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Fundamental Value and Price Divergence: Evidence from Tehran's Stock Exchange

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Abstract

This paper investigates the information content of some accounting variables and degree of their association with risk and return by residual income model in Tehran stock exchange (TSE). In order to determine risk factors, we use Fama and French (1992) three-factor Model. The first contribution is that the fundamental value based on accounting figures, is highly correlated with stock prices, that is, the accounting numbers as residual income and book value and the fundamental value based on them, are important factors determining the market value of stocks. Our results indicate that beta coefficient cannot explain price differentials, and price differentials are not related to abnormal return. We further document that relative information content of price differentials and Systematic Risk are different. Finally, we find that price differentials with systematic risk do not contain incremental information content to explain returns in TSE.

Key words: Price Divergence, Fundamental Value, Irrational Behavior, Residual Income Model.
JEL Classification: G02, G11, G32

Introduction

Existing research on "Efficient Market Hypothesis" (EMH) has devoted more attention to full disclosure and rational decision of investors. Hence, all investors have the same amount of accessibility to information; market price will close to fundamental value and as a result, the possibility of achieving abnormal return will not be available to them. But studies along with experimental evidence depict market ignorance, the occurrence of irrational behavior and the creation of abnormal profits (Shleifer, 2000). Griblatt and Han (2005) demonstrate that investors do not always act rationally and predictably. They show various behavioral deviations in investors; "Market Anomalies" which lead to price divergence from the fundamental value of shares and cause mispricing. For example, Bayoudh et al. (2012) try to identify whether the excessive volatility of observed stocks on the Tunisian Stock Market results from the excessive trading of overconfident investors. Their analysis indicates quite clearly the importance of considering this bias in analysis of the specificities of Tunisian Stock Market. They suggest that overconfidence admits a more pronounced effect on the volatility for daily time intervals compared to weekly and monthly intervals.

There is different evidence concerning this subject. For example Brainard et al. (1980) argue that Low price levels cannot be rationally generalized to existing economical realities; the findings of Shiller (1981) shows that there is no logical relationship between stock price volatility and economical events.

Traditional theory on the role of accounting numbers in valuation, such as the residual income valuation model (e.g. Feltham and Ohlson, 1995) simplifies the role of risk. Feltham and Ohlson present a framework which is consistent with the measurement perspective, by showing how the market value of the firm can be expressed in terms of fundamental balance sheet and income statement components. According to Dechow et al. (1999) we first measure fundamental value using residual income model and calculate

price differential (which is used by Baginski and Wallen, 2003); fundamental value minus share prices. We then examine whether price differential can be as a risk factor (in addition to the Fama and French's (1992) three-factor model). We, next test whether price differential is significantly related to abnormal return (difference between actual and expected return). Finally, we develop an approach by using Wald Test statistic to examine the relative information content and incremental information content of market beta and price differential return. In addition, we employ Fama and French (1992) three-factor model as determining risk factors.

Our results can assist the standard setters to redefine usefulness of accounting information. Our results indicate that market beta coefficient cannot explain price differentials. In contrast, book to market ratio (BM) provides relatively high explanatory power to price differentials (more than 70 percent). Also, there is no relationship between price differential and abnormal return. In contrast, BM ratio provides little explanatory power for abnormal return. As expected, in the absence of BM ratio because of the high correlation (between BM ratio and abnormal return), price differential becomes relatively little explanatory power for abnormal return. To test which part of firms can explain more abnormal return in the absence of BM ratio, sample firms were categorized into three parts based on the decline of price differential. Afterwards we test whether our sample firms can achieve more abnormal return. Results indicate that the average of earning abnormal return in our three categories is the same. This shows that there is no chance for firms in Iran to achieve abnormal return. Finally, we find that price differentials, as compared with systematic risk, do not contain incremental information content to explain levels of equity returns in TSE.

The remainder of the paper is organized as follows. Section II provides an overview of previous research and develops our empirical predictions. Section III describes data and methodology. The empirical results are discussed in section IV and finally in section V summery and conclusions of the study are presented.

Literature Review

A number of recent studies invert fundamental value and risk assessment. Baginski and Wallen (2003) evaluate the effects of return and risk on price differential by using the residual income model. They assess the effect of accounting information, emerged from new accounting method, on equity risk, equity price, and return. They developed an accounting-fundamentals-based measure of the market's pricing of risk- the difference between actual share price and residual income valuation model estimate of share value using risk free rates of return. They calculate the price differential- the fundamental value estimate minus share price. The results of their study show that price differential are positive for all firm-years and as a practical matter, their estimates of price differential is highly positively correlated with estimates of expected rate of return. Their results show that systematic risk in residual return on equity partially explains the price differential.

Frankle and Lee (1998) and Ali et al. (2003), differentiate between the effect of the fundamental value to price ratio based on risk and mispricing. Hence, they test the relationship between earnings, the $\frac{V}{P}$ ratio and recognizable risk factors. However, Xie (2004) evaluates the relationship between price convergence and income obtained from applying the $\frac{V}{P}$ investment rule. Therefore, if we can describe the income obtained from applying the $\frac{V}{P}$ investment rule with the price convergence and fundamental value, we can state that the reason for income creation is mispricing re-convergence of price.

Lo and Lys (2000) state that if the $\frac{V}{P}$ ratio replaces some unpredictable risk factors, it can be expected that the mentioned ratio has the power to predict future return. Ali et al. (2003) evaluate the reasons for the effectiveness of $\frac{V}{P}$and gaining abnormal return; resulting from the use of this ratio based on Frankle and Lee's model (1998), they state that mispricing and

risk factors are two main influential factors in creating this abnormal return.

Klimzak (2010) examines a residual income model on a sample of firms listed in Germany and France stock exchanges. He finds dramatically divergent patterns of fit. In France, accounting numbers have strong relevance for market valuation after publication of annual report. In Germany, accounting numbers have stronger relevance during the fiscal year.

We contribute to this discussion by identifying additional risk factor and restudying the effects of return and risk on price differential by using the residual income model.

Model and Hypothesis Development

The clean surplus theory or the residual income model has had a tremendous effect on financial accounting theories and research. In 1995, Feltham and Ohlson presented a framework which is based on fundamental value. In this theory it is assumed that ideal conditions (such as certainty etc) exist. The F&O model can be used to estimate the value of the firm's shares. This can then be compared to the actual market value to indicate possible over-or under-valuation by the market. The fundamental value can also be expressed in terms of financial statement variables. We evaluate fundamental value based on Dechow et al. Model (1999) as follow:

$$V_t = B_t + \frac{(x_t - r_e.B_{t-1})\omega_t}{(1 + r_e - \omega_t)} \quad (1)$$

At any time t, V_t denotes fundamental value, B_t denotes book value of per share, X_t represents residual net profit of per shares, r_e shows the Equity Cost of Capital rate, w_t represents the Earning Persistent Coefficient which is calculated based on the convergence model which is based on time series (for total study period), as follows:

$$(x_{i,t-1} - reB_{i,t-2}) = \alpha_t + \omega_t (x_{i,t-2} - reB_{i,t-3}) \quad (2)$$

For each model above, we calculate Equity Cost of Capital rate (r_e) based on market beta and CAPM model (with the 17% risk free rate equal treasury bill). In this case if the rate becomes minus, the decline rate will equal to the average of equity cost of capital of the firm in the research period. Also, if the fundamental value becomes minus, it will equal to the book value of the end of fiscal year, and finally if the book value becomes minus too, the firm will be eliminated. The fundamental value estimated using the model, show a correlation about 86% with market value of stocks as shown in appendix 1, that is the accounting numbers as residual income and book value, are important for users in the market and have information content.

Thus, after estimating the fundamental value, we compute *price differential* (Pdiff) as:

$$Pdiff_t = V_{it} - P_{it} \quad (3)$$

where P_{it} is the price per share for firm i and V_{it} is the fundamental value of firm i.

From the viewpoint of risk, the prediction power of $\frac{V}{P}$ ratio can be attributed to inaccurate measurement of omission of some risk-causing factors which influence earnings (Bal et al., 1995).

We test whether the market beta has an explanatory power for price differential (1- $\frac{V}{P}$). This means that accounting variables such as fundamental value can be another risk factor beyond Fama and French (1992) three-factor model in evaluating risk and predicting return. This fact indicates that amount of completeness of accounting information content and by that the amount of deviation of price from fundamental value will be assessed. Therefore we use the multiple regressions for testing the above-mentioned explanation using market beta besides two remaining risk factors (Fama and French (1992) three-factor Model), and LnrankδROE (Logarithm of rank ROE of the sample firms) for independent variables and Growth as a control variable. So we test the following hypothesis:

H1- There is a significant relationship between the price differential and systematic risk of shares.

Based on traditional theories, it is expected that the trend of prices in market, as a result of the transactions of rational investors, the over/under pricing gradually removes and the possibility of gaining profit from arbitrage vanishes. The more complete and accurate the information available in the market, and the higher the market efficiency in proportion to available information, the less would be the arbitrage time and the abnormal earning in this regard. Thus, over/under pricing of bands vanishes quickly. Of course, during this period the intelligent investors who are able to catch this opportunity can obtain abnormal earning, which facilitates the discovery of fundamental value of shares in the market. Dechow et al. (1999) contend that when high fundamental value companies are identifies as higher risk in the eyes of the investors, it is expected that it is possible to take advantage of the future earning prediction power by variables such as the BM ratio etc.

If one can justify the earning obtained from applying $\frac{V}{P}$ ratio by using the price divergence, it is possible to attribute the existence of abnormal earning to price divergence.

Since $\frac{V}{P}$ ratio has been calculated using the market price and risk is reflected in the market price. This ratio may be a simple substitute for the expected return, to the extent that the abnormal return measured by researchers has not regarded all the risk factors in return estimate; the $\frac{V}{P}$ ratio may be in relation with abnormal return due to the inaccurate measurement of the removal of the above mentioned factors. One technique to control this is to apply a regression analysis between abnormal return and price differential, while controlling the effect of substitute variables defined for risk. In this regard, Frankle and Lee (1998) have regarded firm size, BM ratio and market beta as a controlling variables. We, too, will use these three variables as regression controlling variables. If the price differential can substitute some unknown risk factors, one can expect $\frac{V}{P}$ ratio to have predictive power of abnormal return. So the following second hypothesis is:

H2- There is a significant relationship between the price differential and abnormal return of shares.

At the end, we prospect the abnormal return by testing the relative and incremental information content of systematic risk and price differential by representing the following hypotheses:

H3- The price differential variable compared to the systematic risk of shares has relative informational content in return prediction.
H4- The price differential variable compared to the systematic risk of shares has incremental informational content in return prediction.

For all the hypotheses above, we examine the following equations (4 to 9 respectively):

$$\text{Pdiff}_{it}/\text{P}_{it} = \beta_0 + \beta_1(\text{beta}) + \beta_2(\text{LnSize}) + \beta_3(\text{BM}_{it}) + \beta_4(\text{Lnrank}\sigma\text{ROE}) + \beta_5(Growth) + \varepsilon_t \quad (4)$$

where, (1) The three Fama and French's (1992) risk factors (Beta, LnSize, BM), (2) LnRankσROE is the standard deviation logarithm of net profit rank to equity shareholders and (3) one control variable (Growth).

In order to moderate beta measurement error, we replace beta risk rank in the above regression with market beta.

$$\text{Pdiff}_{it}/\text{P}_{it} = \beta_0 + \beta_1(\text{Lnrankbeta}) + \beta_2(\text{LnSize}) + \beta_3(\text{BM}_{it}) + \beta_4(\text{Lnrank}\sigma\text{ROE}) + \beta_5(Growth) + \varepsilon_t \quad (5)$$

As we mentioned above, if there is a significant relationship between Beta and Pdiff, we can purpose Pdiff as another risk factor in predicting ARET. So the following model for hypothesis 2 is:

$$\text{ARET} = \beta_0 + \beta_1(\text{Pdiffit/pit}) + \beta_2(beta) + \beta_3(Lnsize) + \beta_4(\text{BM}_{it}) + \varepsilon_t \quad (6)$$

We compute *ARET (Abnormal return)* the

difference between actual and expected return. The rest were defined earlier.

Since the effect of accounting information on share price becomes clear over time, a suitable time for computing return has to be determined between the Pdiff and return, therefore a 6 months period is the suitable time. (Since in Iran 29thIsfand (End of fiscal year) is considered as fiscal year. In this case, by taking into account that the date of creating the portfolio (to calculate return) is the end of Shahrivar (September), there will be at least 6 months left until the end of fiscal year).

Then for better testing this model, after general fitness, we use statistical distribution division based on the Pdiff and the relations mentioned are assessed again among the different subclasses of the sample. We also use logistic regression for testing the power of predicting positive ARET by our sample firms.

And finally for testing the hypotheses 4 and 5 by using Wald test, the models (7 and 8 respectively) are:

$$\mathrm{RET} = \beta_0 + \beta_1(beta) + \beta_2(Lnsize) + \beta_3(BM) + \varepsilon_t \quad (7)$$

$$\mathrm{RET} = \beta_0 + \beta_1(Pdiff\ /\ P_{it}) + \beta_2(Lnsize) + \beta_3(BM) + \varepsilon_t \quad (8)$$

And finally for testing the fourth hypothesis:

$$\mathrm{RET} = \beta_0 + \beta_1(\mathrm{beta}) + \beta_2(Pdiff\ /\ P_{it}) + \beta_3(Lnsize) + \beta_4(BM) + \varepsilon_t \quad (9)$$

In order to examine the equation above, we use the multiple regressions (stepwise method), logistic regression and the Wald Test, with the help of the R statistical software. Wald Test and logistic regression will be briefly summarized in order to understand their meaning. Watt (1979) and Honda (1982) proposed a Wald Test under the equality of the two variances. The test statistic has the form:

$$\mathrm{w} = (\beta_1 - \beta_2)'\partial_1^2(x_1'x_1)^{-1} + \partial_2^2(x_2'x_2)^{-1})^{-1}(\beta_1 - \beta_2)$$

where $\partial_i^2 = \frac{\varepsilon i' i}{nt - k}$, i=1,2 are the usual unbiased least square estimators of the variances of the error terms. The Wald Test is obviously easy to compute and test statistic has a χ^2 asymptotic distribution. According to Logistic regression, sometimes the dependant variable is two dimensional. On the other hand, the independent variables which can be used to evaluate their effect on dependant variables may be quantitative. Therefore, the relation that exists in linear regression is not followed in this situation. A solution for this problem is to change the left side of the equation to a quantitative variable, and this could be done with the help of logistic variables.

Sample Selection and Data description

Our sample of firms had the following requirements, from 2002 to 2008:
1- Excluded from financial and investment companies.
2- Being listed in TSE at the beginning of the study time and being active during the studying period.
3- A complete set of book value, market price of shares in hand, and annual earnings per share; and
4- Sufficient data to compute fundamental value and betas.

The sample meeting these requirements are 82 firms and the observations are 574 firms.

Table 1 illustrates descriptive statistics for our all variables. Mean of dominant variables is not far from their median. Minus mean of Pdiff shows that in market of Iran, usually the market price is determined under their fundamental value. Moreover, mean BM, which is less than one, indicates that book value of per share for sample firms is less than its market price. Spearman rank correlation among ARET and BM (not tabulate) are statistically significantly positive (at $P < 0.05$). The results of the *Shapiro-wilk's* Test (Appendix 1) show that all dependent variables are relatively normal and $B_{i's}$ coefficients are estimated from 4 regression equations. At the end of each Table, we aggregate the results by reporting t-statistic.

Data Analysis and Results

The results in Table2 illustrate that just regression coefficient estimation for BM is positive and significant (at $P < 0.05$ or lower)

and there was no significant relationship between *Beta* and *Pdiff*. Adjusted R^2 (72%), indicating that BM highly explained Pdiff. In order to moderate beta measurement error, we repeated the regression process reported in Table 3, substituting *LnrankBeta* with *Beta*, we found that coefficient of *Lnrankbeta* was not significant either.

We reported the results of multiple regression including all three Fama and French's (1992) factors for hypothesis 2 in Table4. In this regression, again the coefficient for BM is 0.0208 ($P < 0.05$). However, this regression's adjusted $R^2$1 percent indicated that BM explains little of ARET. As a result of signification of BM in our models above and the high correlation between BM and ARET (P-Value= 0.008), which diminished the correlation of *Pdiff* and *ARET*, we omitted BM from the equation and examine the regression once more (Table5). As Expected, Pdiff had little explanatory power for *ARET* and was positively associated with *ARET*. However, R^2 adjusted on *Pdiff* was still low (0.01377).

After preliminary analysis in the absence of abnormal return, we grouped our sample firm into three portfolios based on the decline of Pdiff. The grouping was done as follows: top quartile; acclaimed companies with the lowest price differential, bottom quartile; companies with the highest price differential and the middle quartile companies with average price differential.

The results of this grouping in Table 6 demonstrated that companies with the high Pdiff compared to others, had a higher explanatory power (although it is low, around 10%) for abnormal return. Also in top and middle quartiles, Pdiff had a positive and significant association with abnormal return, and *Lnsize* in the middle quartile had a negative one. Also we noted that the whole model for bottom quartile was not significant. To test the amount of ARET achievement we evaluated the variance analysis in Table 6. Results of variance analysis in Table 7 showed that, the means of three groups were not significantly different. So there was no chance for companies to receive more ARET. We next investigated which group of firms (based on high and low *Pdiff*) had more explanatory power in predicting positive ARET.

We indicated positive *ARET* to 1, and negative one to zero. The results of logistic regression in Table8 and 9 reported that *Negelkerk-*R^2 approximately 10% in the bottom quartile indicated the higher explanatory power to compare with top one. But Pdiff still had no significant association with ARET. Therefore the chance of predicting positive ARET in bottom quartile was higher than in top ones.

The result of Wald Test for examining the relative and incremental information contents of beta and *Pdiff* in explaining return were demonstrated in Tables 10 and 11 respectively. We found that although the adjusted R^2 of beta and *Pdiff* were the same, from the Wald Test statistic, these two, did not have equal relative information content. Also from Table11, after adding *Pdiff*, the adjusted R^2 reduced from 0.01063 to 0.009188, so there was no need to use Wald Test. The results showed that market beta and Pdiff had no incremental information content in explaining return.

Conclusion

In this research, we tried to make use of residual income model, in order to come up with a new accounting method in the assessment of equity risk on price and stock return, using the difference between market price and fundamental value (Baginski and Wallen, 2003) in TSE. We employed a residual income model to investigate the presence or absence of information content of accounting variables and degree of their association with risk and return in Tehran stock exchange. This information will improve the investors' knowledge of optimal analysis as well as confirmation or rejection of the previous decisions.

The final conclusion of each model is discussed at the end of each Table. We will discuss the result of each hypothesis in the following section.

As for the *first hypothesis*, results suggested that only *BM* ratio was robustly positively associated with *Pdiff*. Thus, the reason why

there was no relationship between market beta and price differential was due to the insufficiency of effective investments in the market or the irrationality of them. Also, it may be due to its coexistence with other risk factors such as BM ratio and company size, which in turn results in a reduction in the effectiveness of systematic risk. The results of this study were inconsistent with Baginski and Wallen's studies (2003). They conclude that due to problems in evaluating systematic risk, this variable is slightly able to explain price differential, but reversely, total volatilities have a very high power in explaining that variable.

With regard to *hypothesis two*, results suggested that BM ratio was significantly positively correlated to abnormal return. These results helped us to explain that reasons such as the arbitragers' limitation paved the way for opportunistic investments to invest. Of course, the existence of abnormal return is not necessarily mean that the market is inefficient because according to what was mentioned, in an efficient market, abnormal return exists, but the abnormal return mean tends to zero. Also, logistic regressions and variance analysis confirmed these results-three group of companies based on *Pdiff* achieved the same mean of abnormal return, moreover one of our portfolios (top quartile) had more explanatory power for abnormal return; however, *Pdiff* still had no association with return.

Third hypothesis confirmed its rejection. Wald Test results showed that the price differential and systematic risk variables did not have a similar relative content in explaining abnormal return. And finally based on the *fourth hypothesis*, market beta and *Pdiff* did not have any incremental information in explaining return.

Conclusively, it seemed that price differential was not a suitable replacement for risk factors and did not have a considerable explanatory power in describing return. Such result may be related to the mean reverse because based on the existing theories, price is expected to change based on fundamental value and its mean is expected to be consistent with fundamental value. Hence, the price differential mean was expected to tend towards zero (occur spontaneously and randomly). If this is the case, we cannot predict other variables with the help of this one.

Table1: descriptive statistic for all variables in the equations

Variable	Mean	Standard Deviation	Minimum	Median	Maximum
Pdiff	-0.384	0.821	-0.978	-0.52488	14.44
Beta	0.387	1.223	-6.32	-0.235	7.94
LnRankBeta	3.49	0.931	0.000	3.78	4.46
BM	0.592	0.807	0.024	0.452	15.45
RET	0.179	0.622	-0.848	0.0588	3.34
ARET	0.088	0.706	-1.60	-0.126	2.50
LnSize	12.54	1.611	8.71	12.46	16.83
LnRankσROE	3.53	0.899	0.000	3.80	4.46
Growth	0.218	0.342	2.15	0.179	-0.896

Table2: The relationship between price differential and systematic risk (equation4)

R^2	0.7237	Variable name	P-Value	β
adjusted R^2	0.7212	(β_0)	1.6 e^{-11}	-1.069
Model Significant	2.2 e^{-16}	BM	2 e^{-16}	0.868

Conclusion: There is no significant relationship between systematic risk and price differential; the hypothesis about the existence of this relationship is rejected.

Table3: The relationship between price differential and systematic risk rank **(equation5)**				
R^2	0.724	Variable name	P-Value	β
adjusted R^2	0.7216	(β_0)	7.52 e^{-11}	-1.0148
Model Significant	2.2 e^{-16}	BM	2 e^{-16}	0.868
Conclusion: There is no significant relationship between systematic risk rank and price differentia; therefore by replacing risk with risk rank, the relationship between price differential and systematic risk is also unacceptable.				

Table4: The relationship between price differential and Abnormal Return (**equation6)**				
R^2	0.01895	Variable name	P-Value	β
adjusted R^2	0.01377	(β_0)	0.180	0.3350
Model Significant	0.01242	BM	0.0208	0.08555
Conclusion: There is no significant relationship between abnormal return and price differential; therefore, the second part of hypothesis 2 regarding the existence of such a relationship is rejected.				

Table5: The relationship between price differential and abnormal return in the absence of BM **(equation6)**				
R^2	0.01895	Variable name	P-Value	β
adjusted R^2	0.01377	(β_0)	0.890	0.39317
Model Significant	0.01242	Pdiff	0.0204	0.08385
Conclusion: By eliminating BM ratio, the price differential variable has a positive significant relationship with abnormal return. Therefore, with this change, the second hypothesis regarding the existence of a significant relationship between price differential and abnormal return is confirmed.				

Table6:The relationship between price differential and abnormal return in the absence of BM in the top quart**ile (equation6)**				
R^2	0.10	Variable name	P-Value	β
adjusted R^2	0.087	(β_0)	0.000	2.490
Model Significant	0.001	Pdiff	0.002	1.715
		LnSize	0.007	-0.094
Conclusion: By eliminating BM ratio, the price differential variable's explanatory power regarding abnormal return reached 10% in the top quartile. Also, the price differential variable has a positive and significant relationship and the company size variable has a significant and negative relationship with abnormal return.				
The relationship between price differential and abnormal return in the absence of BM in the middle quartile **(equation 6)**				
R^2	0.056	Variable name	P-Value	β
adjusted R^2	0.053	(β_0)	0.004	0.298
Model Significant	0.000	Pdiff	0.000	0.728
Conclusion: In the middle quartile, the price differential variable has a positive significant relationship with abnormal return but has little power in explaining it.				
Relationship between price differential and abnormal return in the bottom quartile in the absence of BM **(equation6)**				
R^2	0.011			
adjusted R^2	-0.010			
Model Significant	0.653			
C**onclusion:** The model is not significant				

Table7: Variance analysis Table of ARET variable (equation6)					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
GROUP	1.167	2	0.583	1.169	0.311
Error	283.869	569	0.499		
Total	289.468	571			
Conclusion: The mean of Abnormal Return is equal in the three quartiles					

Table8: Evaluating the prediction of abnormal return with price differential in the top quartile **(equation 6)**				
Negelkerk R^2	0.045	Variable name	P-Value	β
Model's significance	0.229	(β_0)	0.006	-0.705
		BM	0.035	1.490
Conclusion: In the top quartile, the dependant variables are able to slightly predict abnormal return variables. However, since the price differential variable is not significant, the hypothesis regarding the prediction ability of abnormal return by price differential is rejected.				

Table9: Results of testing significant relationship between the price differential and abnormal return of shares **(equation 6)** in bottom quartile for predicting the Abnormal Return				
Negelkerk R^2	0.091	Variable name	P-Value	β
Model's significance	0.247	(β_0)	0.003	-1.125
		BM	0.012	0.995
Conclusion: In the bottom quartile, the dependant variables have a higher prediction level in explaining the abnormal return variable compared to the top quartile. However, since the price differential variable is not significant, the hypothesis regarding the prediction ability of abnormal return by price differential is rejected**.**				

Table10: The results of Wald Test statistic for examining the relative information content of price differential and systematic risk in predicting return, Third hypothesis **(equation 7)**				
Dependant Variable	R-Square	Adj R^2	P-Value	Significance Level
Price differential	0.01611	0.01092	0.02632	0.05
Systematic risk	0.01583	0.01063	0.02834	0.05
Conclusion: The two adjusted R^2 for price differential and systematic risk are very close to each other.				

P-Value	Wald
0/7187	0/1297
Conclusion: Systematic risk and price differential do not have an equal relative content. Hypothesis 3 regarding the equality of the relative content of the above mentioned variables is rejected.	

Table 11: The results of Wald Test statistic for examining the incremental information content of price differential and systematic risk in predicting return, Forth hypothesis **(equation 8)**

Dependant Variable	R-Square	Adj R^2	P-Value	Significance Level
Price differential	0.01613	0.009188	0.05547	0.05
Systematic risk	0.01583	0.01063	0.02834	0.05

Conclusion; With the addition of the price differential variable, the amount of the adjusted R^2 is reduced. Therefore, price differential along with the systematic risk variable does not have an incremental content for explaining return. Thus, the fourth hypothesis regarding the existence of an incremental content is rejected.

Appendix 1- Statistical output

The fundamental value based on residual income model

	MV	IntV
Pearson Correlation	1	0.862**
Sig. (2-tailed)		.000
N	572	572
Pearson Correlation	0.862**	1
Sig. (2-tailed)	.000	
N	572	572

Correlation is significant at the 0.01 level (2-tailed).

Shapiro-wilk's Test		
Variable name	*P_Value*	*W*
Price differential	*0.8048*	*0.9982*
nruteR lamronbA	*0.8924*	*0.9984*
nruteR	*0.7452*	*0.998*

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