized portfolios that are missed by CAPM can be explained using the three factor model of Fama and French (1993) specified as follows.

The Fama French (FF) Model (FFM) is given by:

$$R_{pt} - R_{ft} = a + b(R_{pt} - R_{ft}) + s(SMB_t) + h(LMH_t) + e_t \quad (3)$$

Where SMB_t is the difference between returns on portfolio of small stock firms and returns on portfolio of big stock firms.

LMH_t is the difference between returns on a portfolio of high book to market stocks and returns on a portfolio of low book to market stocks.

s and h are the sensitivity coefficients of SMB_t and LMH_t

The other two terms are same as defined in Equation (2).

As the FF model has been estimated using LMH factor instead of HML factor, our interpretation of the value factor will be inverse. We estimate the SMB and HML as follows. .

SMB_t is constructed as follows such that it is independent of value factor:

$$SMB = \frac{\frac{S}{L} + \frac{S}{M} + \frac{S}{H}}{3} - \frac{\frac{B}{L} + \frac{B}{M} + \frac{B}{H}}{3} \quad (4)$$

(LMH_t) is constructed as follows such that it is independent of size factor:

$$LMH = \frac{\frac{S}{L} + \frac{B}{L}}{2} - \frac{\frac{S}{H} + \frac{B}{H}}{2} \quad (5)$$

The size value portfolios for calculating SMB and LMH are formed from the intersection of two size groups, small or S (bottom 50%) and big or B (top 50%) and three value groups, Low or L (bottom 33 1/3%), medium or M (between 33 1/3 % and 66 2/3%) and high or H (greater than 66 2/3%) in December of t-1. Monthly equally weighted returns are calculated for all portfolios from Jan to December of year t. Insignificant intercepts from the FFM regressions implies that the FF specification is able to capture cross sectional patterns in average stock returns that are missed by CAPM. On the other hand statistically significant intercepts of FF model shall suggest missing risk factors which one needs to identify for creating a complete factor structure.

We next augment the FF model with a liquidity factor, where the importance of liquidity is addressed in the context of other known time series determinants of stock returns. The liquidity factor is calculated as

the difference between returns on low liquidity stocks (P1) and high liquidity stocks (P5).The liquidity augmented FF model now is:

$$R_{pt} - R_{ft} = a + b(R_{pt} - R_{ft}) + s(SMB_t) + h(LMH_t) + l(LIQ_t) + e_t \quad (6)$$

Where LIQ is the factor mimicking portfolio for liquidity and l tests the sensitivity of the liquidity factor (see Keene and Paterson (2007). The other terms are same as in Equation (3).

TESTS OF EQUITY MARKET ANOMALIES

In this section, we discuss the empirical results obtained for equity market anomalies under consideration for the sample emerging markets. Table 1 reports unadjusted excess returns (excess of portfolio returns over risk free rate) for different characteristic sorted portfolios. CAPM regressions are reported in Table 2 and Table 3 gives results of Fama French regressions. All results are analyzed at 5% level of significance.

Size Anomaly- The unadjusted excess returns on size sorted portfolios are larger for small stocks vis-a-vis large stocks for all sample countries confirming the negative relation between size and average returns. The mean monthly return differential between small and large stocks is the highest in case of Brazil and least in case of South Africa. Results in Table 3 on CAPM point out that the intercept values which show the extra normal returns (after adjusting for market risk) are significantly different from zero for small stock portfolios of all countries except South Africa. The market factor captures a large amount of variation in common stock returns, which is evident from the significant beta for both small and large stock portfolios. However, there is no substantial difference between the beta coefficients of the corner portfolios for all countries except in Brazil, which signifies that the market risk of small firms is not substantially larger than that of large firms. Thus, CAPM fails to explain the size effect for remaining five countries. The Fama French model, explains the size effect completely in Brazil, China and Indonesia, but only partially in India and South Korea. In case of Brazil, we observe that the alpha for small stocks is 5.9% per month. Although this value lacks statistical significance but being a large figure, it has economic significance and can be exploited by arbitrageurs. Hence, investors should be cautious while interpreting alpha value. Thus, size is confirmed to be an asset pricing anomaly in Indian and South Korean markets. Chui and Wei (1998) too find presence of strong size effect in South Korea. Results on size effect for India are in line with existing research (see Sehgal, Subramaniam & Moriandiere, 2012). On the other hand, we find that China and South Africa do not report significant size effect. These results are in line with international evidence (see De Villiers, Lowlings, Petit & Affleck-Graves,1986, Bradfield, Barr & Affleck-Graves,1988, Page,1986,Page & Palmer,1991 Hoffman,2012) for South Africa and Chen, Kim, Yao & Yu,2010 for China).

Value Anomaly - Results in Table 1 show that unadjusted returns obtained by sorting stocks based on their price to book (P/B) ratio are higher for low P/B stocks as compared to high P/B stocks confirming the existence of a value effect in all markets. The size effect is more than the value effect for Brazil and India, with the reverse true for South Africa and negligible difference between the two effects for China, Indonesia and South Korea. We find that the intercept value is low for high P/B portfolios in contrast to low P/B portfolios suggesting that low P/B stocks produce higher CAPM based higher risk adjusted extra normal returns during the study period. CAPM is unable to explain the cross sectional differences on value sorted portfolios in all markets except Brazil where alpha is not significantly different from zero. Teixeira (2011) in their study on Brazil find that based on Sharpe ratio, value strategy had best performance from 2001 to 2010. For all countries, the three factor FF regression has a higher adjusted R^2 than CAPM regression for both corner portfolios. The h coefficient is negative for high P/B (low BE/ME) and positive for low P/B (high BE/ME) confirming the presence of value effect in the remaining

five countries. The size and value factors of the Fama French model explain the cross sectional differences in returns in India, Indonesia and China.

Table 1: Unadjusted Average Monthly Excess Returns

Portfolio	**Brazil**		**China**		**India**	
	Mean	**t-stat**	**Mean**	**t-stat**	**Mean**	**t-stat**
Size sorted portfolios						
P1	0.093	2.669**	0.022	2.465**	0.056	4.801**
P5	0.018	1.864	0.007	1.014	0.013	1.754
Value sorted portfolios						
P1	0.030	2.783**	0.021	2.416**	0.038	3.237**
P5	0.023	2.398**	0.007	0.906	0.018	2.437**
Prior returns sorted portfolios(6/6)						
P1	0.042	3.007**	0.013	1.705	0.023	2.338**
P5	0.039	3.731**	0.012	1.512	0.036	4.062**
Prior returns sorted portfolios(12/12)						
P1	0.072	2.224**	0.014	1.705	0.027	2.561**
P5	0.041	3.152**	0.009	1.235	0.036	3.882**
Liquidity sorted portfolios						
P1	0.036	2.722**	0.012	1.547	0.032	3.960**
P5	0.032	3.231**	0.012	1.477	0.021	2.181**
Profitability (ROE) sorted portfolios						
P1	0.026	2.830**	0.017	1.941	0.021	2.170**
P5	0.036	3.710**	0.012	1.570	0.015	2.035**
Profitability (ROA) sorted portfolios						
P1	0.050	3.145**	0.016	1.919	0.021	2.270**
P5	0.058	1.625	0.010	1.394	0.013	1.900
Accruals sorted portfolios						
P1	0.016	1.542	0.017	2.002**	0.023	2.799**
P5	0.030	1.578	0.015	1.727	0.024	2.467**
Stock issues sorted portfolios						
P1	0.018	1.392	0.016	1.448	0.030	2.493**
P5	0.014	0.813	0.011	1.292	0.041	2.876**
Stock repurchases portfolio						
P1	0.031	3.174**	0.012	1.252	0.040	3.334**
P2	0.035	2.772**	0.013	1.330	0.030	2.480**
Portfolio	**Indonesia**		**South Africa**		**South Korea**	
	Mean	**t-stat**	**Mean**	**t-stat**	**Mean**	**t-stat**
Size sorted portfolios						
	0.045	3.361**	0.015	2.120**	0.029	2.775**
	0.015	1.652	0.011	1.748	0.009	1.144
Value sorted portfolios						
	0.041	3.155**	0.034	4.712**	0.022	2.110**
	0.011	1.474	0.011	1.620	0.003	0.388
Prior returns sorted portfolios(6/6)						
	0.031	2.921**	0.015	2.182**	0.015	1.515
	0.029	2.397**	0.028	3.902**	0.011	1.376
Prior returns sorted portfolios(12/12)						
	0.037	3.307**	0.019	2.834**	0.018	1.793
	0.024	2.241**	0.025	3.292**	0.006	0.812
Liquidity sorted portfolios						
	0.022	1.783	0.021	3.718**	0.012	1.393
	0.023	1.206	0.014	2.042**	0.009	0.947
Profitability (ROE) sorted portfolios						
	0.030	2.370**	0.031	4.638**	0.016	1.465
	0.028	2.573**	0.014	2.085**	0.010	1.124
Profitability (ROA) sorted portfolios						
	0.030	2.213**	0.031	4.423**	0.015	1.428
	0.021	2.488**	0.011	1.840	0.009	1.225
Accruals sorted portfolios						
	0.036	2.507**	0.022	2.985**	0.013	1.547
	0.034	2.942**	0.020	2.770**	0.010	1.050
Stock issues sorted portfolios						
	0.023	2.513**	0.014	2.170**	0.030	2.677**
	0.012	1.250	0.008	1.172	0.013	1.064
Stock repurchases portfolio						
	NA	NA	0.031	3.574**	0.025	2.434**
	NA	NA	0.019	2.695**	0.023	2.093**

*The table shows unadjusted average monthly excess returns for stocks portfolios formed based on size, price to book, prior returns, liquidity, profitability, accruals, stock issues and stock repurchases. P1 is the portfolio consisting of 20% of companies with lowest attribute while P5 consists of top 20% companies with highest attribute under consideration. In case of repurchases, stocks are divided into two portfolios viz. P1 and P2. ** t-statistics are tested for significance at 5% level on two-tail basis. The first half of the table shows the results for Brazil, China and India. The second half of the table shows results for Indonesia, South Africa and South Korea.*

Table 2: Empirical Results Based On One Factor CAPM

Port.	Brazil			China			India		
	a	t(a)	Adj.R^2	a	t(a)	Adj.R^2	a	t(a)	Adj.R^2
Size sorted portfolios									
P1	0.078	2.252**	0.029	0.015	2.334**	0.500	0.041	4.699**	0.440
P5	-0.001	-0.562	0.915	0	-0.091	0.840	0.001	0.726	0.942
Value sorted portfolios									
P1	0.012	1.770	0.632	0.013	2.354**	0.584	0.022	2.757**	0.534
P5	0.005	1.097	0.744	0	0	0.678	0.007	2.412**	0.865
Prior returns sorted portfolio 6/6									
P1	0.026	2.174**	0.271	0.005	0.974	0.621	0.009	1.594	0.679
P5	0.024	3.038**	0.438	0.004	0.992	0.707	0.023	5.260**	0.765
Prior returns sorted portfolios 12/12									
P1	0.053	1.663	0.070	0.006	1.262	0.627	0.013	1.817	0.538
P5	0.026	2.344**	0.267	0.002	0.496	0.711	0.022	4.885**	0.773
Liquidity sorted portfolios									
P1	0.024	1.960	0.179	0.004	1.083	0.680	0.021	3.757**	0.547
P5	0.016	2.451**	0.593	0.004	0.879	0.650	0.006	1.595	0.833
Profitability(ROA) sorted portfolios									
P1	0.038	2.480**	0.133	0.009	1.583	0.580	0.009	2.001**	0.746
P5	0.040	1.120	0.051	0.003	0.793	0.777	0.006	2.040**	0.849
Profitability(ROE) sorted portfolios									
P1	0.012	1.832	0.530	0.009	1.620	0.560	0.009	1.709	0.711
P5	0.020	3.166**	0.580	0.004	1.132	0.753	0.006	2.341**	0.862
Accruals sorted portfolios									
P1	-0.0002	-0.035	0.610	0.010	1.774	0.579	0.011	2.427**	0.722
P5	0.010	0.562	0.290	0.007	1.347	0.633	0.009	1.894	0.761
Stock issues sorted portfolios									
P1	0.004	0.726	0.835	0.007	0.942	0.572	0.003	0.696	0.864
P5	-0.003	-0.318	0.687	0.004	0.879	0.773	0.009	1.380	0.806
Stock repurchases sorted portfolios									
P1	0.0121	2.062**	0.641	0.013	2.584**	0.840	-	-	-
P2	0.016	1.573	0.413	0.002	0.371	0.794	-	-	-
Port.	**Indonesia**			**South Africa**			**South Korea**		
	a	t(a)	Adj.R^2	a	t(a)	Adj.R^2	a	t(a)	Adj.R^2
Size sorted portfolios									
P1	0.029	2.627**	0.340	0.007	1.254	0.462	0.023	3.153**	0.498
P5	-0.003	-1.454	0.948	0.001	0.295	0.894	0.004	1.514	0.917
Value sorted portfolios									
P1	0.022	2.400**	0.539	0.025	4.831**	0.489	0.016	2.444**	0.608
P5	-0.003	-0.861	0.817	0.001	0.336	0.662	-0.003	-0.740	0.845
Prior returns sorted portfolios 6/6									
P1	0.013	2.136**	0.664	0.006	1.300	0.570	0.010	1.573	0.603
P5	0.010	1.286**	0.560	0.018	4.021**	0.610	0.006	1.576	0.746
Prior returns sorted portfolios 12/12									
P1	0.019	2.694**	0.606	0.010	2.307**	0.592	0.013	2.054**	0.623
P5	0.007	1.019	0.605	0.013	3.135**	0.644	0.002	0.458	0.738
Liquidity sorted portfolios									
P1	0.001	0.207	0.844	0.014	3.576**	0.552	0.006	1.543	0.768
P5	-0.005	-0.406	0.621	0.003	1.049	0.764	0.003	0.647	0.703
Profitability(ROA) sorted portfolios									
P1	0.010	1.072	0.499	0.022	4.426**	0.487	0.009	1.398	0.646
P5	0.005	1.534	0.841	0.002	0.631	0.771	0.004	1.276	0.808
Profitability(ROE) sorted portfolios									
P1	0.011	1.250	0.554	0.023	4.721**	0.486	0.009	1.520	0.687
P5	0.010	1.540	0.634	0.004	1.130	0.731	0.004	0.992	0.773
Accruals sorted portfolios									
P1	0.015	1.482	0.500	0.009	2.479**	0.726	0.007	2.001**	0.806
P5	0.015	2.130**	0.611	0.008	2.123**	0.752	0.004	0.802	0.731
Stock issues sorted portfolios									
P1	0.007	1.298	0.611	0.007	1.971	0.720	0.013	2.148**	0.717
P5	-0.004	-0.734	0.629	0.001	0.284	0.548	-0.005	-0.732	0.680
Stock repurchases sorted portfolios									
P1	0.004	0.641	0.599	0.008	1.785	0.780	0.030	3.370**	-0.003
P2	0.004	0.695	0.660	0.006	1.064	0.771	0.018	2.593**	-0.008

This table reports the regression estimates from time series regressions of excess portfolio returns on characteristic sorted portfolios on the returns for the market factor. P1 is the portfolio consisting of 20% of companies with lowest attribute while P5 consists of top 20% companies with highest attribute under consideration. In case of repurchases, stocks are divided into two portfolios viz. P1 and P2. The CAPM has been operationalized using the excess return version of the market model as stated below: $R_{pt} - R_{ft} = a + b\,(R_{mt} - R_{ft}) + e_t$. *CAPM restricts the intercept term in the equation (a) to be zero. Any significant value for intercept term implies departure from CAPM. a is the imtercept in the CAPM and t(a) shows its t-statistic.**t-statistics are tested for significance at 5% level on two-tail basis. The first half of the table shows the results for Brazil, China and India. The second half of the table shows results for Indonesia, South Africa and South Korea.*

Table 3: Empirical Results for the Three Factor Fama French Model Based on Market, Size and Value Factors

Port	Brazil			China			India		
	a	t(a)	Adj. R^2	a	t(a)	Adj. R^2	a	t(a)	Adj. R^2
Size sorted portfolios									
P1	0.059	1.670	0.056	-0.001	-0.470	0.881	0.017	3.061**	0.785
P5	-	-	-	-	-	-	-	-	-
Value sorted portfolios									
P1	-	-	-	-0.001	-0.561	0.851	-00.01	-0.310	0.938
P5	-	-	-	-	-	-	0.004	1.750	0.910
Prior returns sorted portfolios 12/12									
P1	-	-	-	-	-	-	-	-	-
P5	0.015	1.376	0.375	-	-	-	0.014	3.735**	0.841
Prior returns sorted portfolios 6/6									
P1	0.013	1.124	0.412	-	-	-	-	-	-
P5	0.017	2.331**	0.534	-	-	-	0.015	3.951	0.833
Liquidity sorted portfolios									
P1	-	-	-	-	-	-	0.013	2.470**	0.615
P5	0.009	1.487	0.654	-	-	-	-	-	-
Profitability (ROA) sorted portfolios									
P1	0.021	1.571	0.340	-	-	-	0.001	0.337	0.838
P5	-	-	-	-	-	-	0.002	0.852	0.887
Profitability (ROE) sorted portfolios									
P1	-	-	-	-	-	-	-	-	-
P5	0.016	2.607**	0.644	-	-	-	0.003	1.316	0.896
Accruals sorted portfolio									
P1	-	-	-	-	-	-	0.002	0.539	0.793
P5	-	-	-	-	-	-	-	-	-
Stock issues sorted portfolios									
P1	-	-	-	-	-	-	-	-	-
P5	-	-	-	-	-	-	-	-	-
Stock repurchases sorted portfolios									
P1	0.006	1.124	0.693	-	-	-	0.010	2.028	0.844
P2	-	-	-	-	-	-	-	-	-
Port.	**Indonesia**			**South Africa**			**South Korea**		
	a	**t(a)**	**Adj. R^2**	**a**	**t(a)**	**Adj. R^2**	**a**	**t(a)**	**Adj. R^2**
Size sorted portfolios									
P1	0.002	0.265	0.724	-	-	-	0.009	2.552**	0.870
P5	-	-	-	-	-	-	-	-	-
Value sorted portfolios									
P1	-0.002	-0.530	0.898	0.018	4.122**	0.653	0.009	2.266**	0.873
P5	-	-	-	-	-	-	-	-	-
Prior returns sorted portfolios 12/12									
P1	0.004	0.692	0.792	0.004	1.032	0.868	0.004	1.032	0.868
P5	-	-	-	-	-	-	-	-	-
Prior returns sorted portfolios 6/6									
P1	0.003	0.556	0.769	-	-	-	-	-	-
P5	-	-		0.018	4.459**	0.694	-	-	-
Liquidity sorted portfolios									
P1	-	-	-	0.013	3.510**	0.620	-	-	-
P5	-	-	-	-	-	-	-	-	-
Profitability (ROA) sorted portfolios									
P1	-	-	-	0.021	4.371**	0.592	-	-	-
P5	-	-	-	-	-	-	-	-	-
Profitability (ROE) sorted portfolios									
P1	-	-	-	0.018	4.254**	0.614	-	-	-
P5	-	-	-	-	-	-	-	-	-
Accruals sorted portfolio									
P1	-	-	-	0.009	2.199**	0.727	0.004	1.203	0.824
P5	0.004	0.597	0.728	0.008	2.150**	0.749	-	-	-
Stock issues sorted portfolios									
P1	-	-	-	-	-	-	0.009	1.683	0.772
P5	-	-	-	-	-	-	-	-	-
Stock repurchases sorted portfolios									
P1	-	-	-	0.024	2.728	0.017	-	-	-
P2	-	-	-	0.016	2.160	-0.001	-	-	-

*P1 is the portfolio consisting of 20% of companies with lowest attribute while P5 consists of top 20% companies with highest attribute under consideration. In case of repurchases, stocks are divided into two portfolios viz. P1 and P2. The table shows the excess returns on various stylized portfolios regressed on the returns for the market (R_{mt} - R_{ft}) factor and the two proxy portfolios that mimic for size (SMB) and price to book equity (LMH) factors. $R_{pt} - R_{ft} = a + b\ (R_{mt} - R_{ft}) + s(SMB_t) + h(LMH_t) + e_t$. a is the intercept in the fama French model and t(a) shows its t-statistic. ** t-statistics are tested for significance at 5% level on two tail basis. The first half of the table shows the results for Brazil, China and India. The second half of the table shows results for Indonesia, South Africa and South Korea.*

Nevertheless, value anomaly persists in South Africa and South Korea. Page (1986) and Page and Palmer (1991) did find a P/E existed on the Johannesburg stock exchange5. Hoffman (2010) finds a positive relation between B/M and future returns persists after controlling for risk and confirms that B/M is more useful relationship to exploit than market cap in case of South Africa. Wang and Xu (2004) show that book to market ratio does not explain cross sectional differences in returns in China.

Prior Return Patterns-Table 1 gives results on unadjusted average returns on both 6/6 and 12/12 prior return patterns for corner portfolios. A positive return differential between corner portfolios (P5 and P1) implies momentum whereas a negative return differential implies contrarian. Results of 6/6 prior return patterns show that India and South Africa exhibit momentum behavior while the remaining four countries display contrarian behavior. No significant prior return patterns are reported for China and South Korea. CAPM results show that intercepts for winner portfolios are statistically significant in case of India and South Africa. The market factor does not explain momentum, which could be a result of very narrow differences in betas of corner portfolios. Even the Fama French factors are unable to completely explain the abnormal returns on winner portfolios for both India and South Africa because winner portfolio loads less on value factor as compared to loser portfolio. This means winners portfolio consist of growth stocks whereas they should have comprised of value stocks for providing a risk explanation. Thus momentum pattern persists for India and South Africa providing a monthly abnormal return on winner portfolio of 1.5% in India and 1.8% in South Africa respectively. For countries with contrarian behavior, both size and value factors of the FF model are able to explain returns on .loser portfolio in Indonesia but FF factors fail to explain returns on winner portfolio for Brazil with an alpha of 1.7% per month. The results show that reversal pattern obtained under CAPM for Brazil turns into momentum pattern under FF framework, which may be statistically explained owing to the fact that P5 shows low loadings on size and value factors than P1. Results for 12/12 prior return strategy are similar to that of 6/6 strategy. Significant momentum profits are reported only for India and South Africa, since the Fama French model is unable to explain the abnormal returns on the winner portfolios. On the other hand, Brazil and Indonesia report strong reversals. However, the contrarian effect established for these two countries with unadjusted average returns get absorbed by size and value factors of the Fama French model. Thus, profits from prior return strategies are large for emerging markets. Evidence for international momentum effects is mixed in the literature. Negative momentum effects for Indonesia are reported in Chen and Feng (2009) and Rowenhorst (1999). Chui, Titman and Wei (2010) and Vu (2012) find insignificant negative momentum profits for South Korea. Chen, Kim, Yao and Yu (2010), Wang (2004) and Wang and Chin (2004) find trading on momentum is unprofitable in the Chinese market. Lemos and Costa Jr. (1997) and Bonono and Dall' Agnol (2003) support a reversal in Brazilian market.

Liquidity Anomaly-Table 1 shows that low liquidity portfolio provides higher unadjusted average monthly returns than high liquidity portfolios in all countries except China and Indonesia where difference between P5 and P1 is negligible. This relation between liquidity and returns is consistent with that in developed markets. India has the highest significant return differential of 1.1% per month and South Korea has the least return differential of 0.3% per month. The intercepts in CAPM regressions are significantly higher in low volume stocks as compared to high volume stocks in case of India, Brazil and South Africa. This is in line with results of Brazilian market obtained for 1995-2008 obtained by Machado and Mediros (2012) and Sehgal, Subramaniam and Moriandiere (2012) for India. We find that market beta is higher for high volume stocks as compared to low volume stocks, which is inconsistent with risk story. Fama French regressions in Table 3 show significant intercept for low volume stocks in case of India and South Africa whereas size factor is significant in explaining alpha in Brazil. However unexplained returns to the tune of 1.3% per month both in India and in South Africa remain. Hence liquidity anomaly exists in India and South Africa. Chen, Kim, Yao and Yu (2010) and Naughton, Cameron and Veeraraghavan (2008) find that trading volume does not significantly predict stock performance in China.

Profitability Anomaly- Literature provides two contrasting relationships between profitability and returns. If profits are examined from the firm's point of view a positive relation between profitability and returns is supported (Fama & French, 2008)). This is because profits are visualized as the reward for growth and innovation, which exposes entrepreneur to higher risk thus resulting in higher returns. On the other hand, from the perspective of the investor a relatively profitable firm is perceived to be less risky and hence should provide low returns (see Sehgal & Subramaniam, 2012)). Sorting portfolios on ROA we find that the unadjusted returns are larger for less profitable stocks as compared to more profitable stocks in the case of all five markets except Brazil. This negative relation obtained for five emerging markets is in contrast to results obtained for mature markets and support the investor's perspective on relation between profitability and returns. Of this basket, the return differential between less profitable and more profitable stocks is maximum in South Africa (2 % per month) followed by India and Indonesia each at 0.7% per month and South Korea and China not displaying any significant unadjusted returns. Brazil seems to be the only market among sample emerging markets group showing a positive relation between profitability and returns as is confirmed for mature markets.

The return differential between more profitable and less profitable stocks in Brazil stands at 0.8% per month. CAPM results show that significant intercepts exist for low profitability portfolio in India and South Africa and high profitability portfolio in India. The market beta for less profitable stocks is more than that of more profitable stocks in India and South Africa as anticipated showing that less profitable stocks are riskier. The reverse pattern is observed in Brazil where beta for more profitable stocks (better performing) is more. A significant value of beta in all above cases establishes the important role of the market return factor in capturing a large amount of variation in common stock returns. Results of the market model on ROE sorted portfolios also show significant intercept for low profitability portfolio in South Africa and high profitability portfolio in Brazil and India. The three factor model explains the profitability anomaly on ROA sorted portfolios in the Indian and Brazilian market. This result for Indian market confirms with that obtained by Sehgal and Subramaniam (2012).However the model fails to capture extra normal returns observed in South African market. Results on ROE sorted portfolios for Brazilian market indicate significant intercept for high profitability portfolio, which was not, observed when the profitability proxy was ROA. Thus, FF results on ROE sorted portfolios show that profitability anomaly exists in both South Africa and Brazil. A weak positive relation is observed between profitability and returns for South Africa by Hoffman (2010) for a longer time period 1985-2010, which is sustained after compensating for size and value.

Accruals Anomaly- Sloan (1996) establishes a negative relation between accruals and returns due to mistakes made by investors in valuation of earnings attributable to accruals. Investors overestimate the lower persistence of accruals component of earnings and underestimate the higher persistence in cash flows component. However if investors under price the information in accruals component of earnings and overprice the information in cash flows component of earnings a positive relation between accruals and returns would be obtained (See Sehgal, Subramaniam & Deisting, 2012). Table 1 shows a negative relation between accruals and average returns for China, Indonesia, South Africa and South Korea. A positive relation is established for India and Brazil, which is contrary to existing studies for mature markets. The market model results show that significant abnormal excess returns are obtained on low accrual stocks for India and South Africa and on high accrual stocks for Indonesia and South Africa. Hence, accruals seem to be an equity market anomaly when one uses the CAPM framework for these three countries The FF model is successful in absorbing the extra normal returns that are missed by CAPM in case of India and Indonesia. This is made possible by the additional contribution of the both size and value factors. However, the accrual anomaly exists in South African market due to presence of significant abnormal returns in FF framework. Chen, Kim, Yao and Yu (2010) find that size, value, momentum and accruals are absorbed by FF model in china. A weak negative relationship is also reported by Hoffman (2010) for South Africa, which is not sufficiently strong to be exploited. Cupertino, Martinez and Costa Jr. (2012) show that returns are lower for firms with lower accruals and the

occurrence of accrual anomaly does not provide any arbitrage opportunities for Brazilian case. Leippold and Lohre (2007) do confirm the negative relation between accruals and returns, but do not find statistically significant returns from accruals trading strategy for Indonesia and South Korea. Kho and Kim(2007) find that the FF three factor model explains anomalous returns on accrual sorted portfolios for medium sized small and large value stocks for South Korean market from 1993-2005.

Stock Issues and Stock Repurchases Anomalies - The relation between average returns and share issues and repurchases is captured by the net share issues variable, which is the change in the natural log of (split-adjusted) shares outstanding from the fiscal year ending in calendar year t-2 to the fiscal year ending in calendar year t-1. A positive value indicates issues of shares whereas a negative value implies repurchases. We will discuss results for each case separately.

Stock Issues Anomaly

Existing research on mature markets states that future returns are low after stock is issued. Lougran and Ritter (1995) have argued that a possible explanation for the underperformance of equity issuing firms is that investors under react to the adverse news of an equity issue. Ritter (1998) states that most firms which go public are small growth stocks which in general have very low returns. Eckbo, Masulis and Norli (2000) and Eckbo and Norli (2005) argue that issuing firms are viewed as less risky by investors and hence are priced to yield lower expected returns. We find that returns for companies with larger stock issues are low as compared to those with low stock issues for all countries except India, which confirms with existing evidence on mature markets. In India high issues stocks significantly outperform low issues stock by 1.1% per month on unadjusted returns basis. The CAPM explains this anomaly since we find insignificant intercepts for India, Indonesia and South Africa on corner portfolios except South Korea. The beta of the highest issues portfolio is larger than that of lowest issues portfolio for India, Indonesia and South Korea. However, we find that returns on high issues portfolio is more only in the Indian case. This is in line with the results of Sehgal, Subramaniam and Moriandiere (2012) for India when returns were measured in INR. They found that cash flow to assets ratio is lower for high stock issues firms compared to low stock issues firms both for the year prior to issue period and three years later. This suggests that high stock issues firms persistently exhibit lower operating efficiency and hence are riskier than low issues firms. However, the returns on high issues portfolio are less vis-a-vis low issues portfolio for South Korea and Indonesia, which seems to be an aberration. This means that although CAPM beta has the propensity to absorb returns, the return beta relationship is not as neat as postulated by CAPM for the above two markets. Unexplained alphas on low issues portfolio for South Korea are explained by the FF model owing to contribution of both size and value factors. We can therefore say that stock issues do not provide anomalous returns in any of the sample markets.

Ikenberry et al (1995) find that on average, market under reacts to open market share repurchase announcements. They hypothesize that the market treats repurchase announcements with skepticism leading prices to adjust slowly overtime. Higher repurchases (P2) provide significantly higher unadjusted returns vis-a-vis lower repurchases (P1) for India, South Korea and South Africa, which confirms with existing literature on developed markets. The reverse holds true for Brazil. The return differential between P2 and P1 is highest at 1.2% per month for South Africa followed by 1% per month for India. The market model results indicate insignificant intercepts for South Korea implying that CAPM absorbs the anomalous pattern in excess returns. The anomaly remains in South Africa as the additional risk factors viz. size and value are unable to explain the extra normal returns earned on repurchases sorted portfolio. The results obtained in this study for the Indian market in USD denominated returns is different from the study of Sehgal et al(2012) which is in INR denominated returns only in case of share repurchases. Here we find that higher repurchases provide significant abnormal return of 1% per month even after adjusting for size and value factors of Fama French model. In case of South Africa, Hoffman

(2010) finds that net stock issues display a weak negatively correlated relationship with returns and after adjusting for risk, the results are still statistically significant.

The above results indicate the presence of the size anomaly in India, South Korea and Brazil, value anomaly in South Korea and South Africa, momentum anomaly in India and South Africa, mild reversals in Brazil, liquidity anomaly in India and South Africa, profitability anomaly in Brazil and South Africa, accruals anomaly in South Africa and stock repurchases anomaly in India and South Africa. Results confirm the presence of the size anomaly in three countries and value, liquidity, profitability and repurchases anomaly in two countries each and accruals anomaly in one country. We find that momentum anomaly is present in two out of the six countries under study, with one country reporting mild reversals. This is surprising given that momentum is the most important stock characteristic predicting stock returns in US and other mature markets. It also implies that the existing reasons for momentum in mature markets may not hold for emerging markets. Anomalous returns cannot be earned by trading strategy formed on stock issues in any of the countries under consideration.

ROLE OF LIQUIDITY FACTOR IN STOCK RETURNS

We next investigate whether the asset pricing anomalies found in previous section for the different sample markets, can be explained by using liquidity as an additional risk factor in the FF factor structure. A broad literature exists to account for the role of liquidity risk in explaining asset prices. Pastor and Staumbaugh (2003), Keene and Paterson (2007), Liu (2004), Bali and Calici (2004), Chan and Faff (2005), Miralles and Miralles (2006) provide evidence of relationship between expected returns and liquidity factor. Most of these papers assigned to liquidity a role of stock's common risk factor similar to SMB and HML (LMH in our case) in the framework of FF model and found that liquidity emerged as an important factor influencing returns even after the effect of other known variables was considered (see Liu,2006, Leipplod & Lohre,2009, Sehgal, Subramaniam & Moriandere,2012. These views have found support in studies on developed markets and could be tested for their applicability in emerging markets. In addition, including the liquidity factor may prove to be important particularly in emerging markets where illiquidity is a common issue.

Based on the above opinions, we augment the FF three-factor model with a liquidity factor. By comparing estimated intercepts of Equation 6 with Equation 3 we can infer whether inclusion of liquidity alters the estimated intercepts or alters the effect of other variables on portfolio returns. The dependent variable in the above regression is the excess return on various characteristic sorted portfolios, which could not be explained by the FF model in the different countries.

Results in Table 4 show that the liquidity augmented FF model is able to mop up all the excess returns on liquidity sorted portfolios which were missed by FF in the Indian case. But this does not hold true for South Africa, where liquidity factor absorbs around 38% of the extra normal returns (on liquidity sorted portfolios) generated from the FF model. However, significant unexplained returns to the tune of 0.8% per month still remain. The augmented model is also a better descriptor of returns on size sorted portfolios in the Indian case, but not in case of South Korea. Regression results of the four factor model on the prior return winner portfolios (both 6/6 and 12/12) show significant intercepts for India, Brazil and South Africa. The liquidity augmented FF model is unable to absorb alphas on the P/B sorted portfolios for South Africa and South Korea. Significant intercepts remain in the liquidity augmented model on profitability sorted portfolios in the case of South Africa and Brazil. In case of ROE sorted portfolios, liquidity augmented FF model is able to explain returns on high profitability portfolio for South Africa The additional liquidity factor does not help to absorb extra normal returns missed by FF model on accrual and repurchases sorted portfolios for South Africa. It however explains the extra normal returns on repurchases sorted portfolios for India.

Table 4: Empirical Results for the Liquidity Augmented Fama French Model

Portfolio	Brazil			India			South Africa			South Korea		
	a	t(a)	Adj. R^2	a	t(a)	Adj. R^2	a	t(a)	Adj. R^2	a	t(a)	Adj. R^2
Size sorted portfolio												
P1	0.058	1.647	0.075	0.010	1.940	0.844	-	-	-	0.013	3.406**	0.880
P5	-	-	-	-	-	-	-	-	-	-	-	-
Value sorted portfolio												
P1	-	-	-	-	-	-	0.018	3.956**	0.652	0.009	2.257**	0.872
P5	-	-	-	-	-	-	-	-	-	-	-	-
Prior returns sorted portfolio (6/6)												
P1	-	-	-	-	-	-	-	-	-	-	-	-
P5	0.017	2.316**	0.545	0.013	3.543**	0.835	0.017	4.103**	0.701	-	-	-
Prior returns sorted portfolio (12/12)												
P1	-	-	-				0.009	2.114**	0.665	-	-	-
P5	-	-	-	0.013	3.386**	0.842	0.015	3.920**	0.712	-	-	-
Liquidity sorted portfolio												
P1	-	-	-	0.002	0.671	0.851	0.008	2.833**	0.780	-	-	-
P5	-	-	-	-	-	-	0.008	2.833**	0.842	-	-	-
Profitability sorted portfolio(ROE)												
P1	-	-	-	-	-	-	0.016	3.786**	0.640	-	-	-
P5	0.016	2.613**	0.661	-	-	-	0.006	1.702	0.767	-	-	-
Profitability(ROA) sorted portfolio												
P1	-	-	-	-	-	-	0.020	4.107**	0.594	-	-	-
P5	-	-	-	-	-	-	-	-	-	-	-	-
Accruals sorted portfolio												
P1	-	-	-	-	-	-	0.010	2.330**	0.726	-	-	-
P5	-	-	-	-	-	-	0.008	2.168**	0.747	-	-	-
Stock Repurchases sorted portfolio												
P1	-	-	-	0.009	1.612	0.844	0.025	2.769**	0.010	-	-	-
P2	-	-	-	-	-	-	0.017	2.172**	-0.009	-	-	-

P1 is the portfolio consisting of 20% of companies with lowest attribute while P5 consists of top 20% companies with highest attribute under consideration . The table reports the regressions of excess stock returns on the excess market return and the mimicking returns for size, value and liquidity. $R_{Pt} - R_{Ft} = a + b\,(R_{Mt} - R_{Ft}) + s(SMB_t) + h(LMH_t) + l(LIQ_t) + e_t$ *where LIQ is the factor mimicking portfolio for liquidity and l is the sensitivity coefficient. The other terms are same as in the Fama French model.a is the intercept in the model and t (a) shows its t-statistic.. t-statistics are tested for significance at 5% level on two tail basis.*

In sum the four factor Liquidity Augmented FF is a better descriptor of asset pricing compared to one factor CAPM and three factor FF only in the Indian context. The liquidity augmented FF model should be used as a benchmark in the Indian case by portfolio managers and investment analysts. However this model does not seem to play any significant role for explaining anomalies in other countries. This implies that in the absence of pricing of liquidity factors, the FF seems to be an appropriate performance benchmark for other sample emerging markets. The persistence of anomalies may suggest that there is role for additional risk factors in returns. Factor identification continues to be a challenge for researchers especially when one is trying to develop a strong economic foundation for the risk story. Alternatively, one might require a behavioral explanation.

CONCLUDING COMMENTS

In this paper, we investigate the existence of prominent asset pricing anomalies viz. size, value, momentum, liquidity, profitability, accruals, stock issues and stock repurchases in select emerging markets. We use data on share prices, market index and various company characteristics for the sample markets from Jan 1994 to Dec 2011. First, we attempt to identify the presence of these anomalies. Next, we evaluate if they can be explained by standard asset pricing models such as CAPM and Fama French. If these models are unable to fully explain these anomalies, then we augment the Fama French model with a liquidity factor where the importance of liquidity is addressed in the context of other known time series determinants of stock returns.

On the basis of our empirical tests, one can conclude that South Africa seems to be the most inefficient market as the FF model is unable to explain returns on all characteristic sorted portfolios considered,

except those based on size. Hence, anomalous returns can be earned on the JSE by employing trading strategies based on value, momentum, profitability, accruals and stock repurchases. It should thus serve as the most exciting destination for global portfolio managers. It is followed by Brazil where trading on contrarian strategy and profitability provide abnormal returns to investors. Next is the South Korean market where size and value based stocks provide extra normal returns followed by the Indian market where momentum trading would be profitable. China and Indonesia are the two countries not displaying significant equity market anomalies and hence would not be of interest to global portfolio managers. Thus emerging markets seems to be a heterogeneous asset class since each country exhibits a unique character in terms of equity market anomalies. Magnitude of anomalies varies across countries as well as across time periods for the same country, when compared with prior research.

Our empirical results also provide evidence about selection of appropriate risk models as benchmark of performance evaluation for sample emerging markets. The FF model could be used as a performance benchmark for all markets except India where the liquidity augmented FF seems to do a better job in explaining cross section of average stock returns. The arbitrage opportunities in emerging markets cited by the research shall be interesting for investment analysts and global fund managers who indulge in risk diversification process given the historical low correlation between mature and emerging markets (Literature exists to show diversification benefits from emerging equity markets (see Bekaert and Uris (1996), Harvey (1995), Bailey and Stultz (1990), Bekaert and Harvey (2003)). These studies state that portfolio risk can be reduced by including emerging markets securities in diversified portfolio, since emerging markets tend to have low correlations with developed markets thus leading to overall risk reduction benefits to portfolio). Our results would have practical implications for country selection in international portfolio investment of managed funds. They shall also be relevant for policy makers in these economies as they make efforts for long term economic cooperation and greater financial integration. The study contributes to equity market anomaly literature for emerging economies.

However, it should be borne in mind that the successful implementation of stock selection strategies in emerging markets could be hindered by transaction costs, short selling constraints, and policy implementation delays. In addition, differences exist among these countries w.r.t political system, exchange rate regime and regulations on international capital mobility. In addition, the investor behavior in emerging markets is different from that of developed markets.

Further research could involve a comparative analysis for other emerging markets viz. emerging markets of Europe, emerging markets of South America and countries that form part of a trade block. It would be exciting to study the relationship between company characteristics and stock returns separately in the pre liberalization and post liberalization phases. In addition as the liberalization policies differ among the emerging markets, it would be interesting to examine if differences in policies account for the difference in anomaly results.

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BIOGRAPHY

Sanjay Sehgal is Ph.D. finance from Delhi School of Economics and postdoctoral commonwealth research fellow from London School of Economics, UK. He is professor of Finance in Department of Financial Studies, South Campus, University of Delhi, India. Email: sanjayfin15@gmail.com

Srividya Subramaniam is M.Phil (Economics) from Delhi School of Economics and is currently pursuing Doctoral Research at Department of Financial Studies, South Campus, University of Delhi, India. She is Assistant Professor of Economics in Department of Economics, SGTB Khalsa College, University of Delhi, India, srividyadse@gmail.com

Florent Deisting is a Professor of Finance, Group ESC Pau, Campus, Universitaire - 3, Rue Saint John Perse, BP 7512 - 64075 PAU Cedex, FRANCE. Email: florent.deisting@esc-pau.fr