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Trade Credit and Stock Return Predictability: Evidence from Pakistan

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Abstract

Trade credit transfers private information about borrower's creditworthiness and future performance to other lenders and this information can also be translated into the stock market. The purpose of this study is to analyze the informational role of trade credit in predicting future stock returns of the firms in the context of Pakistan. After controlling for market and firm-specific characteristics in our proposed five-factor model, it is found that firms depending more on trade credit as compared to bank loans have higher future stock returns. These findings suggest that trade credit supply signals the information that the supplier has about the borrower and this information is gradually and positively translated in the market.

Keywords: Trade Credit, Stock return Predictability, Fama & French Three-Factor Model

Trade credit extension, if handled carefully, is a typical practice of doing business and is considered as a more refined form of loans (Zhu & Jiang, 2009). Trade credit is embedded with a special attribute of having a strong transactional relationship where trade creditors acquire private information about their customers which are superior to the information acquired by banks. This information is a by-product of selling activities about their customers that can be obtained without incurring any cost (Miwa & Ramseyer 2008; Uchida et al., 2013). Biais and Gollier (1997) introduced a screening process which is adopted by suppliers to screen their borrowers as they have an information advantage over banks and then the provision of trade credit signals the creditworthiness of the borrowers. This provision of trade credit by seller provides a valuable signal to the banker that the buyer is worthy of credit. Thus, the banker provides the buyer with more credit than he would otherwise have provided. Furthermore, the acceptance of credit risk of customers by the seller may also signal that the seller may have a positive prediction about the future performance of the firm (Aktas et al., 2012). The assurance of creditworthiness is vital for suppliers otherwise they may be hesitant to provide trade credit to financially constrained firms (Xu et al., 2021).

This signaling model shows how trade credit transfers private information signals about the borrower's future performance to other lenders. The central question arises that if private information signals about borrower's future performance to other lenders, then does this information advantage also exist in stock markets and can predict future stock returns of the firms? The information accompanied by trade credit about firms' future performance can also be translated into the stock market but often ignored by investors.

Goto et al., (2015) examined the informational content in predicting the sales growth and future stock returns by using a trade credit ratio in context of US firms. They found that trade credit extension reveals suppliers' information that diffuses gradually across the investing public which suggest that firms relying more on trade credit relative to debt financing have higher subsequent stock returns. Moreover, when this information content is ignored by the investors about customer firms, then a delayed market response is expected about future sales growth of firms and stock return predictability. In this study, we are conducting the first empirical study in context of Pakistani manufacturing firms that provides evidence for investors' limited attention to the suppliers' superior information. As firms demand trade credit for different purposes and in Pakistan it as considered as a substitute to bank loans (Mubashar et al., 2018) therefore, it blurs the stock market signal content.

To simplify the research problem, following are the research question and objective of the study:

Research Question: Does informational role of trade credit exist in the stock market of Pakistan?
Research objective: To empirically test the informational role of trade credit in predicting firm's stock returns.

Scarce literature analyze informational role of trade credit in general and stock returns predictability in particular, for instance (Aktas et al., 2012; Agostino & Trivieri, 2014; Goto et al., 2015; Cao, et al., 2018). However, the main focus of these studies is rather future firm performance, borrowing capacity or investment quality. The novelty of the present study is to analyze the informational role of trade credit in predicting stock returns, using Accruals and Trade Credit Ratio by employing asset pricing models. The selection of efficient and precise asset pricing model is one of the requisite to estimate stock prices and to guide investors in planning and constructing efficient investment strategy (Shoaib & Siddiqui, 2020). Two alternatives are available capital assets pricing model (CAPM) by Sharpe (1964) and Linter (1965), and the second one is the Three Factor Model suggested by Fame and French (1992). CAPM model explains stock returns as a function of market return. Fama and French model is alternative of CAPM model with its two additional factor size and value. This three-factor model was significant improvement in CAPM model over the period (Laxmi, 2020). At this point, it merits referencing that the literature on asset pricing model using informational role of trade credit is rather limited. Moreover trade credit Ratio and accruals are neither tested alone nor simultaneously to find out prices of financial assets in Pakistani equity market.

A first study predicting sales growth and stock returns using informational role of trade credit was by Goto et al., (2015) and found strong prediction for services industry and used Fama Macbeth to predict sales growth and stock returns. To distinguish our work, we employed the traditional asset pricing models, and also proposed a new multi-factor model by incorporating two new factors –accruals and trade credit ratio. It is, however, pertinent to mention that use of trade credit is more profound for manufacturing sector.

Moreover, the study also contributes in the area of knowledge by empirically testing the applicability of the five factor model proposed by Fama and French (2015) for determining risk adjusted returns in the context of developing country such as Pakistan.

To the best of our knowledge, the informational role of trade credit in predicting stock returns, using accruals and trade credit ratio is neither tested alone nor simultaneously to find out prices of financial assets in Pakistani equity market. As, Pakistan is a developing country and such markets' asset pricing dynamics are quite different from developed markets and it is very likely that financial markets in Pakistan not only suffer from market imperfections but also experience asymmetric information problem more profoundly. Therefore, this contributes to the existing literature of multi-factor asset pricing model as Pakistani market seems more relevant and interesting for such analysis which may further help to enhance our understanding of the asset pricing models.

Literature Review

Since the 1960s, researchers are working on various methodologies to construct a model that can be considered as an ultimate approach for future stock prediction but due to different dynamics of every market, they remained unsuccessful. In 1964, Sharpe presented the first beta based pricing model "Capital Asset Pricing Model" which was later on tested in different contexts. As CAPM was a single-factor model, it could not succeed to predict the future returns of various markets. To address the problem, Roll and Ross (1986) presented the Arbitrage Pricing Theory with the introduction of new variables and various factors and those factors found to have macro-economic significance to predict future stock reruns.

In 1992, Fama and French developed a model for asset pricing with the inclusion of two more factors with market beta i.e. size premium and value premium. This model was developed to efficiently capture the cross-sectional variations in stock returns as compared to CAPM in the context of the US market. They found that the existence of size and value premiums was rewarded for bearing risk by investors. In Pakistan, the three-factor model is also analyzed and results found that these factors are priced by Pakistani equity markets (Chughtai, 2016).

Empirical literature has widely used market capitalization as a proxy of measuring size. High-cap firms are considered as "Big" whereas low-cap firms are referred to as "Small". The size was initially tested by Banz (1981) with stock returns and found that high returns are earned by

small capitalized firms as incomplete information is available for small firms so the uncertainty results in size effect. Market capitalization, a proxy of measuring size is criticized by Coleman (1997) who argued that it is a misconception of investors who believe that firms with high market capitalization will earn high returns in the context of Pakistan. Mix results are found as Mirza (2008) while evaluating Fama and French 3-factors model found positive results with size premium for small firms generating higher returns. On the other hand, Khan et al (2012) examined the size premium in the context of Pakistan using market capitalization with stock returns and found that large firms outperformed small firms.

The value of the stock is measured as the deviation between the book value of stock and market value of stock and is considered as an important factor in predicting stock returns. Rosenberg et al., (1985) found a positive impact of value premium on stock returns and also found that stocks having the high book to market ratio outperformed low book to market stocks.
Urooj (2016) found that CAPM does not provide a justified prediction about the future portfolio return to the investor so, there is a need to introduce a more powerful indicator which can help the analyst predict future portfolio return.

Previous researches have documented the role of accruals in predicting cross-sectional returns. Sloan (1996) found a negative association between stock returns and accruals. This is justified on the basis of the fact that high accruals are the indication of effective earnings management whereas investors wrongly perceive this signal and expect more increase in future profitability. Kothari et al. (2006) found similar results that managers overstate their earnings which results in overpriced equity and therefore result in negative future stock returns.

Trade Credit and Future Stock Returns

Literature on the signaling model and information content suggests that managers use trade credit to send a signal about their private information related to their performance of business and investment projects' quality (Aktas et al., 2012). On the other hand, Goto et al., (2015) suggest that the supplier's private information about the buyer's future growth is also incorporated with trade credit. The signaling model was first introduced by Biais and Gollier (1997) where suppliers have monitoring advantage over banks to screen their borrowers and thus alleviate credit rationing. Recently, Agostino and Trivieri, (2014) investigated the signaling role of trade credit in the context of small and new firms of Italy and confirmed the hypothesis that for new firms for which record is not yet established, the supply of trade credit is considered as a positive signal about the severe opaqueness of the firms. Goto et al., (2015) examined the informational content in predicting the sales growth and future stock returns by using a trade credit ratio. They found that trade credit does incorporate an information advantage that supplier has about its customers' future sales growth. This information advantage is further analyzed and extended to the stock market to test their ability to generating stock return predictability.

Following the influential work of Goto et al., (2015), after controlling both macro and micro factors, they found that firms that depend more on trade credit as compared to debt financing have higher subsequent stock returns. So, this analysis also adds to the literature of suppliers' information advantage that generates signals about the future performance of the buyer's business which results in lowering the reputational risk of the buyer hence signals the uplift of future returns of the firms which is translated in the stock markets. This leads to the following hypothesis.

H_1: Informational role of trade credit generates signal about future stock returns of Pakistani firms.

Research Methodology

To test stock returns predictability of trade credit in the context of Pakistan, the sample consists of accounting data and stock returns data of manufacturing firms because of their excessive usage of trade credit. The criteria for sample selection are as follows:
Firstly data availability was the prime step. Second, firms having negative equity values and negative book to market ratios were excluded. Third, outliers were also omitted. Data was extracted from annual reports and stock prices were downloads from the PSX official website and after following the mentioned criteria, data for 90 firms and for the period 2005 to 2017 was finalized. All factors estimation and portfolio development occurred at the end of June each year.

Methodology

Fama and French's (1992) three-factor model is considered as the appropriate methodology for predicting stock returns. Fama and French (1992) established the authenticated asset pricing model that incorporated factors, like Book to Market Ratio and size. The influential and extensive work of Fama and French (1992), recognized size and book to market equity ratio as the two foremost elements that explains cross-sectional expected returns (Shoaib & Siddiqui, 2020). The identification of additional factors for this methodology is the most critical issue as it varies and for this research, factors are aligned with the objective of our study.

The literature suggests that portfolios formation eliminates the unsystematic risk and minimizes the errors in variable (EIV) problem (Thomas 1994). Fama and Macbeth (1973) and Chen et al., (1986) suggest that to reduce EIV and to mitigate the noise in individual stock returns, stocks should be grouped into the portfolios. Hence, the errors in stock returns are likely to cancel each other and aggregate affect becomes negligible (Blume 1970). The portfolio formation process involves three core steps:

1. Ranking the securities with same characteristics to form the portfolios.
2. Estimating the factor premium by using return of the portfolio.
3. Using factor premium to explain return of the portfolio.

The Fama and French methodology is first applied on Fama French three factor models, then on proposed four-factor model, and finally on proposed five-factor model. A total of 3 models are tested through Fama and French methodology. Below is the detail of the models.

Fama & French Three-Factor Model:

For the construction of portfolios based on size, market capitalization is used to sort firms into big and small. Calculations are made at the end of the June each year (t-1), and after arranging the data in descending order; the data is then divided into two equal parts based on the observed median. Above median stocks are considered as "Big" while below-median are named as "Small".

After sorting the portfolios based on size, these are further divided based on high and low book to market ratio. After sorting and dividing the small and big portfolios based on book to market ratio, four sub-portfolios are constituted namely S/L (Small and low), S/H (Small and High), B/L (Big and low) and B/H (Big and high). These portfolios are formed after one year lagged period to confirm that information is priced in the next year's stock returns.

Following the approach of Fama and French, (1992), our three-factors (market factors, size factor, and value factor) are constructed as follows:

MKTi,t= (Rm-RFR)

SMBi,t= ½*[(S/L-B/L) +(S/H-B/H)]

HMLi,t=½*[(S/H-S/L) + (B/H-B/L)]

Following the Fama & French's three-factor model, Eq.3.1 given below captures the impact of Market factor, Size factor and Value factor on Stock returns.

Three-Factor Model:

$$(R_{pt} - RFR) = \alpha_t + \beta_1(MKT_t - RFR) + \beta_2(SMB_t) + \beta_3(HML_t) + \mu_t \qquad \text{Eq 3.1}$$

Where

R_{pt} = Expected stock returns on portfolio "p" at time t

Rf_t= Risk free rate of return at time t

Rm_t = Market returns at time t

SMB_t= Returns of small sized firms – returns of big sized firms at time t

HML_t=Returns of high Book to market firms-returns of low Book to market firms at time t

μ_t = error term

The Extended Frame Work for Four Factor Model

For the performance factors, Accruals are categorized into low and high accruals. Using the same approach of sorting and dividing size and value-based portfolios, accruals are also further sorted based on low accruals (LAC) and high accruals (HAC), which result in the construction of 8 new sub-portfolios. These 8 portfolios are titled as *S/L/LAC, S/L/HAC, S/H/LAC, S/H/HAC, B/L/LAC, B/L/HAC, B/H/LAC, and B/H/HAC.*

Now following the approach of Fama and French, (1992), our four factors (market factors, size factor, value factor, and performance factor) are constructed as follows which lead to model 2:

MKT= Rm-Rfr
SMB=1/4[(S/L/LAC-B/L/LAC)+(S/L/HAC-B/L/HAC)+(S/H/LAC-B/H/LAC)+(S/H/LAC-B/H/LAC)]*
HML=1/4[(S/H/LAC-S/L/LAC)+ (S/H/HAC-S/L/HAC)+(B/H/LAC-B/L/LAC)+ (B/H/HAC-B/L/HAC)]*
ACC=*1/4*[(S/H/LAC-S/H/HAC)+ (S/L/LAC-S/L/HAC)+(B/H/LAC-B/H/HAC)+ (B/L/LAC-B/L/HAC)]*

Extended Four-Factor Model:

Above factors lead to the estimation of Model 2:

$$(R_{pt} - RFR) = \alpha_t + \beta_1(MKT_t - RFR) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(ACC_t) + \mu_t \quad \text{Eq 3.2}$$

Where

R_{pt} = Expected stock returns on portfolio "p" at time t
Rf_t= Risk free rate of return at time t
Rm_t = Market returns at time t
SMB_t= Returns of small sized firms – returns of big sized firms at time t
HML_t=Returns of high Book to market firms-returns of low Book to market firms at time t
ACC= Returns of low accrual firms– Returns of high accrual firms at time t
μ_t = error term

The Extended Frame Work for proposed Five-Factor Model

To address the informational role of neutral trade-credit ratio (NTC), similar Fama& French (1992) approach is used for the construction of the portfolio. For this purpose, size, value, and performance-based portfolios are further sorted into low and high NTC. LNTC represents portfolios having low NTC whereas HNTC represents portfolios having high NTC. After sorting and dividing the portfolios, 16 sub-portfolios are constituted namely *S/L/LAC/LNTC, S/L/LACC/HNTC, S/L/HAC/LNTC, S/L/HAC/HNTC, S/H/LAC/LNTC, S/H/LAC/HNTC, S/H/HAC/LNTC, S/H/HAC/HNTC, B/L/LAC/LNTC, B/L/LAC/HNTC, B/L/HAC/LNTC, B/L/HAC/HNTC,B/H/LAC/LNTC,B/H/LAC/HNTC B/H/HAC/LNTC and B/H/HAC/HNTC.*

Again following the approach of Fama and French, (1992), our five factors are constructed as follows:

MKT= Rm-Rfr
SMB= 1/8[(S/L/LAC/LNTC-B/L/LAC/LNTC)+ (S/L/LAC/HNTC-B/L/LAC/HNTC)+ (S/L/HAC/LNTC-B/L/HAC/LNTC)+ (S/L/HAC/HNTC-B/L/HAC/HNTC) + (S/H/LAC/LNTC-B/H/LAC/LNTC)+(S/H/LAC/HNTC-B/H/LAC/HNTC) +(S/H/LAC/LNTC-B/H/LAC/LNTC)+ (S/H/LAC/HNTC-B/H/LAC/HNTC)]*
HML= 1/8[(S/H/LAC/LNTC-S/L/LAC/LNTC)+ (S/H/LAC/HNTC-S/L/LAC/HNTC)+ (S/H/HAC/LNTC-S/L/HAC/LNTC)+ (S/H/HAC/HNTC-S/L/HAC/HNTC)+ (B/H/LAC/LNTC-B/L/LAC/LNTC)+ (B/H/LAC/HNTC-B/L/LAC/HNTC) +(B/H/HAC/LNTC-B/L/HAC/LNTC)+ (B/H/HAC/HNTC-B/L/HAC/HNTC)]*
ACC= *1/8*[(S/H/LAC/LNTC-S/H/HAC/LNTC)+ (S/H/LAC/HNTC-S/H/HAC/HNTC)+ (S/L/LAC/LNTC-S/L/HAC/LNTC)+ (S/L/LAC/HNTC-S/L/HAC/HNTC)+ (B/H/LAC/LNTC-B/H/HAC/LNTC)+ (B/H/LAC/HNTC-B/H/HAC/HNTC)+ (B/L/LAC/LNTC-B/L/HAC/LNTC)+ (B/L/LAC/HNTC-B/L/HAC/HNTC)]*
NTC= *1/8*[(S/L/LAC/LNTC-S/L/LAC/HNTC)+ (S/L/HAC/LNTC-S/L/HAC/HNTC)+ (S/H/LAC/LNTC-S/H/HAC/HNTC)+ (S/H/HAC/HNTC-S/H/HAC/HNTC)+ (B/L/LAC/LNTC-B/L/LAC/HNTC)+ (B/L/HAC/LNTC-B/L/HAC/HNTC)+ (B/H/LAC/LNTC-B/H/HAC/HNTC)+ (B/H/HAC/HNTC-B/H/HAC/HNTC)]*

Extended Five-Factor Model:

Above factors construction lead to the following Eq. 3.3:

$$(R_{pt} - RFR) = \alpha_t + \beta_1(MKT_t - RFR) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(ACC_t) + \beta_5(NTC_t) + \mu_t \quad \text{Eq 3.3}$$

Where

R_{pt} = Expected stock returns on portfolio "p" at time t
Rf_t= Risk free rate of return at time t
Rm_t = Market returns at time t
SMB_t= Returns of small sized firms – returns of big sized firms at time t
HML_t=Returns of high Book to market firms-returns of low Book to market firms at time t
ACC= Returns of low accrual firms– Returns of high accrual firms at time t
NTC= Returns of low NTC – Returns of high NTC firms at time t

μt = error term

Variable Measurements

Below are the measurements of the variables used in this study.

Table 1: *Variables measurement*

Variables`	**Measurement**
Portfolio Returns (R_p)	Excess Stock Returns of portfolio at time *t*
R_{pt}-RFR	Stock returns in excess of Risk-free rate of return on portfolio "p" at time *t*
Market (MKT)	Return of KSE Index at time *t*
MKT_t-RFR	Market returns in excess of Risk-free rate of return at time *t*
Size (SMB)	Returns of small size firms – returns of big size firms at time *t*
Book to Market Ratio (HML)	Returns of high Book to market firms – returns of low Book to market firms at time *t*
Accruals (ACC)	Returns of low accrual firms– Returns of high accrual firms at time *t*
Neutral Trade Credit Ratio (NTC)	Returns of low NTC – Returns of high NTC firms at time *t*

Stock Returns

Monthly returns are calculated for each year (from July to June) by taking the natural log of current price divided by the previous price following the continuous compounding assumption for portfolio analysis. For excess stock returns, annual T-Bills rate data was obtained.

Market Returns (Market Factor)

Market factor is measured as an excess return of market portfolio which is market return minus the risk-free rate. The market portfolio contains information on all assets and liabilities available in the market (Chughtai, 2017). Market returns are calculated using the closing prices of the PSX-100 index.

Size Factor

Market capitalization is a proxy used to measure the size of the firms based on the market price of shares and the total number of shares outstanding (Banz, 1981).

Value Factor

Book-Market ratio is a proxy used to measure the forward-looking information about a firm's future performance. This ratio is calculated using accounting data and market data i.e. book value of equity to market value of equity or market capitalization (Rosenberg, 1985).

Performance Factor

Another variable for measuring the forward-looking information is Accruals for measuring performance of firms. This variable is measured using the cash flow statement approach by subtracting cash flow from operating activities of the current period from net income of the current period and divided by lagged total assets (Collins &Hribar, 2002).

Information Factor

The trade-credit ratio is measured by dividing accounts payables to total debt obligation and is considered as a raw trade-credit ratio (RTCR) which is used as a proxy to measure the suppliers' information advantage over financial institutions. This proxy is theory-driven as the lending activities of suppliers and financial institutions are accompanied by the information they have about borrowers, therefore, the denominator of the ratio justifies the information advantage of suppliers relative to financial institutions (Nissim& Penman, 2003). To observe the unique variation of the trade credit ratio, RTCR is neutralized by regressing raw trade-credit ratio on factors affecting RTCR such as a book to market ratio, market capitalization, and leverage to capture the common variations and then residuals are estimated. In the following empirical

analysis, these residuals are used and termed as "NTC" to mean the neutralized trade-credit ratio (Goto et al., 2015).

Data Analysis and Results

Descriptive Analysis

The descriptive statistics of monthly average returns of all portfolios for the period of 2005 to 2017 with 132 observations are given below in Table 2. Results are reported for Big(B) size firms in Panel 1 and Small (S) firms in panel 2.

Table 2: *Descriptive statistics*

Portfolios	Mean	Standard Deviation	Kurtosis	Skewness	Minimum	Maximum
P	0.0061	0.0754	1.3215	-0.0034	-0.2044	0.2866
Panel 1: Big size portfolios						
B	0.0012	0.0728	1.9895	-0.2014	-0.1981	0.2772
B/L	0.0006	0.0648	3.0650	0.2081	-0.1848	0.2972
B/H	0.0023	0.0802	0.6331	-0.5219	-0.2262	0.2063
B/L/LAC	0.0048	0.0625	3.1972	0.1736	-0.1928	0.2845
B/L/HAC	-0.0011	0.0809	2.5617	-0.1538	-0.2464	0.3334
B/H/LAC	0.0047	0.0882	2.3102	-0.5855	-0.3395	0.2602
B/H/HAC	0.0040	0.0934	1.1713	0.0036	-0.2728	0.3095
B/L/LAC/LNTC	0.0066	0.0712	2.0912	0.1767	-0.2448	0.2873
B/L/LAC/HNTC	0.0009	0.0739	2.7586	0.0164	-0.2653	0.3037
B/L/HAC/LNTC	-0.0023	0.1017	5.4365	0.3672	-0.3844	0.4879
B/L/HAC/HNTC	0.0008	0.0841	2.4913	-0.8173	-0.3584	0.2381
B/H/LAC/LNTC	0.0018	0.0865	1.0911	-0.0920	-0.3015	0.2417
B/H/LAC/HNTC	0.0081	0.1244	6.0289	-0.2713	-0.5792	0.5162
B/H/HAC/LNTC	0.0051	0.1172	7.3422	0.9294	-0.3598	0.6338
B/H/HAC/HNTC	0.0027	0.1022	2.6971	-0.1170	-0.3701	0.3886
Panel 2: Small size portfolios						
S	0.0106	0.0911	5.2569	0.8861	-0.2823	0.4817
S/L	0.0079	0.0787	2.4273	0.6192	-0.1658	0.3509
S/H	0.0116	0.0851	1.1440	0.3693	-0.1923	0.2890
S/L/LAC	0.0070	0.0769	0.5621	0.2169	-0.1722	0.2788
S/L/HAC	0.0020	0.0914	5.0609	0.9653	-0.2135	0.4730
S/H/LAC	0.0089	0.0967	2.5344	-0.0173	-0.3799	0.3300
S/H/HAC	0.0095	0.0930	0.2840	0.1494	-0.2157	0.2481
S/L/LAC/LNTC	0.0083	0.0935	0.6851	-0.2224	-0.2787	0.2613
S/L/LAC/HNTC	0.0023	0.0878	0.3012	-0.1082	-0.2208	0.2643
S/L/HAC/LNTC	0.0072	0.1132	3.8679	0.1791	-0.4875	0.4599
S/L/HAC/HNTC	0.0096	0.1233	12.5573	1.8309	-0.3412	0.8042
S/H/LAC/LNTC	0.0029	0.1312	3.7521	-0.0152	-0.5317	0.4104
S/H/LAC/HNTC	0.0114	0.1170	0.8337	-0.0300	-0.3079	0.3688
S/H/HAC/LNTC	0.0051	0.1021	1.3721	-0.4344	-0.3570	0.2819
S/H/HAC/HNTC	0.0135	0.1073	0.8307	0.3032	-0.2671	0.3309
MKT	0.0010	0.0707	16.1540	-2.4707	-0.4605	0.1707
SMB	0.0052	0.0545	3.7848	-0.1446	-0.1734	0.1569
HML	0.0026	0.0461	4.6760	-0.2527	-0.1659	0.1425
ACC	0.0010	0.0425	7.1013	-0.8513	-0.2086	0.1201
NTC	0.0018	0.0416	7.4713	0.4707	-0.1685	0.1914

Note: Here P represents the portfolio of all sample firms in the sample period. S and B represent size i.e. small and big. L and H are Low book to market ratio and High book-to-market ratio respectively. HAC and LAC indicate sorting based on high accruals ratio and low accruals ratio. LNTC and HNTC are the low neutralized trade credit ratio and high neutralized trade credit. MKT is market return in excess of Rfr, SMB is small minus big, HML is high minus low, ACC is LAC-HAC and NTC is HNTC-LNTC.

This table shows that the average return of all sample firms is 0.61% and the standard deviation is 7.54%. Similarly, for the big sized firms, average return is 0.12% and standard deviation is 7.28%. For small size firms, the average return is 1.06% and the standard deviation is 9.11%. Comparing both averages of size sorted portfolios it is evident that small stocks are riskier hence they earned more return. The standard deviation of SMB is much lower than S and B which satisfies the purpose of constructing portfolios i.e. minimization of idiosyncratic volatility. Whereas, descriptive statistics of low book-to-market and high book-to-market portfolios, it is indicated that in terms of high average returns, low book-to-market portfolios outperform high book-to-market portfolios along with possessing high risk. Similarly, accruals of small firms also outperformed big sized firms' accruals and average returns of small-sized firms sorted on the basis of neutralized trade credit ratio also outperformed.

Correlation Analysis

To test the association among all factors, the Correlation matrix is computed by using data average monthly returns of 90 stocks for the period 2005-2017 with 132 observations in Table 3 for five factors.

Table 3: *Pearson correlation-five factor model*

	MKT	***SMB***	***HML***	***ACC***	***NTC***
MKT	1				
SMB	-0.086***	1			
HML	-0.010	0.245	1		
ACC	-0.134	0.224***	0.340***	1	
NTC	0.063	-0.050	-0.242***	-0.240***	1

Note: Here MKT represents Market return in excess of RFR, SMB is Size premium, HML is value premium, ACC is performance premium sand NTC is information premium.

As the result shows, none of the factors from our five factor model is strongly related to other and all variables have almost weak correlation and none of our value reaches the range of .8 and above so multicollinearity issue will not affect the estimation results.

Regression Results Fama & French Three Factor Model

Results reported in Table 4 shows the relationship of market, size factor and value factor with stock returns of the portfolios that are sorted on the basis of size(small, big) and book to market ratio (high low).

According to the Fama and French three-factor model results, it is found that market factor is positively predicting future returns for firms sorted on the basis of market capitalization only. Coefficients of size factor are statistically significant for small firms' portfolios whereas, for big firms' portfolios, the size factor is negatively predicting future returns for firms having a high value. Furthermore, the value premium is negatively and significantly predicting returns of low book-to-market ratio firms' portfolios and positively related to high book to market ratio firms. The explanatory power of three factors model varies across the portfolios. On the basis of above findings, it is suggested that investors or portfolio managers can design their investment strategies keeping in view these sorted portfolios.

Table 4: *Regression results from Fama & French three Factor Model*

Dependent variable/ Sub-Portfolios	**C**	**MKT**	**SMB**	**HML**	**Adj. R^2**
$(R_{pt} - RFR) = \alpha_t + \beta_1(MKT_t - RFR) + \beta_2(SMB_t) + \beta_3(HML_t) + \varepsilon_t$					
P	-0.0044	0.1719*	0.2618**	0.0536	0.035
S	-0.0035	0.1759*	0.7632***	-0.2163	0.206
B	-0.0057	0.1640*	-0.1315	-0.1345	0.022
S/L	-0.0047	0.1276	0.6245***	-0.3199**	0.208
S/H	-0.006	0.1284	0.8965***	0.6893***	0.4556
B/L	-0.006	0.1284	-0.1035	-0.3107***	0.0635

B/H	-0.0047	0.1276	-0.3755***	0.6801***	0.2345

Note: Here P represents portfolio of all sample firms in sample period. S and B represent size i.e. small and big. L and H are Low book to market ratio and High book-to-market ratio respectively.

Regression Results for Four-Factor Model

Results reported in Table 5 shows the relationship of market, size factor, value factor and performance factor with stock returns of the portfolios that are sorted on the basis of size, book to market ratio and Accruals.

Table 5: *Regression Results from Proposed Four-Factor Model*

Dependent variable/ Sub-Portfolios	**C**	**MKT**	**SMB**	**HML**	**ACC**	**Adj. R^2**
$(R_{pt} - RFR) = \alpha_t + \beta_1(MKT_t - RFR) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(ACC) + \varepsilon_t$						
P	-.0086	-.9863***	1.9960***	.0134	-.0054	.9972
S	-.0032	-1.1259***	2.1815***	-.1658**	-.1200	.8305
B	-.0112	-.7846***	1.6256***	-.0770	-.1708**	.7700
S/L	-.0040	-.9086***	1.7530***	-.4076***	-.0080	.6942
S/H	-.0040	-.8515***	1.5942***	.8132***	-.0867	.7166
B/L	-.0105***	-.6906***	1.4128***	-.2995***	-.1206	.7312
B/H	-.0134***	-.7228***	1.5163***	.5983***	.2676**	.6234
S/L/LAC	-.0077*	-.9094***	1.8012***	-.3461***	.8225***	.6670
S/L/HAC	-.0092**	-.9593***	1.8312***	-.3805***	-.3880***	.6948
S/H/LAC	-.0095*	-.7274***	1.4462***	1.0717***	.7441***	.6529
S/H/HAC	-.0051	-.8067***	1.4975***	.8471***	-.3997***	.6156
B/L/LAC	-.0070**	-7121***	1.3859***	-.2750***	.1762**	.6139
B/L/HAC	-.0115***	-.7572***	1.6072***	-.4450***	-.3722***	.7433
B/H/LAC	-.0113**	-.9891***	1.9922***	.1027	.4957***	.6532
B/H/HAC	-.0096**	-.8148***	1.6896***	.5317***	-.6016***	.7223

Note: Here P represents portfolio of all sample firms in sample period. S and B represent size i.e. small and big. L and H are Low book to market ratio and High book-to-market ratio respectively. HAC and LAC indicate sorting on the basis of high accruals ratio and low accruals ratio.

Table 5 shows that four-factor model outperformed and successfully explains the returns of all stylized portfolios. MKT is found to be significant for all portfolios therefore providing empirical support for CAPM validity in Pakistan. Size premium also provides the strong support in predicting stock returns with positive coefficients hence supporting the traditional size anomaly which states that small firms are considered as more risky firms due to low capitalization and are more sensitive to the macro-economic shocks therefore high returns are required by the investors. On the other hand, value premium is providing mixed results that vary across portfolios. For instance, portfolios sorted on the basis of size and further sorted on the basis of low value are negatively predicting stock returns. High value portfolios outperform the low value portfolios with all sub-portfolios. For Accruals, average returns sorted on the basis of accruals are providing significant results and particularly portfolios of High accruals show negative coefficient. This finding is consistent with Kothari et al. (2006) who found that manager overstate their earnings which results in overpriced equity and therefore result in negative future stock returns.

Regression Results from Proposed Five-Factor Model

Results reported in Table 6 shows the relationship of market, size factor, value factor and performance factor with stock returns of the portfolios that are sorted on the basis of size(small, big), book to market ratio (high low), Accruals (low high) and net trade credit ratio (low, high).

Table 6 below shows that with the inclusion of 5th factor in the model i.e. net trade credit ratio, adjusted R-square has decreased dramatically for portfolio "p" and market factor has become insignificant except for few sub-portfolios but SMB is highly significant with mixed directions. HML and ACC have few insignificant coefficients. NTC is highly significant for most of the sub-portfolios with positive coefficient which suggest that using net trade credit ratio as a proxy for the supplier's information advantage; it is evident that this ratio predicts stock returns significantly beyond the known predictors such as MKT, SMB, HML and ACC. A noticeable significant negative

coefficient of small firms having high book to market ratio with low accruals and low NTC suggest that the information about firms who are bearing more risky profile with less usage of trade credit, is negatively translated in stock market and thus the famous notion of "high risk-high return" does not validate for this particular portfolio.

Table 6: *Regression results from Proposed Five-Factor*

Dependent variable/ Sub-Portfolios	C	MKT	SMB	HML	ACC	NTC	Adj. R^2
$(R_{pt} - RFR) = \alpha_t + \beta_1(MKT_t - RFR) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(ACC) + \beta_5(NTC) + \varepsilon_t$							
P	-.004	.097	-.016	.389***	-.488***	0.746***	.255
S	-.001	.078	.339***	.15	-.657***	1.032***	.355
B	-.006	.084	-.497***	.346***	-.431***	0.737***	.407
S/L	-.003	.065	.367***	-.085	-.443***	0.747***	.275
S/H	-.003	047	.613***	.931***	-.593***	0.856***	.538
B/L	-.006	.07	-.292***	.058	-.397***	0.514***	.288
B/H	-.007	.091	-.459***	1.014***	-.088	0.357**	.313
S/L/LAC	-.005	.095	.453***	-.032	.28*	0.537***	.173
S/L/HAC	-.008	.062	.351***	-.021	-.874***	0.586***	.27
S/H/LAC	-.007	.087	.678***	1.116***	.106	0.471***	.509
S/H/HAC	-.005	.05	.725***	0.947***	-.899***	0.715***	.518
B/L/LAC	-.003	.03	-.32***	0.067	-.061	0.551***	.198
B/L/HAC	-.008	.102	-.284***	-0.029	-.746***	0.573***	.379
B/H/LAC	-.004	.071	-.589***	0.622***	.179	0.825***	.259
B/H/HAC	-.004	.074	-.624***	0.966***	-.947***	0.65***	.473
S/L/LAC/LNTC	-.002	-.021	.516***	-.321*	.149	0.424**	.103
S/L/LAC/HNTC	-.009	.228**	.355**	.107	.396**	0.601***	.152
S/L/HAC/LNTC	-.001	.152	.455**	-.402*	-.745***	-0.111	.111
S/L/HAC/HNTC	-.003	-.029	.46***	.017	-1.089***	1.496***	.456
S/H/LAC/LNTC	-.012	.239**	.715***	1.432***	.365*	-.714***	.595
S/H/LAC/HNTC	-.005	-.06	.66***	.887***	-.038	1.568***	.445
S/H/HAC/LNTC	-.008	-.049	.749***	.813***	-1.021***	.025	.338
S/H/HAC/HNTC	-.003	.147	.769***	1.118***	-.72***	.938***	.487
B/L/LAC/LNTC	-.001	.064	-.271**	.128	-.132	.403***	.084
B/L/LAC/HNTC	-.006	.02	-.397***	.003	-.016	.725***	.236
B/L/HAC/LNTC	-	.011	-	-.199	-.941***	.601***	.36

	.008		.367***				7
B/L/HAC/HNTC	-.007	.166*	-.23*	.105	-.636***	.612***	.279
B/H/LAC/LNTC	-.006	.076	-.396***	.63***	.31*	.037	.172
B/H/LAC/HNTC	-.001	.043	-.759***	.796***	.004	1.606***	.356
B/H/HAC/LNTC	-.002	.112	-.915***	1.517***	-1***	-.054	.465
B/H/HAC/HNTC	-.006	.064	-.388***	.589***	-.887***	1.043***	.38

Note: Here P represents portfolio of all sample firms in sample period. S and B represent size i.e. small and big. L and H are Low book to market ratio and High book-to-market ratio respectively. HAC and LAC indicate sorting on the basis of high accruals ratio and low accruals ratio. LNTC and HNTC are the low neutralized trade credit ratio and high neutralized trade credit.

Discussion and Implications

For the stock return predictability hypothesis, previous literature suggests that suppliers of trade credit have more information about its borrower than financial institutions while extending credit (Kallberg & Udell, 2003). In this study, we analyzed that whether this information that is embedded in trade credit provides any positive signal about the borrower's future performance and whether this information content is translated into future stock returns or not in the context of the Pakistani equity markets. Using Fama & French models with our proposed 4 and 5 factors model, we found that net trade credit ratio significantly predicts future stock returns beyond the known predictors such as MKT, SMB, HML, ACC and NTC along with a negative coefficient of small firms having high book to market ratio with low accruals and low NTC suggest that firms bearing more risk and using less trade credit is negatively translated in stock market.

From stock returns analysis, it is found that size premium, value premium, performance premium, and information premium are priced by the market. So, these factors must be considered during assets pricing. Investors must incorporate these factors in taking investment decision. The results of this study warrant all type of investors, fund managers, and analysts to include performance premium and information premium along with market premium, size and value premium for valuation purpose.

The results of the study not only contribute to the existing academic literature, but also have extensive practical implications for corporate managers and investors as the importance of understanding risk and return relationship to avoid losses from irrational decision making cannot be ignored. The study proposes the presence of size and value effect in stock market of Pakistan. Moreover, the predictive power of trade credit for future stock returns implies that investors should reasonably gather information from public sources and pay attention to the information incorporated in in trade credit about future stock returns.

Conclusion and Future Research Direction

Previous literature suggests that suppliers of trade credit have more information about its borrower than financial institutions while extending credit. In this paper, we have analyzed that this information that is embedded in trade credit provide any positive signal about borrowers future performance and whether this information content is translated into future stock returns or not in context of Pakistani equity markets. Using Fama & French models with our proposed 4 and 5 factors model, we find that NTC predicts stock returns significantly beyond the known predictors such as MKT, SMB, HML and ACC.

To test the cross-sectional variations in stock prices, asset pricing models have to be revisited using market-specific risk factors along with firm-specific risk factors for more rational justification of priced risk factors.

Limitations

The focus of this study was mainly on the manufacturing sector and, thus, the findings of this study may not be applicable to other sectors because manufacturing firms are different characteristics that they usually hold high levels of inventories, allow more credit transactions, and

generate more gross profits. Lastly, the sample period for the study was from 2005 onwards as previous data for the manufacturing firms, for a good number of companies was not available.

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