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The Role of Trading Frequency and Transaction Cost on Asset Pricing: Evidence from Pakistan Stock Exchange

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Abstract

This paper compares price impact ratio (Amihud, 2002) and new price impact ratio (Florackis, Gregoriou, & Kostakis, 2011) by taking daily data from Pakistani market for a period of 14 years ranging from January 2000 to December 2013. The first part of the paper covers the comparison of deciles portfolios and the second part covers risk adjusted deciles portfolios. Results suggest that new price impact model gives better results as compared to extensively applied price impact model and confirms that costs of transaction and trading frequency jointly effect asset pricing. Therefore, both the aspects should be studied mutually rather than in isolation.

Keywords: liquidity, price impact ratio, new price impact ratio, transaction cost, trading frequency

JEL Classification Codes: G10; G12; G14

1. Introduction

A stock market is considered to be liquid when large transactions are executed with small impact on prices of securities. Market liquidity can be used to measure the efficiency of a stock market. Liquidity is an exceptionally hot issue now days. It is a basic idea in finance, which can be defined as the capacity to purchase or offer large

[1]**Author's Acknowledgment:** I hereby declare that this paper is a part of my thesis.

amount of asset with ease and more rapidly. The issue of illiquidity has gained notable consideration from analysts in the last two decades. Contemporary researchers investigated liquidity in numerous studies (Acharya & Pedersen, 2005;Brennan & Subrahmanyam, 1996;Hasbrouck, 2009;Liu, 2004). Amihud (2002) by constructing liquidity ratio and found a significantly positive long-term association among illiquidity and return. Due to ease and effectiveness, Amihud (2002) ratio is largely prevalent.

Acharya and Pedersen (2005) utilized the Amihud (2002) measure to demonstrate that the covariance among liquidity and returns considerably affects the stock's normal return. Utilizing the measure of Amihud's (2002), Amihud, Hameed, Kang, and Zhang (2015) analyzed the illiquidity premium in worldwide equity markets. Despite, Florackis et al. (2011) introduced Return to-Turnover proportion as a different option for the generally utilized Return to Volume proportion presented by (Amihud, 2002). They exhibited that instead of simple direct connection between trading cost and stock returns, the combine transaction cost and trading frequency matter more for asset pricing.

Bekaert, Harvey and Lundblad (2007) demonstrated that liquidity is an enormous issue and more imperative in developing markets as compared to developed markets. Wong, Penm, Terrell, and Ching (2004) concentrated on co-movements between a percentage of developed and developing markets and reported that some developing markets give distinctive results as compared to developed markets. Keeping in view the consequences identified by Bekaert et al. (2007); Wong et al. (2004), this study motivated to realize for the first time in the available literature that the ratio recommended by Florackis et al. (2011) that gave overwhelming results in developed economy, would it be able to exterminate Amihud (2002) ratio and does its outcomes stand substantial in a developing and unstable business sector of Pakistan? Additionally, Ahmed and Kashif (2018) also recommended to investigate the liquidity in Pakistani market. Based on the available literature, it is one of the first studies to see the combined impact of transaction cost and trading frequency on asset pricing in Pakistani context.

2. Literature Review

The importance of liquidity in capital markets has been analyzed by a number of studies (Acharya & Pedersen, 2005;Brennan & Subrahmanyam, 1996;Hasbrouck, 2009; Liu, 2006). To address the issue of illiquidity, different dimensions and determinants have been studied by different researchers. Theoretically, the studies conducted by Heaton and Lucas (1996); Vayanos (1998) reported the effect of transaction costs on asset prices. Jacoby, Fowler, and Gottesman (2000) documented that by considering the true measure of systematic risk, liquidity cost depends on net returns. Lo, Mamaysky, and Wang (2004) used dynamic equilibrium model and argued that agent's optimal trading policy can be increase by small fixed transaction cost. Similarly, Liu (2004) found same results in the presence of multiple risky assets.

Empirically, researchers have shown that for the least liquid stocks, liquidity risk generates substantially higher cost of capital. Specifically, Amihud and Mendelson (1986) found that the relation between illiquidity and stock returns is significantly positive. Chan and Faff (2005); Ho and Hung (2009); Nguyen, Mishra, Prakash, and Ghosh (2007) documented an inverse relation of liquidity with stock returns for stocks having high turnover ratio as compared to stocks with low turnover ratio. In addition, Madhavan (1992); Wong, Yiu, and Chau (2012) linked liquidity with information asymmetry and documented that the quality of information lowers market liquidity. In a similar vein,Cornell and Sirri (1992); ElGhoul, Guedhami, Ni, Pittman, and Saadi (2013) ;Pagano and Röell (1996) reported that information asymmetry enhances market liquidity.

In prior literature, researchers had used various measures for liquidity such as bid-ask spread (Amihud & Mendelson, 1986), price sensitivity to order flow (Pástor & Stambaugh, 2003), number of zero-return days (Bekaert et al., 2007), amortized spread (Chalmers & Kadlec, 1998), Kyle's lambda (Kyle, 1985), relative spread (Loderer & Roth, 2005), effective spread (Heflin & Shaw, 2000), trading volume (Brennan, Chordia, & Subrahmanyam, 1998), price impact ratio (Amihud, 2002) and turnover rate (Chordia, Roll, & Subrahmanyam, 2001). The most common of all is the price impact ratio (Amihud, 2002). Acharya and Pedersen (2005); Amihud et al.

(2015); Goyenko, Holden, and Trzcinka (2009); Hasbrouck (2009) used price impact ratio and argued that due to convenience, the ratio is more appealing for long time periods. However, this measure of liquidity has shortcomings of size and price level biases and neglects investor's stock holding horizons (Florackis et al., 2011).

Regardless of the importance that illiquidity has gained in prior literature, it still remains an elusive concept (Amihud, 2002; Chordia, Huh, & Subrahmanyam, 2009; Pástor & Stambaugh, 2003). Notwithstanding, none of the aforementioned measures could perfectly fulfill complete dimensions of liquidity. However, Florackis et al., (2011) developed the new price impact ratio by replacing trading volume with turnover ratio in (Amihud, 2002) ratio, which is free of size and price level biases and captures the combine effect of trading frequency and trading cost.

In prior literature, wide efforts and discussions have been placed by different analysts and researchers about liquidity. Some have focused on important factors and determinants of liquidity while the others have focused on its calculation and measurement. Different proxies have been tested on different kinds of data sets but the results were mixed. Most of the models are tested on well-developed market and majority of models used high frequency data. Less developed market doesn't have high frequency data for all the stocks and unfortunately Pakistan Stock Exchange is one of them, where a high frequency model or proxy cannot be applied. Well popular price impact ratio, a low frequency model is presented by Amihud (2002) for the measurement of liquidity. Florickes et al., (2011) presented an alternative liquidity ratio to price impact ratio. This study, do comparison between price impact ratio (Amihud, 2002) and new price impact ratio (Florickes et. al, 2011).

3. Research Methodology

All listed stocks of Pakistan Stock Exchange (hereafter PSX) including active and dead stocks were considered as population of study**.** The study used several screening processes for the initial population in order to reduce the impact of outliers. Following, Fletcher and Kihanda (2005), banking institutions and other financial industries were excluded. The remaining 638 (non- financial) stocks were taken as target population. The study covered both currently listed and inactive

shares (i.e. shares of companies which were de-listed sooner or later through the sample period). Furthermore, the shares and companies for which price data for at least 24 consecutive calendar months that were not available were excluded. After all this screening, 14 years secondary data ranging from 2000 to 2013 of 474 stocks were employed for analysis.

a. Parameters of the Analysis

For each parameter, the study used PSX official website to acquire daily data of the following variables:

- Turnover (proportion of trading to total outstanding shares).
- Market value (current price share multiplied by total outstanding stocks)
- Price-to-book value (current market price of share to book value per share).
- Trading Volume (total shares traded in market over a day).
- Opening prices (the price of a security at which trading starts upon the opening of trading day).
- Closing prices (the price of a security at which trading closed on a given trading day).

b. Analytical Models (Financial Models)

The study mainly utilized two ratios: the price impact ratios (Amihud, 2002) and new price impact ratio (Florackis et al., 2011).

c. Price Impact Ratio

Price impact ratio (henceforth RtoV) developed by (Amihud, 2002) can be defined as the monthly average of absolute daily stock return to the given trading volume of that day, which can be estimated as follows:

$$RtoV_{it} \quad \frac{1}{D_{it}} \sum_{d=1}^{D_{it}} \frac{|R_{itd}|}{V_{itd}} \qquad (1)$$

where, R_{itd} is the ith stock return on day *d* of month *t*. V_{itd} is volume of *ith* stock on day *d* of month *t*, and D_{it} is the total number of days in month *t* for *ith* stock.

d. New Price Impact Ratio

New price impact ratio (henceforth RtoTR) suggested by Florackis et al. (2011), and measured as the monthly average of absolute daily return to the given turnover. This measure can be calculated as follows:

$$RtoTR_{it} \quad \frac{1}{D_{it}} \sum_{d=1}^{D_{it}} \frac{|R_{itd}|}{TR_{itd}} \qquad (2)$$

where, R_{itd} is the ith stock return on day d of month t, TR_{itd} is the Turnover Ratio of ith stock at day d, and D_{it} is the total number of days in month t for ith stock.

e. Asset Pricing Models

To analyze portfolios performances that were constructed based on RtoV and RtoTR ratios, the study utilized the following asset pricing models:

i. The Capital Asset Pricing Model

The capital asset pricing model (CAPM) is the most famous model due to its simplicity and gives more powerful explanation for the relation between expected return and risk (Fama & French, 2004). Besides its usefulness, empirical evidence proved that the relation between beta for different portfolios and average return are much flatter than the CAPM would foresee. It results that the portfolios having high beta carry low returns and the portfolios with low beta takes high returns (Fama & French, 2004). The CAPM can be presented in the following way:

$$r_{i,t} \quad r_{f,t} \quad \alpha \quad \beta_{i,mkt} MKT_t \quad \varepsilon_{i,t} \qquad (3)$$

where r_{it} is the ith portfolio return in month t, r_{ft} is month t risk-free rate, MKT_t is month t excess market portfolio return ($R_{mt} - R_{ft}$).

ii. Fama-French Three-Factor Model

Empirically, the CAPM model performed quite poorly (Fama & French, 2004), therefore the researchers tried to find additional factors that could systematically explain returns. Fama and French (1993) introduced three-factor model and argued that the expected return on a portfolio in excess of the risk-free rate is explained by three factors. The model can be expressed in the following way:

$$r_{i,t} \quad r_{f,t} \quad \alpha \quad \beta_{i,MMKT} MKT_t \quad \beta_{i,SBMB} SMB_t \quad \beta_{i,HML} HML_t \quad \varepsilon_{i,t} \qquad (4)$$

where r_{it} the ith portfolio return in month t is, r_{ft} is the month t risk-free rate MKT_t, is the t month excess market portfolio return ($R_{mt} - R_{ft}$). For size factor (SMBt), all the listed stocks were sorted based on their market capitalization at month t-1. Top 30% (value-weighted) stocks were assigned to the "Big size" portfolio and bottom 30% stocks

were assigned to the "Small size" portfolio. The return differences among the two portfolios at month t give the size factor (SMBt). Following Cuthbertson, Nitzsche, and O'Sullivan (2008), the value factor (HMLt) is measured as the spread among the regular returns of the PSX-100 index.

3.5.3 Carhart 4-Factor Model

Fama and French (1996) found that their three-factor model can explain most of the cross-sectional variation in stock returns. However, the model is not able to explain the momentum effect documented by (Jegadeesh & Titman, 1993). Carhart (1997) constructed a four factor model as an extension of the Fama-French Three-factor model with an additional momentum factor based on the findings of (Jegadeesh & Titman (1993). That can be presented in the following way:

$$r_{it} \quad r_{ft} \quad D \quad E_{i,MKT} MKT_t \quad E_{i,SMB} SMB_t \quad E_{i,HML} HML_t \quad E_{i,MOM} MOM_t \quad H \quad (5)$$

where r_{it} is the ith portfolio return in month *t*, r_{ft} is the month t risk-free rate, MKT_t is the month t excess market portfolio return ((F), and MOM_t is the momentum risk factor. For momentum factor, all the shares at month t-1 were ranked based on their returns from month t-13 to t-2. 11 months cumulative return for all the bottom 10% shares made a looser stock portfolio, while the top 10% of the stocks were categorized as "Winners". The spread of regular monthly returns at month t is considered as the momentum factor (MOMt).

4. Result Discussion

Table 1 illustrates descriptive statistics of 10 portfolios constructed on the basis of RtoV for overall sample and subsamples. The results presented in Panel A of Table 1 for overall sample report that the average portfolio return considerably increases as moving from P1 to P10. The level of this differential is 2.57% per annum for equally weighted returns. For subsamples, Panel B reports the descriptive statistics of all the 10 portfolios ranging from January 2000 to December 2007, while Panel C documents the results ranging from January 2007 to December 2013. The results suggest that for equally weighted portfolios (P10–P1), the spread is 3.03% (p = 0.00) in panel A and 2.48% (p=0.00) in Panel B. P1 are liquid firms and p10 are illiquid firms so that return of P1 is less than P10.

Table 1. Descriptive Statistics of the Portfolios Based on RtoV Ratio

	Decile Portfolios (RtoV)											
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P10-P1**	**t-value**
Panel A: January 2000- December 2013												
EW Returns	-0.35%	0.19%	0.30%	0.78%	0.82%	0.96%	1.09%	1.06%	1.72%	2.22%	2.57%	4.56***
MV (in millions)	2.2E-7	1.9E-6	7E-6	2.6E-5	9.3E-5	2.9E-4	7.0E-4	1.6E-3	3.9E-3	1.9E-2	0.01	3.04***
RtoV	440	312	246	179.2	179	177	161	97.1	66	52.3	-387.7	16.40***
PtoB	0.10	0.04	0.03	0.02	0.03	0.02	0.02	0.02	0.02	0.00	-0.10	5.78***
Beta	0.53	0.46	0.59	0.56	0.51	0.66	0.70	0.88	1.08	1.27	0.74	-25.71***
Panel B: January 2000- December 2008												
EW Returns	0.48%	0.66%	0.99%	0.91%	1.11%	1.29%	1.44%	1.82%	2.32%	3.52%	3.03%	4.63***
MV (in millions)	1E-7	1.8E-6	6.2E-6	1.3E-5	2.2E-5	3.4E-5	5.1E-5	7.6E-5	1.3E-4	5.1E-4	5.1E-4	-2.07***
RtoV	75.4	53.9	42.8	30.2	27.6	19.5	14.2	15.3	12.7	11.1	-64.3	7.83***
PtoB	0.19	0.16	0.07	0.05	0.05	0.04	0.04	0.04	0.03	0.03	-0.15	5.79***
Beta	0.35	0.38	0.48	0.58	0.57	0.64	0.66	0.70	0.84	1.12	0.77	-17.9***
Panel C: January 2008- December 2013												
EW Returns	-0.73%	-0.05%	0.13%	0.22%	0.39%	0.31%	0.55%	0.88%	1.13%	1.74%	2.48%	2.23***
MV (in millions)	3.9E-7	2E-6	8.1E-6	4.5E-5	1.9E-4	6.6E-4	1.6E-3	3.9E-3	9.4E-3	4.5E-2	4.7E-2	2.88***
RtoV	868	735	678	565	409	381	324	354	211	83.1	-784.9	16.58***
PtoB	1.9E-3	3.4E-4	1.4E-4	1.2E-4	1.1E-4	1.0E-4	7E-5	3.4E-5	2.5E-5	1.6E-5	-1.9E-3	4.04***
Beta	1.46	1.32	1.09	0.80	0.77	0.70	0.69	0.68	0.62	0.72	-0.74	-14.31***

Note: ***, **, * denotes significant at .01, 0. 05 and 0.1 level respectively. EW return is the average monthly returns of equal weighted portfolios per annum. MV is the average market capitalization of the shares in million rupees. RtoV is the return to volume ratio. PtoB is the Price-to-Book ratio and beta is CAPM beta.

The MV of stocks in each portfolio decreases almost monotonically in panel A, but in Panel B and C there is no monotonic decrease as moving from portfolio P1 to portfolio P10. The results support the notion of Florackis et al. (2011), who reported that portfolio constructed based on RtoV is negatively associated with MV. Ben-Rephael, Kadan, and Wohl (2015) reported similar result during study of NYSE stocks for decreasing trend of the MV.

They also found that low RtoV had high market value and high RtoV had low market value. The result of PtoB ratio is higher for stocks with low RtoV values than the stocks with high RtoV values. CAPM beta does not differ substantially across 10 portfolios. From Table 1, it can be concluded that P1 consists of highly liquid stocks which can be easily traded on stock exchange any time but with low return. Similarly, P10 consists of highly illiquid stocks which cannot be traded easily; therefore, they carry high returns.

Table 2 reports descriptive statistics of the decile's portfolios constructed on the basis of RtoTR. Panel A consists of all stocks of the whole sample ranging from January 2000 till December 2013, while panel B and C are sub-period analyses that consist of stocks from January 2000 to December 2007 and January 2008 till December 2013 respectively.

The results provided in Panel A show significantly positive spread between P1 and P10, indicating the presence of non-negligible returns differential, which is in line with findings of (Ahmed & Kashif, 2018). It means that from P1 to P10, a considerable decrease in the average portfolio returns were observed, though the pattern is not strictly monotonic in panel C. The known degree of this differential is 2. 28% ($p = 0.00$) for equally weighted returns in panel A. 1.88% ($p = 0.00$) in the Panel B and 2.48% ($p=0.00$) in Panel C. It indicates that return of P10 is less than P1. These findings are consistent with the total results of (Florackis et al., 2011) and the notion that the trading frequency covers the result of transaction costs and for that reason, stocks with low RtoTR have higher returns than stocks with high RtoTR and is supported at PSX completely.

Table 2. Descriptive Statistics of the Portfolios Based on RtoTR Ratio

	Decile Portfolio (RtoTR)											
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P1-P10**	**t test**
Panel: A January 2000- December 2013												
EW return	1.89%	1.48%	1.14%	1.19%	1.02%	0.72%	0.70%	0.66%	0.29%	-0.38%	2.28%	4.47***
RtoTR	0.03	0.19	0.74	3.30	14.64	47.32	131.41	366.73	1169.08	30860.26	-30860.2	7.07***
MV(in millions)	60.8	17.1	18.3	32.9	320.7	47.20	92.00	46.90	425	1210	-1149.2	2.43***
PtoB	0.05	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.03	2.86***
Beta	1.22	1.07	0.87	0.70	0.65	0.61	0.61	0.52	0.57	0.50	0.73	-26.98***
Panel: B January 2000- December 2008												
EW return	2.40%	2.04%	1.98%	1.74%	1.27%	1.25%	1.21%	1.05%	0.80%	0.52%	1.88%	3.28***
RtoTR	0.01	0.06	0.19	0.41	0.76	1.33	2.23	4.00	8.50	207.48	-207.47	4.28***
MV(in millions)	65.7	12.9	10.6	5.91	8.54	19.1	23.3	21.9	22.0	117.0	-51.3	7.73***
PtoB	0.09	0.07	0.06	0.06	0.06	0.05	0.04	0.04	0.04	0.04	0.06	2.71***
Beta	1.06	0.85	0.75	0.64	0.60	0.54	0.53	0.51	0.47	0.45	0.61	-16.06***
Panel: C January 2008- December 2013												
EW return	1.17%	0.83%	0.73%	0.69%	0.51%	0.48%	0.11%	0.09%	0.07%	-1.65%	2.82%	3.03***
RtoTR	0.06	0.37	1.51	7.41	34.39	112.61	315.28	883.07	2819.30	74656.61	-74656.6	6.98***
MV (in millions)	55	22.7	26.8	70.1	37.3	86.4	186	72.2	910	2750	-2695	2.41***
PtoB	0.01	4.2E-5	1.6E-5	8.7E-5	1.3E-4	9.2E-6	9.6E-5	-9.8E-6	1.1E-4	7.5E-4	0.00	4.37***
Beta	1.41	1.27	1.03	0.82	0.78	0.78	0.81	0.63	0.75	0.61	0.80	-16.40***

Note: ***, **, * denotes significant at .01, 0. 05 and 0.1 level respectively. EW return is the average monthly returns of equal weighted portfolios per annum. MV is the average market capitalization of the shares in million rupees. RtoTR is the return to turnover ratio. PtoB is the Price-to-Book ratio and beta is the CAPM beta.

Spread of MV is -1149.2 for panel A, 15.3 and 17.7 for panel B and C respectively. This shows that in panel A, P10 have high average market values than that of P1. In panel B and C, P1 have high average market value as compared to P10. There is no monotonic increase or decrease in all the 10 portfolios, which confirms that the RtoTR is not size biased, which is in line with (Florackis et al., 2011).

The results of PtoB ratio in Table 2 illustrate that P1 has highest average price-to-book value than P10. CAPM beta does not differ substantially across 10 portfolios. Table 2 mentions that P10 consists of highly liquid stocks which can easily be traded on stock exchange any time but with low return. Similarly, P1 consists of highly illiquid stocks which cannot be traded easily; therefore, they carry high return. These results are consistent with the findings of (Kashif, Ilyas, Rehan, & Chhapra, 2018; Ahmed & Kashif, 2018).

In Table 3, from Panel A, CAPM alpha has negative premium -0.09% (p-value=0.05) which shows that P1 has high return than P10. But for Fama & French alpha the spread is 0.34 % (p-value=0.01) and Carhart alpha the spread is 1.73% (p-value=0.02) which is positive. All the alphas are statistically significant at the mentioned probability level. In panel B, spread is negative for all the alphas, for CAPM it is -0.29% (p-value=0.00), for Fama and French it is -0.98% (p-value=0.03), and the spread of Carhart alpha is -0.77% (p-value=0.43). But in cases of Fama & French alpha and Carhart alpha, both P1 and P10 have negative values, which indicate that P1 has to lose more as compared to P10.

Spread of Carhart alpha is -0.77% (p-value=0.43). This shows that in first sub period, P1 has high return as compared to P10. CAPM alpha and Fama & French alphas are significant; however, Carhart alpha is not statistically significant. In panel C, once again spread for CAPM alpha is negative i-e -1.14% but statistically significant at 10% level (p-value=0.09), but for Fama and French alpha it is positive 0.01% (p-value=0.96), but statistically significant and once again negative for Carhart alpha is highly significant -0.75% (p-value=0.00). High liquid firms carry low return and less liquid firms have high return (Amihud, 2002). As this table was based on (Amihud, 2002), so the study was expecting P10 with high return and P1 with low return.

Table 3. Risk Adjusted Performance on the Bases of RtoV

	Deciles Portfolio (RtoV)											
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P10-P1**	**chi.sq**
Panel A : January 2000 - December 2013												
CAPM	0.54%	0.69%	1.30%	0.53%	1.06%	0.84%	0.37%	0.33%	-0.06%	0.46%	-0.09%	10.92
alpha(% p.a)	(0.01)	(0.01)	(0.01) **	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	0.05**	0.364
Fama-French	0.40%	0.61%	1.01%	1.14%	0.92%	0.14%	-0.46%	0.40%	-0.80%	0.74%	0.34%	12.58
alpha (% p.a)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	0.01**	0.25
Carhart alpha	-0.74%	0.32%	0.59%	0.69%	1.15%	0.28%	-0.66%	0.06%	-1.56%	0.99%	1.73%	18.54
(% p.a)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	0.02**	0.05**
Panel B: January 2000 - December 2007												
CAPM	0.31%	1.76%	1.32%	1.73%	0.95%	0.60%	1.19%	0.89%	0.35%	0.02%	-0.29%	29.94
alpha(% p.a)	(0.01)	(0.02)	(0.01)	(0.01) **	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	0.00***	0.00***
Fama-French	-1.34%	-0.90%	0.13%	0.26%	-0.46%	-1.28%	-0.99%	-1.54%	-1.81%	-2.32%	-0.98%	28.53
alpha (% p.a)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	0.03**	0.00***
Carhart alpha	-3.49%	-2.56%	-1.81%	-1.57%	-1.35%	-3.14%	-2.86%	-2.26%	-2.90%	-4.26%	-0.77%	31.64
(% p.a)	(0.01) ***	(0.02)	(0.01)	(0.01)	(0.02)	(0.01) **	(0.02) *	(0.02)	(0.02) *	(0.02) **	0.43	0.00***
Panel C: January 2008 - December 2013												
CAPM	0.69%	-0.27%	1.11%	0.08%	-0.02%	0.10%	0.34%	-0.67%	-2.21%	-0.45%	-1.14%	6
alpha(%p.a)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01) *	(0.01)	0.09*	0.82
Fama-French	1.01%	0.78%	2.00%	1.52%	0.73%	2.37%	1.38%	0.95%	-0.13%	1.02%	0.01%	7.75
alpha(%p.a)	(0.01)	(0.01)	(0.01) **	(0.01)	(0.01)	(0.01) ***	(0.01)	(0.01)	(0.01)	(0.01)	0.96	0.65
Carhart	1.06%	1.23%	2.08%	2.37%	0.40%	2.29%	0.73%	1.36%	0.97%	0.31%	-0.75%	7.49
alpha(%p.a)	(0.01)	(0.01)	(0.01) **	(0.01) **	(0.01)	(0.01) **	(0.01)	(0.01)	(0.01)	(0.01)	0.00***	0.68

Note: ***, **, * denotes significant at .01, 0. 05 and 0.1 level respectively. CAPM alpha, Fama-French alpha and Carhart alpha are the annualized alpha estimations produce from model 3, 4 and 5 respectively. Standard Errors are reported in parentheses.

Table 4 illustrates spread of P1-P10 portfolios made on the basis of RtoTR ratio. From Panel A, B and C, all the three alphas based on CAPM, Fama & French and Carhart are positively significant. Positive spread shows that P1 has high return as compared to P10. These results show that the ratio suggested by Florackis et al. (2011) performs better than that of (Amihud, 2002) in the emerging market of Pakistan. These total results outline that in risk-adjusted conditions; the superior performance of low RtoTR stocks is accordance with the stocks of high RtoTR ratio that were primarily documented in Table 2 for unadjusted returns. To investigate the combine effect of all estimated alphas, a Wald test was employed for each model specifications, which rejects our null hypothesis of jointly zero alpha estimation. The result demonstrates that portfolios based on RtoTR ratio give abnormal returns for the used asset pricing models. These results follow the mean-variance framework and in contrary with (Ahmed & Kashif, 2018), who argued that portfolio constructed on the basis of RtoTR ratio fail to generate abnormal returns.

The study has pointed out the reason for the reversal of the portfolios' returns that are in accordance with (Amihud, 2002). The findings show that after adjusting for size, momentum and value risk, stocks with low R toTR and high turnover rates determine large premia. It means that the trading frequency of return devastatingly effect transaction costs, which is based on notion of (Amihud & Mendelson, 1986) and confirms the results of (Florackis et al., 2011). Overall, our study claims that evaluating each effect in isolation would be misleading; therefore one should take into consideration both effects jointly. The results of Panels B and C in Table 4 indicate statistically significant P1-P10 risk-adjusted premium for each employed asset pricing model. Moreover, for all the 10 portfolios, the Wald test strongly rejects the null hypothesis of jointly zero alpha in each sub-sampled period.

, Q 7 D E O H W K H U H V X O
that all the stocks are defensive. Furthermore, based on Fama-French and Carhart models, our results show that portfolio 1 is more volatile
W K D Q S R U W I R O L R 3 D Q H
but it is positive only for Carhart P10 in sub-sample Panel C.

Table 4: Risk Adjusted Performance on the bases of R toTR

	Deciles Portfolio (RtoTR)											
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P10-P1**	**chi.sq**
Panel A: January 2000 - December 2013												
CAPM alpha(%p.a)	0.79%	1.32%	1.56%	1.69%	0.32%	-0.18%	0.48%	-0.27%	-1.06%	0.13%	0.66%	40.88
	(0.01)	(0.01) *	(0.01) **	(0.01) **	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	0.00***	0.00***
Fama-French alpha(%p.a)	0.23%	0.54%	0.97%	0.72%	0.23%	1.03%	0.48%	-0.61%	-0.32%	0.03%	0.20%	15.37
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	0.00***	0.10*
Carhart alpha(%p.a)	0.08%	0.47%	0.88%	0.58%	-0.52%	1.06%	0.55%	-1.05%	-0.75%	0.00%	0.08%	34.6
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	0.00***	0.00**
Panel B: January 2000 -December 2007												
CAPM alpha(%p.a)	0.65%	2.47%	2.74%	2.26%	0.82%	1.08%	1.02%	0.19%	0.03%	0.65%	0.00%	40.62
	(0.01)	(0.01) **	(0.01) ***	(0.01) **	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	0.07*	0.00***
Fama-French alpha(%p.a)	-0.51%	-0.43%	-0.15%	-0.63%	-0.17%	0.23%	-1.15%	-2.76%	-1.50%	-2.57%	2.06%	22.23
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01) **	(0.01)	(0.02)	0.00***	0.01**
Carhart alpha(%p.a)	-1.62%	-2.05%	-1.88%	-2.37%	-0.72%	-1.58%	-3.55%	-5.33%	-3.47%	-4.23%	2.61%	44.03
	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02) **	(0.02) ***	(0.02) **	(0.02) **	0.00***	0.00***
Panel C: January 2008 - December 2013												
CAPM alpha(%p.a)	0.94%	0.39%	0.54%	1.40%	0.08%	-1.80%	0.15%	-0.53%	-2.18%	-0.30%	1.24%	20.86
	(0.01)	(0.01)	(0.01)	(0.01) *	(0.01)	(0.01) *	(0.01)	(0.01)	(0.01)	(0.01)	0.00***	0.02**
Fama-French alpha(%p.a)	0.97%	1.20%*	1.60%**	1.60%*	0.55%	0.61%	1.50%	0.72%	0.13%	1.59%	-0.63%	14.82
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	0.04**	0.13*
Carhart alpha(%p.a)	0.79%	1.30%*	1.80%**	1.80%*	-0.31%	0.88%	1.49%	0.17%	0.29%	1.62%	-0.83%	25.31
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02	(0.01)	0.00***	0.00***

Note: ***, **, * denotes significant at .01, 0. 05 and 0.1 level respectively. CAPM alpha, Fama-French alpha and Carhart alpha are the annualized alpha estimations produce from model 3, 4 and 5 respectively. Standard Errors are reported in parentheses.

Table 5: Co-Efficient of Betas on the Bases of R toV

		Deciles Portfolio (RtoV)									
		P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Panel A: January 2000 - December 2013											
CAPMβ	**MKT**	0.98***	0.84***	0.69***	0.58***	0.51***	0.45***	0.56***	0.55***	0.65***	0.37***
		(0.07)	(0.07)	(0.07)	(0.08)	(0.08)	(0.09)	(0.10)	(0.09)	(0.11)	(0.11)
Fama-Frenchβ	**MKT**	0.98***	0.84***	0.71***	0.54***	0.48***	0.45***	0. 60***	0.54***	0.68***	0.31***
		(0.07)	(0.08)	(0.07)	(0.08)	(0.09)	(0.10)	(0.11)	(0.10)	(0.11)	(0.12)
	SMB	-0.36*	-0.29	-0.22	-0.19	-0.10	-0.05	-0.01	0.01	0.01	-0.42***
		(0.19)	(0.23)	(0.18)	(0.22)	(0.21)	(0.20)	(0.15)	(0.16)	(0.14)	(0.14)
	HML	0.19	0.12	0.10	0.04	0.01	-0.01	-0.02	-0.07	-0.11	-0.12
		(0.16)	(0.11)	(0.13)	(0.14)	(0.10)	(0.13)	(0.11)	(0.10)	(0.16)	(0.15)
Carhartβ	**MKT**	0.91***	0.86***	0.65***	0.49***	0.52***	0.48***	0.58***	0.51***	0.60***	0.37***
		(0.07)	(0.09)	(0.08)	(0.09)	(0.10)	(0.11)	(0.12)	(0.12)	(0.12)	(0.13)
	SMB	-0.33	-0.28	-0.22	-0.20	-0.17	-0.14	-0.03	-0.01	0.03	-0.38*
		(0.26)	(0.20)	(0.23)	(0.14)	(0.24)	(0.23)	(0.18)	(0.17)	(0.16)	(0.21)
	HML	-0.18*	0.15	0.14	0.10	0.09	-0.03	-0.05	-0.06	-0.08	-0.14
		(0.10)	(0.13)	(0.19)	(0.17)	(0.15)	(0.13)	(0.17)	(0.16)	(0.11)	(0.18)
	MOM	-0.07***	-0.04	-0.07**	-0.05*	0.04	0.05	-0.02	-0.04	-0.09*	-0.06
		(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Panel B: January 2000 -December 2007											
CAPMβ	**MKT**	1.02***	0.78***	0.58***	0.51***	0.48***	0.52***	0.45***	0.47***	0.49***	0.38***
		(0.11)	(0.13)	(0.09)	(0.10)	(0.10)	(0.09)	(0.11)	(0.12)	(0.13)	(0.13)
Fama-Frenchβ	**MKT**	0.90***	0.80***	0.62***	0.60***	0.60***	0.64***	0.58***	0.62***	0.60***	0.54***
		(0.12)	(0.16)	(0.12)	(0.12)	(0.13)	(0.12)	(0.14)	(0.15)	(0.17)	(0.16)
	SMB	-0.26	-0.21	-0.19	-0.17	-0.08	-0.08	-0.05	0.02	-0.74***	0.94***
		(0.28)	(0.20)	(0.23)	(0.24)	(0.19)	(0.27)	(0.20)	(0.21)	(0.27)	(0.20)
	HML	-0.42*	-0.40**	-0.34*	-0.31**	0.11	-0.13	-0.17	-0.24	-0.27	-0.31
		(0.22)	(0.20)	(0.18)	(0.16)	(0.16)	(0.16)	(0.21)	(0.16)	(0.17)	(0.23)
Carhartβ	**MKT**	0.91***	0.75***	0.61***	0.62***	0.61***	0.65***	0.56***	0.58***	0.61***	0.58***
		(0.12)	(0.17)	(0.13)	(0.13)	(0.14)	(0.13)	(0.15)	(0.16)	(0.16)	(0.18)
	SMB	-0.22	-0.09	0.01	0.04	0.07	0.12	0.13	0.16	-0.50*	-0.70***
		(0.23)	(0.26)	(0.28)	(0.28)	(0.22)	(0.22)	(0.32)	(0.25)	(0.30)	(0.22)
	HML	-0.91***	-0.84***	-0.74***	-0.71***	-0.68***	-0.68***	-0.65**	-0.58**	-0.38*	-0.36*
		(0.29)	(0.26)	(0.25)	(0.23)	(0.20)	(0.20)	(0.27)	(0.22)	(0.20)	(0.21)
	MOM	-0.23	-0.18	-0.20*	-0.21**	-0.09	-0.20*	-0.20*	-0.12	-0.14	-0.21**
		(0.15)	(0.14)	(0.11)	(0.10)	(0.11)	(0.10)	(0.12)	(0.13)	(0.13)	(0.10)

Continue Table 5: Co-Efficient of Betas on the Bases of R to V
Panel C: January 2008 - December 2013

CAPMβ	**MKT**	1.00***	0.98***	1.00***	0.77***	0.80***	0.83***	0.58***	0.63***	0.74***	0.75***
		(0.08)	(0.09)	(0.09)	(0.11)	(0.09)	(0.12)	(0.13)	(0.13)	(0.15)	(0.14)
Fama-Frenchβ	**MKT**	0.96***	0.94***	0.97***	0.71***	0.78***	0.76***	0.54***	0.58***	0.66***	0.69***
		(0.08)	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.13)	(0.12)	(0.14)	(0.14)
	SMB	-0.23	-0.20	-0.18	-0.04	0.00	0.03	0.18	0.19	0.24	0.38**
		(0.20)	(0.28)	(0.21)	(0.30)	(0.20)	(0.21)	(0.24)	(0.32)	(0.33)	(0.18)
	HML	0.82***	0.59***	0.45**	0.39**	0.34**	0.30**	0.26**	0.25	0.24	-0.09
		(0.13)	(0.18)	(0.20)	(0.19)	(0.13)	(0.13)	(0.13)	(0.15)	(0.21)	(0.11)
Carhartβ	**MKT**	0.79***	0.91***	0.83***	0.68***	0.68***	0.73***	0.45**	0.52***	0.62***	0.57***
		(0.09)	(0.12)	(0.10)	(0.13)	(0.11)	(0.11)	(0.17)	(0.16)	(0.16)	(0.18)
	SMB	-0.22	-0.13	-0.10	0.02	0.08	0.10	0.15	0.25	0.40	0.53***
		(0.22)	(0.31)	(0.22)	(0.23)	(0.33)	(0.20)	(0.26)	(0.32)	(0.34)	(0.18)
	HML	0.87***	0.63***	0.59***	0.43***	0.42*	0.38***	0.35**	0.35**	0.33	-0.020
		(0.14)	(0.20)	(0.21)	(0.14)	(0.21)	(0.13)	(0.16)	(0.14)	(0.22)	(0.11)
	MOM	-0.09***	-0.00	-0.11**	-0.01	-0.09***	-0.03	-0.08*	-0.01	0.00	-0.08***
		(0.03)	(0.03)	(-0.04)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.02)

Note: ***, **, * denotes significant at .01, 0. 05 and 0.1 level respectively.
CAPM, Fama-French and Carhart betas are based on RtoV ratio. MKT β(0) is CAPM beta, SMB (β,1) is small minus big, HML(β,2) represents high minus low, while MOM(β,3) represents momentum. Standard Errors are reported in parentheses.

Table 6: Co-Efficient of Betas on the bases of RtoTR

		Decile Portfolio (RtoTR)									
		P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Panel A: January 2000 - December 2013											
CAPMβ	**MKT**	0.97***	0.79***	0.64***	0.61***	0.69***	0.61***	0.57***	0.58***	0.55***	0.52***
		(0.06)	(0.08)	(0.07)	(0.08)	(0.07)	(0.08)	(0.08)	(0.09)	(0.10)	(0.11)
Fama-Frenchβ	**MKT**	0.96***	0.83***	0.67***	0.68***	0.71***	0.53***	0.54***	0.60***	0.45***	0.47***
		(0.06)	(0.09)	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)	(0.10)	(0.10)	(0.12)
	SMB	-0.29**	-0.05	-0.07	0.00	0.09	-0.02	-0.15	-0.03	-0.33	-0.38
		(0.12)	(0.17)	(0.16)	(0.16)	(0.15)	(0.16)	(0.18)	(0.19)	(0.20)	(0.24)
	HML	0.33**	0.29***	-0.23**	0.17	0.12	0.04	-0.07	-0.07	-0.09	-0.15
		(0.14)	(0.11)	(0.12)	(0.17)	(0.12)	(0.09)	(0.11)	(0.13)	(0.11)	(0.12)
Carhartβ	**MKT**	0.92***	0.84***	0.68***	0.66***	0.60***	0.57***	0.56***	0.55***	0.42***	0.42***
		(0.06)	(0.09)	(0.09)	(0.09)	(0.08)	(0.09)	(0.10)	(0.10)	(0.11)	(0.13)
	SMB	-0.13	0.01	-0.12	0.01	0.07	-0.07	-0.18	-0.05	-0.34	-0.34
		(0.13)	(0.19)	(0.18)	(0.18)	(0.16)	(0.17)	(0.20)	(0.21)	(0.23)	(0.26)
	HML	0.32*	0.28**	-0.26*	-0.24*	0.08	0.08	-0.02	-0.08	-0.09	-0.11
		(0.17)	(0.13)	(0.14)	(0.14)	(0.14)	(0.19)	(0.12)	(0.15)	(0.13)	(0.10)
	MOM	-0.01	-0.01	0.01	-0.03	-0.13***	0.06*	0.01	-0.05	-0.05	-0.05**
		(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.02)
Panel B: January 2000 - December 2013											
CAPMβ	**MKT**	0.98***	0.58***	0.45***	0.46***	0.55***	0.59***	0.44***	0.46***	0.43***	0.43***
		(0.08)	(0.13)	(0.11)	(0.12)	(0.09)	(0.10)	(0.12)	(0.12)	(0.12)	(0.16)
Fama-Frenchβ	**MKT**	0.89***	0.67***	0.59***	0.66***	0.65***	0.66***	0.48***	0.64***	0.41***	0.48**
		(0.10)	(0.15)	(0.14)	(0.14)	(0.12)	(0.13)	(0.15)	(0.15)	(0.15)	(0.20)
	SMB	-0.68***	-0.54**	-0.36	-0.13	0.08	0.03	-0. 50**	-0.22	-0.55**	-0.78**
		(0.16)	(0.25)	(0.23)	(0.24)	(0.20)	(0.21)	(0.24)	(0.26)	(0.25)	(0.33)
	HML	-0.51***	-0.47**	-0.38**	-0.31	-0.27	-0.23	-0.19	-0.16	0.09	-0.04
		(0.19)	(0.20)	(0.18)	(0.20)	(0.26)	(0.16)	(0.19)	(0.17)	(0.13)	(0.20)
Carhartβ	**MKT**	0.94***	0.71***	0.58***	0.68***	0.64***	0.70***	0.48***	0.62***	0.43***	0.43**
		(0.10)	(0.16)	(0.15)	(0.16)	(0.13)	(0.13)	(0.15)	(0.16)	(0.16)	(0.21)
	SMB	-0.44**	-0.28	-0.24	0.06	0.20	0.22	-0.36	-0.08	-0.31	-0.53
		(0.18)	(0.29)	(0.27)	(0.28)	(0.23)	(0.23)	(0.27)	(0.28)	(0.28)	(0.36)
	HML	-0.94***	-0.93***	-0.85**	-0.82***	-0.73***	-0.69***	-0.56***	-0.55**	-0.46**	-0.30*
		(0.25)	(0.25)	(0.32)	(0.26)	(0.24)	(0.24)	(0.21)	(0.25)	(0.21)	(0.16)
	MOM	-0.09	-0.18	-0.18	-0.20	-0.05	-0.15	-0.30**	-0.26**	-0.18	-0.20
		(0.08)	(0.13)	(0.12)	(0.13)	(0.11)	(0.10)	(0.12)	(0.13)	(0.13)	(0.17)

Continue Table 6: Co-Efficient of Betas on the bases of RtoTR

Panel C: January 2008 - December 2013

CAPMβ	**MKT**	0.96***	1.04***	0.86***	0.81***	0.88***	0. 60***	0.74***	0.74***	0.67***	0.62***
		(0.08)	(0.08)	(0.08)	(0.10)	(0.11)	(0.13)	(0.12)	(0.13)	(0.16)	(0.15)
Fama-Frenchβ	**MKT**	0.91***	0.99***	0.82***	0.80***	0.87***	0.52***	0.68***	0.69***	0.61***	0.55***
		(0.08)	(0.07)	(0.07)	(0.10)	(0.11)	(0.10)	(0.10)	(0.12)	(0.15)	(0.14)
	SMB	0.31	0.31*	-0.00	-0.06	-0.20	-0.20	0.03	0.04	-0.37	-0.04
		(0.19)	(0.17)	(0.17)	(0.23)	(0.26)	(0.24)	(0.24)	(0.29)	(0.34)	(0.32)
	HML	0.82***	0.76***	0.57***	0.49***	0.32*	0.30***	0.25	0.11	0.09	-0.14
		(0.22)	(0.15)	(0.20)	(0.15)	(0.18)	(0.11)	(0.16)	(0.14)	(0.11)	(0.12)
Carhartβ	**MKT**	0.74***	0.90***	0.77***	0.69***	0.67***	0.54***	0.71***	0.52***	0.43**	0.46***
		-0.10	-0.10	-0.09	-0.12	-0.11	-0.13	-0.13	-0.16	-0.18	-0.17
	SMB	0.48**	0.36**	0.06	0.02	0.05	-0.17	0.06	0.20	-0.16	0.12
		(0.19)	(0.17)	(0.18)	(0.24)	(0.21)	(0.26)	(0.25)	(0.31)	(0.35)	(0.33)
	HML	0.99***	0.77***	0.72***	0.53***	0.41**	0.40***	0.38***	0.22	0.14	-0.06
		(0.22)	(0.17)	(0.21)	(0.16)	(0.19)	(0.13)	(0.11)	(0.15)	(0.11)	(0.12)
	MOM	-0.09**	-0.05**	-0.03	-0.06**	-0.18***	0.03	-0.02	-0.11***	-0.12**	-0.10***
		(0.04)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.02)

Note: ***, **, * denotes significant at .01, 0. 05 and 0.1 level respectively.

CAPM, Fama-French and Carhart betas are based on RtoV ratio. MKT β(0) is CAPM beta, SMB (β,1) is small minus big, HML(β,2) represents high minus low, while MOM(β,3) represents momentum. Standard Errors are reported in parentheses.

However, if we conclude the SMB, Table 5 shows that P1 is high in market capitalization stocks while P10 is low in capitalization. In all the Panels, none of the portfolio have Book Value equal to zero or 1 but P10 is less than P1 in all cases, so we can conclude that P10 has the stocks with high price to book ratio. Collectively, MOM of P10 is greater than P1 in all the panels, so we can say that P10 is winner portfolio and P1 is looser portfolio (Florackis et al., 2011; Jegadeesh & Titman, 1993).

Table 6 reports the same results as Table 5, in Z K 0L F K (MKT) is less than 1. It means that portfolio 1 is more volatile than portfolio 10. Like Table 5, Panel A of Table 6 illustrates W K D W is high market capitalization stocks in P1 while low in capitalization in P10. Furthermore, in all the Panels, none of the portfolios have Book Value (BV) equal to zero or 1 but P10 is less than P1 in all cases, so the study can conclude that P10 have the stocks with high price to book ratio, supporting the results of (Florackis et al., 2011).

5. Conclusions

This study compared price impact ratio (Amihud, 2002) and the new price impact ratio (Florackis et al., 2011) at Pakistan Stock Exchange by using 14 years data ranging from January 2000 till December 2013. Ten deciles portfolios were constructed for both ratios before and after adjustment for risk. For risk adjustment Capital Asset Pricing Model, Fama and French (1993) and Carhart (1997) models were used. The study found better performance of RtoTR based portfolios and high return for spread as compared to RtoV based portfolios after testing for risk adjusted pricing models. In model estimation, the study found better performance of RtoTR in terms of stock volatility (CAPM beta), price to book ratio (SMB), market capitalization (HML) and momentum. The study confirms that transaction cost and trading frequency jointly effect liquidity and the two aspects should be taken collectively rather than considering them separately. Hence, new price impact ratio suggested by Florackis et al. (2011) works better than price impact ratio proposed by Amihud, (2002) in Pakistani market.

This study can be extended by future researchers for multiple liquidity proxies as recommended by Lam et al. (2011) in the context of Pakistan stock exchange. The comparative study of liquidity of

Pakistani market with other South Asian markets is another avenue for future research. Additionally, using the same procedure, future studies can use additional factors that could systematically explain returns. Moreover, future studies can use the same procedure as used in this study for the bond market.

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