International Journal of
Finance and Accounting
(IJFA)

A TEST OF THE FAMA-FRENCH FIVE FACTOR MODEL IN COMPARISON TO THE CAPITAL ASSET PRICING MODEL AT THE LUSAKA SECURITIES EXCHANGE

Nsama Musawa, Prof. Sumbye Kapena and Dr . Chanda Shikaputo

International Journal of Accounting and Finance
ISSN 2518-4113 (Online)
Vol.3, Issue 1, No.3, pp 35 - 47, 2018

www.iprjb.org

A TEST OF THE FAMA-FRENCH FIVE FACTOR MODEL IN COMPARISON TO THE CAPITAL ASSET PRICING MODEL AT THE LUSAKA SECURITIES EXCHANGE

[1*]Nsama Musawa

[1]Lecturer: Mulungushi University

[*]Corresponding Author's Email: nsama.musawa@yahoo.com

[2]Prof. Sumbye Kapena and [3]Dr . Chanda Shikaputo

Lecturers: Copperbelt University

Abstract

Purpose: The capital asset pricing model (CAPM) is one of the basic models in the security price analysis.Many asset pricing models have been developed to improve the CAPM.Among such models is the latest Fama and French five factor model which is being empirically tested in various stock markets. This study tested the five factor model in comparison to the capital asset pricing model. Testing the Fama and French Five factor model in comparison to the CAPM was important because the CAPM is widely taken to be the basic model in the security price analysis.

Methodology: The Fama and French methodology was used to test the data from an emerging market, the Lusaka Securities Exchange. A deductive, quantitative research design and secondary data from the Lusaka Securities Exchange was used. Data was analyzed using multiple regression.

Results: The results indicate that the Five Factor model is better than the CAPM in capturing variation in the stock returns. The Adjusted R-squared for the five factor model from all individual portfolio sorting was 0.9, while that for the CAPM was 0.13

Unique contribution to theory, practice and policy: This study has contributed to theory in that it has added a voice to the ongoing debt on the suitability of the new Fama and French Five Factor model which is at the cutting hedge in finance theory.Further the study is from developing capital market.

Keywords:, *CAPM, Stock returns, Fama and French five factor model*

1.0 INTRODUCTION

The CAPM is considered to be one of the fundamental contributions to the exercise of finance, and it has long been a guide for academics and practitioners on how to find the relationship between average stock returns and risk.It builds on the model of portfolio selection developed by Harry Markowitz (1959). Despite being theoretically elegant, the CAPM has performed poorly in empirical studies because its assumptions did not apply in financial markets (Black, 1972).Due to this several stock pricing models have been developed. Among them is the an empirical study by Fama and French (1992) which showed that the covariance of portfolio return and market return does not explain the changes on portfolio excess returns explained by the CAPM. Most recently, Fama and French modified their three factor model into a five factor model (Fama and French 2015). While The CAPM has one factor (the risk premium), the Fama and French Five factor model incorporates the five factors (risk premium, size, and book to market value, profitability and investment). This study tested the Fama and French Five factor model in comparison to the CAPM at the emerging stock market the Lusaka Securities Exchange.The Lusaka Securities Exchange (LuSE) is the principal stock exchange of Zambia. Founded in 1993, it is located in Lusaka the capital city of Zambia. The LuSE is a member of the African Stock Exchanges Association. By the year 2015, it had 22 listed companies, an increase of 7 companies since 2006. Market capitalization of the Lusaka Securities Exchange (LuSE) at the end of 2015 was 64.3 billion Kwacha, or USD 5.9 billion, representing 26 percent of Zambian GDP. The LuSE share index has increased rapidly in recent years closing with 5,734.7 in 2015.The main objective of this study was to test how the way the Fama and French Five factor model fit the data from the Zambian capital market compare to the way the CAPM which is widely taken to be the basic model in the security price analysis fit the same data.

2.0 LITERATURE REVIEW

Although a number of studies testing the 5FF have been done few have compared it to the CAPM.Among such studies is the study by Nguyen, Ulku and Zhang (2015) which compared the five factor model with the CAPM in Vietnam .The results of models showed that the Fama and French five factor model performed better than the CAPM in explaining the average returns. They observed that the average adjusted R square for CAPM on the Vietnam stock market was 74% compared to the Five Factor model with 90%. The the study covered a 8 year period from August 2007 to July 2015

Using data from the indian stock market and covering a period of fifteen years – from October 1999 to September 2014.Singh and Yadav (2015) observed that the adjusted R square for CAPM

on the Indian stock market ranged from 67% to 86%, while that of the Five Factor ranged from 83% to 93% for the individual portfolios that were sorted on Size - Book to market value, Size-profitability and Size- investment. This showed that the Five Factor model explained more variation than the CAPM.

In another related study, Zheng, (2015) analyzed the performance of five-factor model in the Australian market in comparison to the the CAPM. The average adjusted R square for CAPM was 69.7% compared to the Five Factor model with 81.14%. This showed that the Five Factor explained more variation than the CAPM in Australian market. In their study of a comparison of asset pricing models in the Egyptian Stock Market, Shaker and Elgiziry (2014), also found that the Five Factor explained more variation than the CAPM.

3.0 METHODOLOGY

This study used data ranging from 2008 to 2014. The market and financial data were collected from Lusaka Securities Exchange while the treasury bills rate was collected from bank of Zambia. The data set used included annual stock closing prices which were used to calculate the individual stock expected returns found by dividing the stock price in the current year by the stock price in the previous year, this is similar to Fama and French (1992) where the same formula was used. Other data included annual treasury Bills rates obtained from Bank of Zambia which was used as a proxy for risk-free rates of returns, annual Lusaka Securities Exchange market price index as a proxy for the return on the market portfolio and the, market capitalization found by multiplying the shares outstanding at the year end by the share price. From the financial statement the following was obtained; Book-to-market equity (denoted by B/M) which is the ratio of book equity to market equity at the year end. Book equity was picked from the financial statements while the market equity was market capitalization of each company (Chiah, Chai, Zhong, and Li, (2016), Fama and French (1992, 2015)). Profitability (denoted by OP) is the ratio of earnings before taxes to book equity at the year end .This definition is in line with the definition of Fama and French (2015) who defined profitability as the annual revenues minus cost of goods sold, interest expense, and selling, general, and administrative expenses, all divided by book equity. Investment (denoted by Inv) is the change in total assets of the previous year end divided by total assets at the end of the current year (Chiah, Chai, Zhong, and Li, (2016), Fama and French (1992, 2015)).

3.1 Portfolio Construction

In order to first establish the explanatory power of the five-factor model, in the spirit of Fama and French (1993, 2014), three types of portfolios namely, size and

book-to-market, size and profitability, and size and investment portfolios were formed and the expected returns from these portfolios were used as the dependent variable in the test. The portfolios were constructed in the following manner. At the end of each year stocks were allocated to five Size groups (Small to Big) using Lusaka Securities Exchange market capitalization breakpoints. Stocks were also allocated independently to five Book to Market (B/M) groups (Low to High), again using Lusaka Securities Exchange breakpoints. The intersections of the two sorts produce 25 value-weight Size-B/M portfolios. Table 1 shows averages of yearly returns in excess of the Bank of Zambia Treasury bill rate based on first portfolio type size and Book to Market value. The second and third sort, size- profitability and Size-investment were constructed in the similar manner to the size book values only that instead of book value profitability and investment was used. The profitability variable was calculated by finding the ratio of profit before tax and book value which was denoted by shareholders' equity. The investment variable was calculated by finding the change in total assets from the year end of year t-1 to year end of year t, divided by total assets at the year end of year t-1. Table 1 shows averages of yearly returns in excess of the Bank of Zambia Treasury bill rate based on size –book to market, profitability and investment. These were used as a dependent variable.

3.2.Factors definition and formulation

Having calculated the excess average return (representing the dependent variable ER-RF), the next step was to construct the five factors (representing independent variables). This study closely followed the empirical design of prior research in order to enhance comparability.

The risk premium factor (Rm-Rf) was calculated by subtracting the bank of Zambia annual treasury bills rate from the Rm factor which was calculated by dividing the Lusaka Securities Exchange closing price index for the previous into the current year's price index (Rm1/Rm0) this is similar to Eraslan (2013), Muthoni (2013) and Fama and French (1992) were the same formula was used.

To construct the SMB (Size), HML (Book/Market), RMl (profitability) and CML (investment) factors, the study closely followed the methodology outlined in Fama and French (1993, 2014,15), and Brailsford et al. (2012). To create the SMB (small minus big) and HML (high minus low) factors, six portfolios from the intersections of two size and three book-to market portfolios were formed. To do this, at the end of each year, stocks were first ranked according to their market capitalization.They were then allocated into two size portfolios using the median.The largest 8 stocks in terms of market capitalization were classified as large and the remaining 8 stocks were classified as small. In this approach,large stocks comprised about 93%, while small stocks

comprised approximately 7% of the total market capitalization.

Second, the big stocks were divided into 3 groups using the 30th and 70th percentile of the book-to-market ratio (which is the ratio of book equity to market equity at the year end.) following Brailsford et al. (2012b). Stocks with book-to market ratios below or equal to the 30th percentile were classified as growth stocks (represented by BL) and stocks with book-to-market ratios higher than the 70th percentile were classified as value stocks(represented by BH). The remaining were classified as neutral stocks (represented by BN). In the same manner, small stocks were divided into 3 groups using the 30th and 70th percentile of the book-to-market ratio Stocks with book-to market ratios below or equal to the 30th percentile were classified as growth stocks (represented by SL) and stocks with book-to-market ratios higher than the 70th percentile were classified as value stocks (represented by SH). The remaining stocks were classified as neutral stocks (represented by SN). This independent size and book-to-market sorts resulted in six portfolios (SL, SN, SH, BL, BN and BH).Basing on individual stock annual expected return, average value-weighted returns on each of the six portfolios were calculated .This procedure was done for each of the seven years under review. From that, two mimicking portfolios, SMB BM (this was called SMB BM because it is based on market to book value) and HML were created. SMB BM was the average return on the three small size portfolios, minus the average return on the three big size portfolios (Small Minus Big). HML was the average return on the two high book-to-market portfolios, minus the average return on the two low book-to-market portfolios (High Minus Low), these factors from the six size and book-to-market portfolios captured the return premiums associated with size and book-to-market. The two formulae below summarize how SMB BM and HML were calculated.

$$SMBB/M= (SH+ SN+ SL)/ 3 – (BH+ BN+ BL) / 3$$

$$HML= (SH+ BH) / 2 – (SL+ BL) / 2 = [(SH– SL) + (BH - BL)] / 2$$

Following the same approach as the book to market, portfolios relating to profitability and investment were created only that profitability and investment was used in place of book to market value.From the profitability, two mimicking portfolios, SMBOP (this was called SMBOP because it is based on profitability) and RMl were created. SMBOP was the average return on the three small size portfolios, minus the average return on the three big size portfolios (Small Minus Big). RML was the average return on the two robust profitability portfolios, minus the average return on the two weaker profitability portfolios (Robust Minus Weak), these factors from the six size and

profitability portfolios captured the return premiums associated with size and profitability. The two formulae below summarize how SMBOP and RMl were calculated.

SMBOP= (SR+ SN+ SW) / 3 – (BR+ BN+ BW) / 3

RMW= (SR+ BR) / 2 – (SW+ BW) / 2 = [(SR– SW) + (BR - BW)] / 2

From the investment, two mimicking portfolios, SMB Inv (this was called SMB Inv because it is based on investment) and CMl were created. SMB Inv was the average return on the three small size portfolios, minus the average return on the three big size portfolios (Small Minus Big). CMl was the average return on the two aggressive investment portfolios, minus the average return on the two conservative investment portfolios (Aggressive Minus Conservative), these factors from the six size and investment portfolios captured the return premiums associated with size and investment. The two formulae below summarize how SMB Inv and CMA were calculated.

SMBInv= (SC+ SN+ SA) / 3 – (BC+ BN+ BA) / 3

CMA= (SC+ BC) / 2 – (SA + BA) / 2 = [(SC– SA) + (BC - BA)] / 2

The overall SMB factor defined as the average returns of the three SMB portfolios.(SMB BM, SMB OP and SMB Inv) was calculated basing on the formula below

SMB= (SMBB/M+ SMBOP +SMB Inv) / 3

4.0 RESULTS

To assess which of the two models was giving better results the comparison of statistical tests (F test, significant intercepts and adjusted R square) from all three portfolio sorting (Size –Book to market, Size –profitability and Size –Investment) was done. Table 3 below shows the summary of the statistical tests of the five factor model and CAPM

Table 1: Summary of statistical tests for the Five Factor model

		Five Factor	CAPM	
Statistical Test	**Portfolio sorting**	**Critical value**	**Critical value**	**P value 0.05**
F test	Size BM	22.6445,	42.6191	0.000
	Size Profit	29.8081	66.4286	0.000
	Size-Investment	18.8128	24.0616	0.000
Average Adjusted R square	All individual portfolio sorting	0.90	0.13	
Model Intercepts	Size BM	0.5204	0.3682	0.0154,0.023
	Size Profit	1.5292	0.7064	0.0000
	Size-Investment	1.8137	0.5344	0.0000

Source (compiled by the authors)

4.1. F-test

The F statistic test from both models was used to test if all the independent variables in both models jointly explain the variation in the dependent variable. The CAPM had the F statistic of 42.6191 with the P value of 0.000 for Size - Book to market value portfolios, 66.4286 with the P value of 0.000 Size- profitability and 24.0616 with the P value of 0.000, for Size-investment portfolio sortings. The Five Factor model had the F statistic of 22.6445 with the P value of 0.000 for Size - Book to market value portfolios, 29.8081 with the P value of 0.000 for Size- profitability and 18.8128 with the P value of 0.000 for Size- investment portfolio sorting were observed. Therefore, the F-test indicated that both the Five Factor model and CAPM were good because all the variables in each model jointly explained some variation in the price for all portfolio sortings.

4.2. Adjusted R-squared

Adjusted R square from both models was compared to assess which of the two models was explaining more of the variation in the dependent variable (expected returns).This indicated that the Five Factor model was better than the CAPM for practical purposes because its Adjusted R-squared average of 0.90 was higher than the 0.13 for the CAPM for all individual portfolio sorting(See table 4). This is an indication that for the CAPM 13% of the changes in the dependent variable could be attributed to the changes in the independent variables used in the model, while the Five Factor model was explaining a high percentage of 90% changes in the dependent variable. This result is comparable to Nguyen, Ulku and Zhang (2015, Singh and Yadav (2015 and , Zheng, (2015) .

4.3. Intercepts

Regression intercept from both models were used to check if both models completely captured all the variation in price (expected returns). According to Fama and French 1992, 2015, if an asset pricing model completely captures expected returns, the regression intercept is indistinguishable from zero or equal to zero .This was used as a basis to check the models ability to captured variation.

The CAPM had the following absolute intercepts: 0.3682 with the P value of 0.023 for for Size - Book to market value, 0.70643 with the P value of 0.000 for Size- profitability and 0.5344 with the P value of 0.000 for Size- investment portfolio sortings. The Five Factor model had 0.5204 with the P value of 0.0154 for Size - Book to market value portfolios, 1.5292 with the P value of 0.0000 for Size- profitability, 1.8137 with the P value of 0.0000 for Size- investment portfolio sorting, all were statistically significant. Since these coefficients or intercept were not equal to zero, it means that the independent variable in both the CAPM and the five factor model do not completely explain the variation in price (excess return). Further intercepts from each of the 25 individual portfolio sortings were compared for both models. For each of the 25 individual portfolio sortings, the CAPM left 19, 24 and 23 significant alphas for Size –Book to market, Size –profitability and Size –Investment respectively an average of 22. While the Five factor model left 20,23 and 23 significant alphas for Size –Book to market, Size –profitability and Size –Investment respectively an average of 22. This further confirmed that both models do not completely explain the variation in price. (See table 5) Similar results were found by Nguyen, Ulku and Zhang (2015, Singh and Yadav (2015 and , Zheng, (2015) .

4.4 Conclusion

This research has tested the Fame and French Five factor model in comparison to the CAPM. The results show that the Fama and French Five Factor model is better than the CAPM in explaining variation in expected returns for the Zambian data. Therefore the five factor model can be used for practical purposes even in small emerging markets.

REFERENCES

Adjasi, C. K. D., & Biekpe, N. B. (2006). Cointegration and dynamic causal links amongst African stock markets. *Investment Management and Financial Innova*tions, 3(4), 102–116.

Black, F., (1972)., Capital market equilibrium with restricted borrowing. *The journal of business*, *45*(3), pp.444-455.

Cakici, N., &Tan, S., (2014). Size, Value and Momentum in developed country equity returns:Macroeconomic and Liquidity Exposures. *Journal of International Money and Finance* 44, 179-209.

Chandra, T. (2015). Testing Fama & French Three Factors Model within the Context of Indonesia Stock Exchange.

Chiah, M., Chai, D., Zhong, A., & Li, S. (2016). A Better Model? An Empirical Investigation of the Fama-French Five-factor Model in Australia. *International Review of Finance,* 1–33. https://doi.org/10.1111/irfi.12099

Martinsa, C.C. & Eid Jr, W., (2015). Pricing assets with Fama and French 5–Factor Model: a Brazilian market novelty. *XV Encontro Brasileiro de Finanças*.

Fama, Eugene F., & Kenneth R. French, (1992) "The cross-section of expected stock returns," *Journal of Finance*, 46, 427–466.

Fama, E.F., & French, K.R., (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33, 3–56.

Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, 116(1), 1–22. https://doi.org/10.1016/j.jfineco.2014.10.010

Harshita, Singh, S., & Yadav, S. S. (2015). Indian Stock Market and the Asset Pricing Models.*ProcediaEconomicsandFinance*,30(15),294–304 .https://doi.org/10.1016/S2212-5671(15)01297-6

Markowitz, H. (1952). Portfolio Selection. The *Journal of Finance*, 7(1), 77–91. https://doi.org/10.1111/j.1540-6261.1952.tb01525.x

Nghiem, L. (2015). Risk-return relationship: An empirical study of different statistical methods for estimating the Capital Asset Pricing Models (CAPM) and the Fama-French model for large cap stocks. Retrieved from http://arxiv.org/abs/1511.07101

Nhu Nguyen,& Numan Ulku, J. Z. (2015). The Fama-French Five Factor Model: Evidence From Vietnam. *Journal of Chemical Information and Modeling*, 53(9), 1689–1699. https://doi.org/10.1017/CBO9781107415324.004

Shaker, M. A., & Elgiziry, K. (2014). Comparisons of Asset Pricing Models in the Egyptian Stock Market. Accounting and Finance Research, 3(4), 24–30. https://doi.org/10.5430/afr.v3n4p24

Sharpe, W. F. (1964). Capital asset prices: A theroy of market equilibrium under conditions of

risk. The Journal of Finance, 19(3), 425–442. https://doi.org/10.2307/2329297

Singh, S. & Yadav, S.S., (2015). Indian stock market and the asset pricing models. Procedia *Economics and Finance*, 30, pp.294-304.

TABLES

Table 4: Adjusted R-Square from all three individual portfolio sorting for the Five factor Model and the three factor model

Table 4 Pannel A: Adjusted R-Square Five factor Model

B/M R squared

Size	B/M Low	2	3	4	High B/M
Small	0.6134	0.7950	0.8855	0.8965	0.7643
2	0.9356	0.9635	1.0000	0.9944	0.9561
3	0.3246	0.4741	0.7964	0.6384	0.5298
4	0.6736	0.9250	0.9725	0.9843	0.8463
Big 5	0.7473	0.7730	0.8846	0.7126	0.7370

R squre

Size	Profit Low	2	3	4	High profit
Small	0.9399	0.8719	0.9385	0.9869	0.9844
2	0.9743	0.8998	0.9678	0.9947	0.9884
3	0.9876	0.9997	0.9833	0.9691	0.9979
4	0.9881	0.9446	0.9958	0.9975	0.9910
Big 5	0.9087	0.9885	0.8991	0.8278	0.9745

Ad R squre

Size	Invest Low	2	3	4	High Invest
Small	0.9998	0.9948	0.9818	0.9883	0.9936
2	0.9830	0.9917	0.9999	0.9154	0.8856
3	0.9857	0.9944	0.9985	0.9276	0.8959
4	0.9754	0.9974	0.9958	0.9388	0.9390
Big 5	0.9786	0.9660	0.7320	0.9985	0.9445

Source: (compiled by the author)

Table 4 Panel B: Adjusted R-Square three factor Model

R square

Size	B/M Low	2	3	4	High B/M
Small	0.3383	0.6879	0.8253	0.7770	0.4958
2	0.8335	0.4422	0.7329	0.7796	0.6839
3	0.2756	0.0857	0.4731	0.5480	0.4291
4	0.4741	0.4189	0.6729	0.7909	0.8213
Big 5	0.7173	0.4803	0.7340	0.8296	0.6512

Profitability R sqaure

Size	Profit/Low	2	3	4	High Profit
Small	0.8060	0.5868	0.8227	0.6277	0.5707
2	0.9405	0.6719	0.8649	0.9103	0.6336
3	0.9473	0.8588	0.8336	0.9430	0.5660
4	0.4815	0.3536	0.5163	0.8533	0.7785
Big 5	0.4658	0.4597	0.3837	0.7752	0.7489

Investment Adj R sqaure

Size	invest/Low	2	3	4	High Invest
Small	0.3239	0.5464	0.5723	0.6794	0.2782
2	0.9680	0.6620	0.8981	0.7535	0.4463
3	0.3578	0.9610	0.9921	0.8904	0.8770
4	0.6299	0.4445	0.5805	0.6474	0.2129
Big 5	0.5539	0.3064	0.4437	0.3962	0.0113

Source (compiled by the author)

Table 5 :Regression Intercepts from all three individual portfolio sorting for the Five factor Model and the three factor Model

Table 5 Panel A Regretion intercepts Five factor Model

Regression Intercepts

Size	B/M Low	2	3	4	High B/M
Small	-2.2979*	-1.0679*	-2.71927*	-2.9121*	-3.4229*
2	0.8662	2.1358*	1.2387*	1.0838*	0.0374
3	0.3592	1.5696*	1.0764*	-0.4803	-0.9094*
4	0.7735*	-1.5874*	-3.1269*	-3.289*	-3.7778*
Big 5	1.1097*	2.1937*	0.7095*	0.5327*	-0.4148

*significant at 0.05 leve

Intercepts

Size	Profit Low	2	3	4	High profit
Small	-1.3605*	-2.1114*	-1.6326*	-1.8174*	-0.6230*
2	-0.7978*	-1.5394*	-1.2167*	-1.2078*	-0.0081
3	-0.7160*	-1.4739*	-1.0201*	-1.1168*	0.0825*
4	-0.6672*	-1.4138*	-0.9534*	-1.1310*	0.0190
Big 5	-0.1957*	-0.7957*	-0.6913*	-0.6985*	-0.0264

Investment Intercepts

Size	Invest Low	2	3	4	High Invest
Small	-1.8413*	-0.6829*	-1.9855*	-2.39746*	-0.0039
2	-0.9978*	0.1040*	-1.2467*	-1.7841*	0.5299*
3	-1.9276*	-0.7887*	-1.8957*	-2.5852*	0.0293
4	-0.7330*	0.3100*	-0.8572*	-1.5773*	0.8565*
Big 5	-1.4018*	-0.2657*	1.0748*	-2.0605*	0.3291*

Source (compiled by the author)

International Journal of Accounting and Finance
ISSN 2518-4113 (Online)
Vol.3, Issue 1, No.3, pp 35 - 47, 2018

IPRJB
INTERNATIONAL PEER REVIEWED JOURNAL AND BOOK PUBLISHING
www.iprjb.org

Table 5 Panel A Regretion intercepts three factor Model

Intercepts

Size	B/M Low	2	3	4	High B/M
Small	-0.7354*	-0.6946*	-2.1114*	-1.8521*	-1.9999*
2	-0.1948	-0.2490	-1.2650*	-0.8737*	-1.4857*
3	-0.4025	-0.3204	-1.1259*	-1.5904*	-1.5667*
4	-2.2329*	-2.0893*	-3.4666*	-3.1686*	-3.1512*
Big 5	0.3393	0.3121	-0.9891*	-0.6460*	-1.2506*

*significant at 0.05 level

Panel B Size -profit 3 factor intercepts

Size	Prof /Low	2	3	4	High Profit
Small	-0.7147*	-0.6833*	-0.9173*	-1.3148*	-1.5136*
2	-0.6464*	-0.6347*	-0.5380*	-1.2864*	-1.6033*
3	-0.7258*	-0.6916*	-0.9492*	-1.2872*	-1.4738*
4	-0.9299*	-0.9187*	-1.3587*	-1.5564*	-1.8111*
Big 5	-0.4065*	-0.3998*	-0.3763*	-1.1170*	-1.1384*

*significant at 0.05 level

Investment Intercepts

Size	invest/Low	2	3	4	High Invest
Small	-0.7554*	-1.2845*	-1.7044*	-1.8621*	-0.0498
2	-0.8475*	-1.1135*	-1.4869*	-1.6461*	0.3117*
3	-0.8444*	-1.3325*	-2.1668*	-1.8682*	0.0006
4	-0.9312*	-1.4979*	-2.5091*	-2.0832*	-0.1866
Big 5	0.1680	-0.294125	-0.7439*	-0.8883*	1.0086*

*significant at 0.05 level