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Illiquidity, Foreign Investor Preferences and Asset Pricing In Kenya

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Abstract

In this paper we examine the role of illiquidity and foreign investor preferences in asset pricing in the Kenyan frontier stock market. Since stock illiquidity and heterogeneous foreign investor preferences are pervasive features of this market, investors are likely to demand higher compensation for holding illiquid and less foreign investor-preferred stocks, thereby increasing cost of equity. We test this hypothesis by incorporating an illiquidity and foreign stock holding factor into the classical Capital Asset Pricing Model (CAPM). Our analysis employs monthly data for the period January 2011 to September 2016. Our empirical results support a four-factor CAPM which incorporates size, illiquidity, and foreign preferences factor. Importantly, the illiquidity and foreign factors attract a risk premium ranging between 5-9 percent yearly. This implies that Kenyan firms can significantly reduce the cost of equity finance by improving liquidity and foreign investor holdings.

Keywords: CAPM, Illiquidity, Foreign Investor

JEL classification: G12, G15

1. Introduction

Frontier markets are clearly distinct from developed markets (Jung, Lee, & Park, 2009; Minovic & Zivkovic, 2010). For example, Jung *et al*. (2009) shows that although there have been significant efforts to integrate world financial markets, there still remains substantial segmentation between these markets. Jung *et al*. cite political uncertainty and weak corporate governance as the leading time invariant factors that create a gap between these markets. Similarly, Minovic and Zivkovic (2010) highlight several features that differentiate frontier markets from developed markets. Firstly, frontier markets tend to have few listed stocks that are further internally segmented in terms of market capitalization. That is, a handful of stocks account for a greater share of the total market capitalization. This intra-market segmentation is also documented by Hearn, Piesse, and Strange (2010).

Secondly, illiquidity is a key feature characterizing frontier markets. The few listed stocks in these markets trade irregularly and infrequently. Thirdly, frontier markets suffer from lack of transparency and reliability of information. For example, there are no standard rules as to what information about a firm should be made public. Consequently, there are bound to exist opportunities for insider trading. Additionally, such information opaque environments maximize the scope for investor disagreement with potential implications for asset pricing (Jung *et al*., 2009)

In light of the differences between frontier and developed markets, Jung *et al*. (2009) and Minovic and Zivkovic (2012) advocate for development of new asset pricing models for the emerging and frontier markets. Particularly, asset pricing models for the less developed markets ought to take into account such pervasive features as illiquidity frictions and investor heterogeneity. Accordingly, this study attempts to examine the role of illiquidity and foreign investor preferences on stock price formation in Kenya over the period 2011 to 2016. Particularly, this study makes two important contributions to the asset pricing literature and indeed the stock market development literature; Firstly, Kenya ranks among the economies with a high cost of raising equity (Hearn *et al*., 2010). One plausible explanation for the high cost of equity for Kenya and other African frontier markets relate to high transactional costs (Hearn *et al*. (2010). Stock illiquidity is one prominent form of transaction cost because investors demand high illiquidity premium to hold stocks that are hard to sell. Accordingly, quantifying the effects of illiquidity on stock returns is an important first step in dealing with the high cost of equity.

Notable studies on the impact of illiquidity on stock returns in Kenya are Hearn (2009) and Hearn *et al*. (2010). These studies find an active role of size and illiquidity in the price formation process for the selected sample African stock markets including Kenya. It is important to note that even in these studies, Kenya is considered as part of a panel of countries and hence no country level policy implications can be drawn from these studies. Besides, existing studies focus on the period before the global financial crisis. It is therefore interesting to examine whether investors focus more on liquidity after the great liquidity shock of 2008.

Consequently, using post 2008 stock data from Kenya, this paper examines the role of liquidity in explaining stock return variations in the Kenyan stock market. Employing, a new dataset also serves as a robustness check on previous similar studies and hence avoids the problem of data snooping (Lo & MacKinlay, 1990).

Secondly, this is the first study to model the role of foreign investor stock holdings on stock price formation in Kenya. The impact of foreign investor preferences on stock prices is not only important to specific firms and market regulators but also to other economic policy authorities. To the firms, if stocks less demanded by foreign investors attract some premium in the market, then it would be important for these firms to find out what makes their stocks less preferred. This will help them lower their cost of raising equity finance. To the regulators, if for instance, foreign investors neglect some stocks due to lack of information, then this provides an impetus for the regulators to tighten the information dissemination framework.

2. Previous Evidence

2.1 Illiquidity and asset pricing

The impact of illiquidity on stock price formation has been carefully studied over the last 30 years. Amihud and Mendelson (1986) were the first to extensively study the effects of illiquidity on stock returns. Using the Fama and MacBeth (1973) regression framework and employing the bid-ask spread as a liquidity measure, these authors document a significant positive link between observed stock returns and illiquidity for the U.S equity market over the period 1961-1980. They therefore conclude that rational investors price stocks in a way that returns for illiquid stocks are higher relative to liquid stocks. Liquidity being a multidimensional attribute, focusing on only one measure of liquidity as Amihud and Mendelson does may not be provide firm conclusions regarding the relation between asset prices and liquidity.

Revisiting Amihud and Mendelson (1986)'s work, Eleswarapu and Reinganum (1993) document that the positive illiquidity premium documented by Amihud and Mendelson appears to be seasonal. Specifically, they find a strong January effect for the illiquidity premium. Brennan and Subrahmanyam (1996) also confirm the existence of an illiquidity premium using a Fama-French liquidity augmented model for the U.S market. Eleswarapu and Reinganum share in the weakness of Amihud and Mendelson in the sense that they employ only one dimension of liquidity (the spread aspect). Moreover, these two studies focus on the U.S market which is arguably the most liquid market in the world. However, Bekaert *et al*. (2007) argues that illiquidity effects are best tested in markets where illiquidity is a more severe problem.

Chan and Faff (2005) explore the question of whether illiquidity is priced in the Australian stock market over the period 1990-1998. To proxy for liquidity Chan and Faff employ the share turnover ratio. Further, they form mimicking portfolios associated with size, book to market, and illiquidity. Together with the CAPM market beta they estimate a time series regression in a GMM framework. Their results indicate that illiquidity attracts premium in the Australian market of up to about 1.35 per cent per month (or about 16 percent annually). However, like earlier studies, this study narrowly focuses on one measure of liquidity without testing whether the results are robust across other dimensions of liquidity. Interestingly, Marcelo, Quirós, and Oliveira (2011) using the same methodology as Chan and Faff (2005) and the proportion of zero returns of Lesmond *et al*. (1999) as the liquidity measure, finds that illiquidity is not priced in the Portuguese market over the period 1988 to 2008. The findings of Marcelo *et al*. opens up a debate on whether illiquidity effects on asset prices are dependent on the market examined, the methodology employed, or the liquidity measure utilized in the analysis.

Minovic and Zivkovic (2012) run a horse race of asset pricing models including the classical CAPM, the Fama and French (1993) three factor model, the liquidity adjusted CAPM of Liu (2006) and a liquidity-augmented Fama and French (1993) using Serbian stock data for the period 2005-2009. This study is remarkable in the sense that it focuses on a small frontier market where illiquidity is a pervasive feature. We thus expect strong evidence of illiquidity effects. Indeed, the authors find that the liquidity adjusted CAPM characterizes the Serbian stock returns relatively well.

In the context of Kenya, empirical literature on asset pricing continues to evolve. There exist several studies focused on the impact of macroeconomic factors on stock returns using simple OLS with no specific asset pricing framework in mind (Olweny & Omondi, 2011; Ouma & Muriu, 2014; Mumo, 2017 among others). However, there also exist a few studies which examine stock returns variations in the context of some established asset pricing models especially the CAPM and Fama-French.

With regard to CAPM, recent empirical studies by Hearn (2009) and Coffie and Chukwulobelu (2013) find that the model is able to explain variations in stock prices over time especially when it is augmented with some firm specific characteristics. Hearn (2009) test the significance of size and illiquidity factors in explaining portfolio returns variations across some selected African frontier stock markets including Kenya. He finds that the size and liquidity-augmented CAPM characterizes the stock price formation in these markets better than the standard CAPM. For example, the adjusted R-squared for the extended CAPM exceeds that of single factor CAPM by about 20 percent. Although the study by Hearn (2009) is remarkable in understanding the effect of

illiquidity on stock returns across the African markets, it is largely an aggregate study that gives no country specific policy implications of the pervasive illiquidity effects on stock price formation.

Regarding the applications of Fama and French (1993), a recent study by Nayema and Muriu (2016) validates the suitability of this model in explaining stock returns for the Kenyan equity market. Notably, these authors modify the Fama-French model by accounting for thin trading as well as the tiered nature of the NSE, whereby trading is highly concentrated on a few large stocks. These authors find a positive relationship between portfolio returns and trade concentration. They then conjecture that this positive return-trade concentration may plausibly be an indicator of foreign investor's preference for large and liquid stocks. In view of this, this study follows up this claim and empirically examines the impact of illiquidity and foreign investor preferences on stock returns.

2.2 Foreign investor preferences and asset pricing

Jung *et al*. (2009) construct a two factor model including the market beta (of CAPM) and a foreign ownership factor. To motivate their foreign ownership factor augmented CAPM, Jung *et al*. (2009) argue as follows: The influx of foreign investors creates a segmentation of some sort. Foreign investors selectively hold stocks which have certain characteristics (such as those that are large and liquid) while domestic investors have to pick their preferred portfolio but additionally hold stocks that are neglected by foreign investors so as to clear the market. This implies that domestic investors are forced to deviate from their planned optimal portfolios. Moreover, stocks not held by foreign investors have limited risk pooling benefits. Consequently, to hold these less-foreign-preferred stocks, rational domestic investors must be rewarded with higher expected returns. The essence of this argument therefore is that, stocks with low foreign ownership are expected to generate higher risk-adjusted returns compared to those with a higher foreign presence.

Jung *et al*. (2009) demonstrate that the above claim holds in Korea and weakly in Japan. Specifically, for the period July 1992 to December 2006, these authors first construct a foreign ownership factor as follows; they rank all sample stocks into quintiles based on their level of foreign shareholding and then form the factor as the average return of the lowest quintile minus the average return of the largest quintile. After forming this foreign factor these authors then test a time series version of a foreign-ownership factor augmented CAPM. The results of this empirical exercise shows that the foreign factor augmented CAPM is superior to the single factor CAPM as well as the Fama and French (1993) three factor model for Korea and Japan.

Ceylan, Dogan, and Berument (2015) extends Jung *et al.*(2009)'s two-factor model into a four factor model by incorporating size and book to market factors in the style of Fama and French (1993). Ceylan *et al.* (2015) then test the extended Fama-French four factor model using data from the Turkish stock market over the period 1999 to 2012. Ceylan et al. finds that stocks with low foreign investor ownership earn a return risk premium relative to stocks with a high foreign concentration confirming the findings of Jung *et al*. (2009).

Two key observations emerge from the review of previous evidence on the interactions between illiquidity, foreign investor preferences, and expected stock returns; First, as aptly observed by Ceylan *et al*. (2015) the search "for a missing factor to obtain a better asset pricing model still remains a vivid and disputable issue". Probably, it is on this basis that some researchers have recently suggested that the differential holdings of foreign investors should be incorporated into the asset pricing models.

Secondly, the empirical results on the role of illiquidity in asset pricing appear mixed. For example, while Chan and Faff (2005) find robust evidence of a positive illiquidity premium for the Australian stock market, Miralles Marcelo *et al*. (2011) finds no illiquidity premium in the Portuguese stock market. However, the literature relating to emerging and frontier markets seem to favor the existence of positive illiquidity premiums. Interestingly, not many studies focus on the frontier markets where illiquidity is likely to yield powerful results (Bekaert, Harvey, & Lundblad, 2007). Motivated by this dearth of studies covering frontier markets, the current study focuses on the role of illiquidity and foreign investor holdings on the stock returns in the Kenya.

3. Methodology

3.1 Theoretical framework

The methodology employed in this study closely follows that of Fama and French (1993) 's extension to the classical CAPM. Fama and French argue that portfolio stock returns variations can be explained by variations in market risk (market beta), size risk factor (SMB) and the variations in a stock's book to market value (HML). However, Hearn (2009), Hearn *et al*. (2010), and Minovic and Zivkovic (2012) do not find the HML factor very useful in frontier markets. Accordingly, this study does not explore the effect of book to market ratio in the price formation of the NSE stocks. As a result, the model specified in this study retains the market beta and the size factor of Fama and French but then adds two other factors; an illiquidity factor (IML) and a foreign ownership factor (FOF). Hence, the final four-factor model assumes the following theoretical framework;

$$E((R_i) - R_f) = \beta_i (E(R_m) - R_f) + s_i E(SMB) + l_i E(IML) + f_i E(FOF) \quad (1)$$

Where, R_i is return for asset (portfolio) i; R_f is the risk-free return; R_m is the return of a market portfolio; SMB is the mimicking portfolio for risk associated with firm size, IML is the mimicking portfolio representing the illiquidity risk factor, and FOF is the risk factor associated with foreign investors ownership patterns.

3.2 Model Specification

Equation (1) is expressed in expectations form, however, to estimate this equation using sample historical data the following empirical version is specified;

$$r_{it} = \alpha_i + b_i r_{mt} + s_i SMB_t + c_i IML_t + f_i FOF_t + e_{it} \quad (2)$$

Where the dependent variable r_{it} refers to the monthly average excess (over risk-free) return for asset i, r_{mt} is the monthly mean market return, SMB_t is the simple average monthly return of small minus big zero-investment mimicking portfolio, FOF is the simple average of returns of a low foreign ownership minus high foreign ownership mimicking portfolio, IML_t is the simple average returns of an illiquid minus liquid mimicking portfolio, and e_{it} is the stochastic error term.

3.3 *Mimicking Portfolio Construction Procedure*

The construction of the size, illiquidity and foreign ownership factors are constructed in the style of Fama and French (1993). For the period 2011 to 2015, in June of every year, sample NSE stocks are first ranked by market capitalization (price x outstanding number of shares), then, using the median value of the market capitalization the stocks are split into two groups, low market capitalization (ML) and high market capitalization (MH).

Each of the two stock size groups are then further split into two groups based on stock liquidity value. Specifically, stocks within each size group are ranked in ascending order of illiquidity to form two groups; high liquidity (LH) and low liquidity (LL). Intersecting the size and the liquidity groups generates four stock portfolios (ML/LL, ML/LH, MH/LL, and MH/LH).

Further, each of the four portfolios is also split into two groups based on the level of foreign investor shareholding. To form the foreign holding subgroups, stocks are first ranked (in ascending order) on the basis of foreign investor shareholding of local stocks. Then the median of the foreign holding is used to break the stocks into two subgroups; low foreign shareholding (FL) and high foreign shareholding (FH). Again intersecting these foreign shareholding subgroups with the four portfolios constructed initially results in eight stock portfolios (ML/LL/FL, ML/LL/FH, ML/LH/FL, ML/LH/FH, MH/LL/FL, MH/LL/FH, MH/LH/FL, and MH/LH/FH). For example, the ML/LL/FL contains stocks in the low market capitalization group that are also less liquid and less preferred by foreign investors.

The final step consists of building the risk factors from the portfolios constructed. The SMB (small minus big) factor which captures the size effect is constructed by subtracting the daily equally weighted average returns of large-sized (by market capitalization) stock portfolios from small-sized stock portfolios. More explicitly;

$$\text{SMB} = (\text{ML/BL/FL} + \text{ML/BL/FH} + \text{ML/BH/FL} + \text{ML/BH/FH})/4 - (MH/BL/FL + MH/BL/FH + MH/BH/FL + MH/BH/FH)/4 \quad (3)$$

The IML (illiquid minus liquid) factor which represents the underlying risk of illiquid stock is also constructed as the difference between equally weighted average returns of high illiquid (low liquid, LL) portfolios and the low illiquid (high liquid, LH) portfolios. That is;

$$IML = (MH/LL/FH + MH/LL/FL + ML/LL/FH + ML/LL/FL)/4 - (MH/LH/FL + MH/LH/FH + ML/LH/FL + ML/LH/FH)/4 \quad (4)$$

The foreign ownership factor (FOF) is also constructed as the average returns of the portfolios with stocks that are less preferred by foreign investors minus returns of portfolios of stocks highly held by foreign investors.

That is;

$$FOF = (MH/LL/FL + MH/LH/FL + ML/LL/FL + ML/LH/FL)/4 - (MH/LH/FH + MH/LL/FH + ML/LH/FH + ML/LL/FH)/4 \quad (5)$$

3.4 Data and Measurement of Variables

The analysis in this study was conducted for ordinary stocks traded at the NSE at the monthly level from January

2011 to September 2016 (69 months). The sample period is selected based on the availability of foreign ownership data. For the construction of illiquidity, size, and foreign ownership portfolios, data was obtained from four sources. The daily volume of shares traded, closing stock prices, and number of outstanding shares for each stock are collected from DataStream and verified with NSE database. The market price index is obtained from (NSE) while the foreign ownership data is collected from the Capital Markets Authority (CMA). The 91-day Treasury bill rate which is employed as a proxy for risk free rate is obtained from the Central Bank of Kenya

For the purpose of constructing the illiquidity (IML) factor this study utilizes the popular Amihud (2002) price impact measure of illiquidity. This illiquidity measure is defined as follows;

$$ILLIQ_{i,d} = \frac{|R_{id}|}{P_{id}VO_{id}} \quad (6)$$

Where $ILLIQ_{i,d}$ represents the daily Amihud measure for a particular stock, $R_{i,d}$ is the daily continuously compounded stock return, and $VO_{i,d}$ is the daily stock trading volume, $P_{i,d}$ is the daily price for stock i. Monthly ILLIQ is then obtained as an equally weighted average of daily ILLIQ.

For the purpose of estimations and testing, the dependent variable is portfolio excess returns (measured as the portfolio returns minus the return on a three-month treasury bill- as a proxy for risk free rate), while the independent variables are the SMB, IML, FOF which are constructed in section (3.3).

4. Results and Discussion

4.1 Descriptive Statistics

Table 1 presents the average number of stocks in each of the 8 portfolios employed as the dependent variable. The portfolios are constructed as a 50:50 split of stocks based on stock size liquidity level, and foreign ownership level. The period covered is between January 2011 to September 2016 (69 months). The minimum average number of stocks per portfolio is about 1.6 while the maximum is about 7.9. The striking observation is that portfolios are constructed with very few stocks compared to most studies documented in the asset pricing literature. It is therefore important to note that the subsequent analysis results need to be approached in view of this critical limitation.

Table 2 reports some basic descriptive summary information and correlations for the excess market returns and the risk factors SMB, IML and FOF. Focusing on Panel A of the Table 2, we observe that the mean excess market returns over risk free rate is negative (about 0.97% per month). A plausible explanation for this negative market risk premium is that the interest rates have remained high over the sample period while the NSE index has been declining particularly since the beginning of 2015. For instance, the 3 month Treasury bill rate (used here as a risk free proxy) rose to about 21% in 2012 and also in 2015.

The average risk premium associated with stock size is positive at about 0.5 % per month. Thus, small firms earn up to 6% yearly returns over the big firms. Further, the mean return risk premiums for IML and FOF are surprisingly negative. Intuitively, the influence of large firms (which should show negative risk premiums) overshadows smaller firms yielding an overall negative mean IML and FOF risk premiums. Finally, the correlations reported in panel B are relatively low ranging from 0.08 to 0.38. This outcome indicates that the four factors are approximately orthogonal to each other. In other words, the factors have been constructed to uniquely explain the variations in portfolio returns.

Table 1: Average Number of Stocks for Each Portfolio

Portfolio	Size	Liquidity	Foreign ownership	Mean # stocks
1. ML-LL-FL	Small	Low	Low	3.5
2. ML-LL-FH	Small	Low	High	2.6
3. ML-LH-FL	Small	High	Low	7.9
4. ML-LH-FH	Small	High	High	5.9
5. MH-LL-FL	Big	Low	Low	4.8
6. MH-LL-FH	Big	Low	High	6.7
7. MH-LH-FL	Big	High	Low	1.6
8. MH-LH-FH	Big	High	High	3.3

Table 2: Summary Statistics and Correlations for Excess Market Returns, SMB, IML and FOF

Panel A: Summary statistics				
Variable	Excess market return	SMB	IML	FOF
Mean	-0.0097	0.0051	-0.0059	-0.0024
Std. Dev.	0.0353	0.0362	0.0142	0.0274
Min	-0.1064	-0.0969	-0.0327	-0.0729
Max	0.0425	0.0731	0.0279	0.0614
Panel B: Correlations				
	Excess market return	SMB	IML	FOF
Excess market return	1			
SMB	-0.38	1		
IML	0.08	-0.18	1	
FOF	0.35	-0.14	0.3125	1

4.2 Multifactor CAPM Estimation Results

Eight portfolios are formed from the intersection of three firm characteristics, size, illiquidity and foreign ownership. However, two of those portfolios are dropped due to extremely few stocks included (see Table 1). The time series of the excess returns for each of the retained six portfolios are regressed against four factors namely; excess market return, SMB, IML, and FOF over the period January 2011 to September 2016. The results of this extended CAPM time series regression are reported in Table 3. Several key observations can be drawn from Table 3. First, all the regression intercepts are not statistically significant from zero. In the asset pricing literature these intercepts (also known as Jensen alphas) represent asset pricing errors. Thus the observation that these intercepts are zero in the six portfolios indicates that the model has minimal pricing errors.

Second, the market beta coefficients are positive and significant (at 1 per cent level) for all the six portfolios and range between 0.9 and 1.2. This indicates that market risk is quite strong in explaining portfolio excess returns for all stocks at the NSE. For example, a portfolio with small and illiquid stocks attract up to 14 percent market risk premium on an annual basis. Thirdly, focusing on the size (SMB) risk factor, it is noted that all the six portfolios have significant (at 1 per cent) betas. Further, as expected, portfolios with small stocks have significant positive betas while large firms have negative size factor loadings. This implies that small firms attract positive size premiums ranging from 8.4 to 10.4 percent annually (0.70 to 0.86 per month).

Fourthly, Table 5.3 reveals that four out of the six portfolios have significant betas for the liquidity risk factor (IML). Again as one would expect, illiquid portfolios show high positive betas compared to very liquid portfolios. For example, the largest illiquidity premium for small-sized portfolio is about 0.73 per cent per month which translates to about 8.8 per cent on an annual basis.

Fifthly, five out of six portfolios show significant foreign ownership factor coefficients. Similar to the IML factor, the FOF betas show a strong pattern in that stocks that are less demanded by foreign investors earn higher return premiums than those preferred by foreign investors. For instance, portfolios with stocks less preferred by foreign investors earn annual premiums ranging from 4.6 to 9.7 percent. This betas are comparable to those obtained in Korea (by Jung *et al*., 2009) but higher than those found in Turkey (by Ceylan *et al*., 2015). This suggests that illiquidity and foreign investor preferences are prominently priced risk factors.

The final observation from Table 3 regards model adequacy. The R-squared for all portfolios are fairly high but not as high as the ones originally documented by Fama and French (1993) which ranged 0.90 and above. This could be explained by the few stocks that are employed in this study. Additionally, Table 5.3 reveals that except for one portfolio (portfolio 6), all the other portfolios are free of autocorrelation problem. Specifically, the Breusch-Godfrey of order three fails to reject the null hypothesis of no serial correlation of the regression residuals for all except one portfolio. The F-statistics also confirms that overall; all the regression models are statistically significant.

4.3 Robustness Check: Alternative Liquidity Measures

Liquidity is notoriously challenging to measure and spans multiple dimensions. It is therefore important to not rely on only one measure in examining illiquidity effects. Accordingly, to validate the model in this study, two more other liquidity measures are employed to compute the liquidity mimicking risk factor (IML). The first alternative measure employed is the monthly proportion of zero measure originally suggested by Lesmond *et al.*

(1999). This measure has been used before to construct an illiquidity risk factor (see for example, Minovic & Zivkovic, 2012). The proportion of zero return measure is defined by the following formula;

$$ZR_{i,T} = \frac{NZRD_{i,t}}{TD_{i,t}} \quad (7)$$

Where ZR is the proportion of zero return days, $NZRD$ denotes the number of zero return days in a trading period (say a month), TD is the total number of trading days in a given period. A distinctive advantage of the zero returns measure is that the data required for its construction is widely available for all times and for all firms in any exchange.

The other alternative measure employed to construct an illiquidity risk factor is stock turnover. This is a popular and easy measure which gives indication of how many times a stock turns over in any given period say a month. (Chan & Faff, 2005) uses this liquidity measure to examine liquidity asset pricing effects in the context of Fama and French (2012). The turnover ratio is often expressed as follows;

$$TURN_{i,T} = \frac{1}{D}\sum_{t=1}^{T}\frac{volume_{i,t}}{NOSH_{i,t}} \quad (8)$$

Where $TURN_{i,T}$ is the turnover ratio, D_T is the number of trading days in a period, $Volume_t$ is the number of shares traded in a day, $NOSH_t$ represents the number of shares outstanding of a stock, i and T indicates a particular stock and period respectively

Constructing an illiquidity factor using the two alternative measures and running time series regression in the same manner as the base model yields results reported in Table 4. Panel A reports results based on the zero returns measure while panel B presents results when turnover is used as a liquidity proxy.

Table 3: Multifactor CAPM Regression Results

Table 3 reports the alpha Jensen constant, market, size (SMB), liquidity (IML) and foreign ownership (FOF) beta estimates for a multifactor CAPM time series estimate. The last three columns of the table presents the adjusted R-squared, the overall model F-statistics to gauge the significance of the model and the Breusch-Godfrey test statistic for serial correlation of order 3.

Portfolio	Size	Liquidity	FO	a	b	s	l	f	R^2	F	BG (3)
1	Small	High	Low	-0.002	1.031***	0.750***	-0.414*	0.791***	0.793	61.48 [0.0000]	3.425 [0.3306]
2	Small	Low	Low	-0.002	0.952***	0.865***	0.366	0.812***	0.766	52.35 [0.0000]	5.785 [0.2044]
3	Small	Low	High	0.004	1.231***	0.707***	0.734***	-0.447***	0.686	34.99 [0.0000]	4.590 [0.2044]
4	Big	High	Low	0.004	1.172***	-0.261***	-0.386	0.379***	0.783	61.40 [0.0000]	5.952 [0.1140]
5	Big	High	High	-0.002	1.011***	-0.168*	-0.514**	-0.014	0.717	40.51 [0.0000]	4.850 [0.1831]
6	Big	Low	High	-0.003	0.972***	-0.217**	0.467**	-0.383***	0.685	34.83 [0.0000]	8.279 [0.0406]

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Multifactor CAPM Regression results: Alternative Liquidity Measures

				Panel A: Proportion of Zero Returns Measure (ZR)						
Portfolio	Size	Liquidity	FO	a	b	s	l	f	R	BG (3)
1	Small	High	Low	-0.002	1.031***	0.750***	-0.414*	0.791***	0.793	2.735 [0.8672]
2	Small	Low	Low	-0.002	0.952***	0.865***	0.366	0.812***	0.766	2.805 [0.4227]
3	Small	Low	High	0.004	1.231***	0.707***	0.734***	-0.447***	0.686	1.241 [0.7432]
4	Big	High	Low	0.004	1.172***	-0.261***	-0.386	0.379***	0.793	4.606 [0.2030]
5	Big	High	High	-0.002	1.011***	-0.168*	-0.514**	-0.014	0.717	1.331 [0.7217]
6	Big	Low	High	-0.003	0.972***	-0.217**	0.467**	-0.383***	0.685	2.083 [0.9938]
				Panel B: Turnover Measure (TURN)						
Portfolio	Size	Liquidity	FO	a	b	s	l	f	R	BG (3)
1	Small	High	Low	-0.002	0.944***	0.734***	-0.726***	1.015***	0.677	1.937 [0.5856]
2	Small	Low	Low	-0.006	1.092***	0.774***	0.364*	0.599***	0.54	4.262 [0.2345]
3	Small	Low	High	-0.001	1.003***	0.565***	0.391**	-0.215	0.478	2.124 [0.5471]
4	Big	High	Low	0.003	1.174***	-0.367***	-0.546***	0.393**	0.708	0.282 [0.9634]
5	Big	High	High	-0.009	0.921***	-0.294**	-0.699***	-0.009	0.628	9.136 [0.0275]
6	Big	Low	High	0.001	1.115***	-0.198*	0.337**	-0.377***	0.673	3.750 [0.2898]

*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion

This study investigated two important questions: Is illiquidity priced in the Kenyan stock market? Do foreign investor preferences impact on stock prices in the Kenyan stock market? Accordingly, two inter-related objectives were explored. First, using Kenyan stock data the study examined the role of illiquidity in an extended CAPM framework through the construction of a mimicking portfolio based on (Amihud, 2002) illiquidity measure. However, two other liquidity measures (zero returns and turnover) are used to validate the results. Secondly, for the first time the role of foreign investor stock holdings on Kenyan stock prices was also examined through the formation of a mimicking portfolio based on the level of foreign investor ownership.

To estimate the extended CAPM model we employed a simple ordinary least squares (OLS) approach. Particularly, a portfolio excess return is explained by excess market return, stock size factor (constructed in same manner as in Fama and French, 1993), an illiquidity factor, and a foreign ownership factor. More importantly, the explanatory factors are constructed so as to be approximately orthogonal to each other. The analysis employs monthly frequency data, spanning the period January 2011 to September 2016 (a period of 69 months).

We uncovered three key interesting findings: First, the intercepts (also known as Jensen alpha) of all the portfolio regressions turn out to be statistically insignificant; suggesting a strong support for a four-factor CAPM that incorporates size, illiquidity and foreign preferences factor. Second, the premia on market and size bear the expected signs. For example all the premia on market returns are positively significant and close to 1, while the premia on size has the desirable pattern in that very small stocks exhibit a significant positive size effect and big stocks exhibit negative size premia.

Third, and of close interest, illiquidity and foreign preferences are significant in explaining the disequilibrium in the Kenyan stock market. Specifically, the estimates from the four-factor CAPM show that the additional return of holding illiquid stocks relative to liquid ones range between 5.6 - 8.8 percent per year, while the additional compensation for holding the risky stocks which investors do not hold range between 4.5 and 9.7 percent per year.

We therefore conclude that if the Kenyan stock market can improve the liquidity and foreign investor holdings of its stocks, then it can significantly lower the high cost of raising equity finance. With regard to foreign investor preferences, one important question is;what can firms do to improve the foreign investor holdings of their stocks? Put differently, what is that attracts foreign investors to certain stocks and not others? This question is not explored in this study but remains a relevant research question for future research.

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