The Validity of the Arbitrage Pricing Theory in the Jordanian Stock Market

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Received: February 21, 2012 Accepted: March 6, 2012 Published: May 1, 2012

doi:10.5539/ijef.v4n5p177 URL: http://dx.doi.org/10.5539/ijef.v4n5p177

Abstract

This paper aims to test the validity and applicability of the Arbitrage Pricing Theory (APT) in Amman Stock Exchange (ASE) during the period 2001-2011. To achieve this objective, the study utilized six variables, four macroeconomic variables, i.e., interest-rate term structure, inflation, money supply and risk premium, and two market indicators i.e., dividend yield and productivity of the industry. Using ordinary least square method (OLS), the six variables against twelve industry portfolios of Amman Stock Exchange have been tested. Overall, the finding of the paper support the validity and applicability of APT in ASE, as the results show that four out of the six tested variables, are able to explain 84% of the change in the stock returns of the Jordanian industrial firms during the study period. Another finding of this paper is that the effect of the tested variables varies among industries.

Keywords: Arbitrage pricing theory, Amman stock exchange

1. Introduction

The Arbitrage Pricing Theory (APT) proposed by Ross 1976 is a model for pricing assets, such as the capital asset pricing model (CAPM). The expected rate of return of the financial asset is determined as a linear function of a number of macroeconomic factors or market indicators, so that each factor has its own beta coefficient, which measures the sensitivity of the expected rate of return for each of these factors. The resulting rate of return is used as the discount rate to calculate the price of the financial asset. Unlike CAPM which links the expected return with a linear function with only systemic risk, the APT reflects a linear multi-factor relationship, in addition to the systematic risk, there are several non diversifiable risk factors that are macroeconomic in nature and affect all stocks returns.

There is no theoretical framework in choosing the macroeconomic factors or market indicators to be included in the APT model (Tunalı, H., 2010). However, this can be seen as a strength point for the model, in terms of allowing researchers to choose the best available factors that explain the change in the expected return without restrictions.

The study is an attempt to analyze the validity of the APT to the pricing of the Jordanian industrial companies stocks, listed on the Amman Stock Exchange (ASE), in terms of identifying the most important macroeconomic factors that assist in the determination or interpretation of the changes on the stocks market value. The study includes four macroeconomic variables: interest-rate term structure, inflation, money supply and risk premium, and two market indicators: dividend yield and the productivity of the industry. The macroeconomic variables and market indicators have been tested against twelve industry portfolios to investigate the effect of these variables on the stocks' expected return, and thus the validity of the Arbitrage Pricing Theory in the Jordanian Stock Market.

2. Related Literature

APT has been tested intensively in developed markets since its introduction in 1976. Among the first who have tested this theory was Gehr (1978) and later Roll and Ross (1980), after that many researchers tested the APT applying difference methodology. For instance, Connor and Korajczyk (1986) applied the principal component analysis and identified five variables that have a direct effect on asset returns. Brown and Weinstein (1983) tested the APT using the bilinear model on a special case in which the numbers of the macroeconomic variables were pre-defined. They rejected the five and seven factors APT models and suggested three factors model, concluding a few rather than many macroeconomic factors that can be priced in the APT model. Cho et al., (1984) tested the APT by applying the inter battery factor analysis and found six factors in two industry groups of securities which could be priced in the APT model. Ozcam (1997) investigated seven macroeconomic factors in Turkey, and concluded that only the expected factors were rewarded in the market. Alty (2003) used a various macroeconomic factors, which

were the key indicators of the economy in both Turkey and Germany, and concluded that in Germany only the unanticipated interest rate affected the stock returns, and thus, rewarded in the stock market. While in Turkey, none of the factors that are tested had an impact in the stock returns.

Chen and Jordan (1993) studied both models: the Factor Analytic Model and the Macroeconomic Variable Model modeling of the APT and their ability to predict the return on securities. They found little difference between the two models, and concluded that the Macroeconomic Variable Model may be a little more accurate for predicting stock returns when tested against a specific time period. Mohseni (2007) tested the APT model in the Tehran Stock Exchange applying the Fama and Macbeth (1973) methodology and concluded that the model was able to explain the returns of the firms' sample through the two macroeconomic factors: oil price and money supply.

Gunsel and Cukur, (2007) aimed to investigate the validity of the APT model in London Stock Exchange using seven macroeconomic factors during the period 1980-1993 on a monthly base. The study concluded a significant relationship between macroeconomic factors and the expected earnings per share. The study also has concluded that the effect of these factors on the expected returns varies from one factor to another and from one sector to another. For instance, there is a significant positive effect for the money supply on the expected returns in the construction and Food and Beverage industries, while the effect is negative in household goods and textiles industries.

In their study Mansor and Syuhada, (2009) aimed to investigate the relationship in the long and short-term between the ratios of cash dividend to price and average price to earnings per share and the stock returns in the Malaysian Securities Market, the study has found that there is a strong positive relationship between these variables and stock returns over the long-term, while in the short-term, the study concluded a significant positive relationship between the ratio of cash dividend to price and the stock returns, and a negative relationship between the ratio of average price to earnings per share and the stock returns.

3. Data and Methodology

The study sample consists of all Jordanian industrial companies listed at Amman Stock Exchange (ASE) and available during the period 2000-2010, and of which there were 70 Jordanian industrial companies. The monthly closing prices of stocks of the sample firms were used in order to calculate the monthly return of the industry portfolios. The industrial sector was divided into eleven industries. Monthly return was calculated for each industry portfolio. Table 1 presents the classification and the number of the companies in the sample study.

Table 2 shows the macroeconomic variables and the industry-specific variables used in the analysis. The variables are measured by the change in the values of these variables instead of the value itself. The reason for this is that the change in value facilitates comparison with stock returns and achieves the relative stability of the values analyzed.

In this study, six variables have been used to test the effect of macroeconomic factors on stock returns in the Amman Stock Exchange (ASE), The model has been designed to take into account the macroeconomic variables (interest-rate term structure, inflation, money supply and risk premium) and the market indicators (dividend yield and productivity of the industry)

Following the study of Chen et al. (1986) and using the ordinary least square (OLS) method, the six variables were added together in a linear regression model as follows:

$$R_{It} = \beta_0 + \beta_{i1}IRTS_t + \beta_{i2}UIF_t + \beta_{i3}MoS_t + \beta_{i4}RkP_t + \beta_{i5}UDY_t + \beta_{i6}PGI_t + \varepsilon_t \qquad (1)$$

Where, R_{It} is the return on the industry portfolio *I*, β_0 constant, β_i the linear regression coefficients, *IRTS* interest-rate term structure, *UIF* unpredictable inflation rate, *MoS* money supply, *RkP* risk premium, *UDY* unpredictable dividend yield of the industry and *PGI* productivity growth of the industry, and ε is the error term.

Since equation (1) represents the expected return on industry portfolio I, or the minimum return required by investors in industry portfolio I, this required return can be used as the risk adjusted discount rate to discount future cash flows of the financial asset to price it. Thus, the main aim is to determine the macroeconomic factors that affect the stocks' return on ASE.

3.1 Interest-rates Term Structure

According to the theories of pricing financial assets, the value of the stocks are directly affected by the risk adjusted discount rate. Therefore, the interest rates are taken into account in the pricing model of financial assets, through its basic component risk-free rate of return. But, because the interest rates are linked directly with the other macroeconomic variables, the interest-rates term structure will be used rather than interest rates to avoid collinearity problem between the macroeconomic variables in the linear regression model.

The effect of the interest-rates term structure on the ASE can be determined by the difference between the long and short-term of government interest rate as follows:

$$IRTS_t = JGB_t - T.B_t \quad (2)$$

Where, $IRTS_t$ is the interest rate term structure , JGB_t is the return on the 25 years Jordanian government bond, $T.B_t$ is the one month rate of the Jordanian Treasury bill.

3.2 Unpredictable inflation rate

Inflation affects the market value of the firm, through its impact on future cash flows and discount rate used in pricing models of financial assets. The effects of inflation depend on whether it is predictable or unpredictable, and since the predictable inflation is taken into account when determining the future cash flows through determining prices for products, and when determining the discount rate used in pricing models of financial assets, only the unpredictable rate of inflation will affect the stock's market value, unpredictable rate of inflation can be defined as follows:

$$UIF_t = Inf_t - E(Inf_t)_{t-1} \quad (3)$$

Where, UIF_t unpredictable inflation rate for the period t, Inf_t is the actual inflation rate for the period t, $E(Inf_t)_{t-1}$ is the expected inflation rate for period t on period $t-1$.

3.3 Money Supply

Generally speaking, the activity level of the stock market is influence by two factors: first, the initial public offerings and the trading activities, second, the demand on the stock which is not only affected by investment behavior but also by the supply of the money in the economy. In general, studies that tested the impact of money supply on stock returns concluded the existence of the significant effect of the money supply, So that the significant increase in money supply, leads to a trend towards investors to invest in real assets resulting in upward pressure on stock prices.

Increasing the money supply leads on increasing the demand on companies' products and thus, increases future cash flows of the company, increasing the money supply also results in a significant reduction in real interest rates, which leads to discount future cash flows with lower discount rates, resulting in an increase in the market value of the company because its stock price rises, as a result of discounting higher cash flow with lower discount rates.

From the above, and based on rational economic logic that supports the relationship between money supply and stock returns, the money supply is included in the linear regression model as one of the macroeconomic factors that can affect ASE. Money supply can be defined as *M0* (M zero) which includes cash and assets that can be converted easily into cash in circulation.

3.4 The Risk Premium

In the literature review, the risk premium indicates the amount by which a financial asset's expected rate of return exceeds the risk-free rate of return. Common method to calculate the risk premium is to compare the risk-free rate of return on Treasury-Bills and the risky rate of return on other investments. The difference between these two returns is due to the risks borne by the investor by investing in risky investments, and refers to the risk premium.

For the stock market, the risk premium is the expected return of the market portfolio minus the risk free rate of return. The expected return of the market portfolio is the total of the dividend yield and capital gains. In determining the discount rate used in the theories of pricing financial assets, the risk premium required by investors plays an important role in determining the discount rate. Increase (decrease) in risk premium required by the investors leads to an increase (decrease) in the discount rate, and thus, reduction in (increasing) the value of the financial assets.

From the above it can be said that the degree of risk aversion can be viewed through the changes in the level of risk premium, therefore the stock returns is affected by changing the level of risk premium. Risk premium for the stock market can be defined as follows:

$$RkP_t = LwGB_t - JGB_t \quad (4)$$

Where, RkP_t is the risk premium, $LwGB_t$ is the return on the low grade corporate bond; JGB_t is the return of the 25 years Jordanian government bond.

3.5 Dividend Yield

The relationship between dividend yield and stock returns received great attention in the finance literature. Most of these studies have been conducted to test the capital assets pricing model (CAPM), which concluded that the positive relationship between dividend yield and stock returns is due to the disparity in tax rates on dividend and capital gain (e.g., Lizenberger and Ramaswamy (1979), and Blume (1980)), While the study of Miller and Scholes (1982) concluded that the reason for the positive relationship is due to information biases, other studies (e.g., Banz (1981) and Reinganum (1981)) have attributed the positive relationship to the anomalous effects.

If dividend yield affects the stock returns at the firm's level, we expect the dividend yield to have the same effect on the market level, and since the predictable dividend yield are taken into account when evaluating companies, only the unpredictable dividend yield will affect the stock's market value, unpredictable industrial dividend yield can be defined as follows:

$$UDY_t = DY_t - DY_{t-1} \tag{5}$$

Where, UDY_t unpredictable dividend yield for the period t, DY is the dividend yield.

3.6 Productivity Growth of the Industry

From a purely economic perspective, increase in productivity growth rates leads to decrease in unemployment rates, rise in wage rates, accelerated output growth, and low rates of inflation, and with continuity, even a small increase in the rate of productivity growth, leads to a large increase in living standards. These changes along with the rise in living standards are reflected positively on the firm's profitability, and therefore on the market value of the firms. Therefore, the market return may give an idea about earlier changes in the level of productivity. The productivity growth of the industry can be defined as follows:

$$PGI_t = IP_t - IP_{t-1} \tag{6}$$

Where, PGI_t is the productivity growth of the industry for the period t, IP is the Productivity of the industry.

4. Empirical Results

The results of investigating the effect of Macroeconomic Factors on the stock returns of the Jordanian industrial companies listed on the Amman Stock Exchange are illustrated in the following section.

Table 3 represents the correlation coefficients matrix between the variables of the study, it shows that the correlation coefficients between the variables of the study are relatively low, due to the conversion process that has been done on the variables where all the variables are in logarithmic, so to avoid the problem of multicollinearity. Table 4 represents the correlation coefficients between the industries' portfolios returns, where the table shows that the coefficients are significantly high, which means that the industries within the Jordanian industrial sector have the same reaction to the macroeconomic variables. Since each portfolio will be analyzed on its own, there will be no problem of multicollinearity resulting from the high correlation between the industries portfolios' returns.

The results of regression analysis shows that there are significant differences in the ability of macroeconomic and financial variables to explain the change in stock returns among industry portfolios, as the coefficient of determination (R^2) ranges between 23% and 84%. One of the reasons that can cause this result is the use of the industry-specific variables, the dividend yield of the industry and the productivity growth of the industry, among the variables of the study. The results of the regression analysis for the pricing relation between macroeconomic variables and stock returns appear in Table 5.

Table 5 shows the results of the multiple regression analysis to investigate the impact of the macroeconomic variables and market indicators on the stock returns of the Jordanian industrial companies at the level of the Jordanian industrial sector as a whole, and the level of each industry.

4.1 Market Portfolio Level

Results show that interest-rate term structure has a positive statistically significant effect on the market portfolios' returns (*AMFI*) at a level of significance less than 0.05.

Money supply has a positive statistically significant effect on *AMFI* at a level of significance less than 0.1. This finding is consistent with the findings of previous studies which conclud that the increase in money supply has a positive impact on the economy in general, and therefore it is not surprising to have a positive impact on *AMFI.*

Risk premium has a positive statistically significant effect on *AMFI* at a level of significance less than 0.01. This means that when the market risk premium rises, the market responds to this rise by increasing the expected return on stocks. This finding is consistent with the Risk-Return Tradeoff Theory.

Productivity growth of the industry seems to have positive statistically significant effect on *AMFI* at a level of significance less than 0.05, indicating that as the productivity moves unexpectedly, the return on stock moves in the same direction, and the market price reflects the upward movement of the productivity.

The probability values of the *UIF* and *UDY* were greater than 0.1 indicating that these two factors do not have significant affect on the *AMFI* at a level of significance less than 0.1. One reason can support this result is that investors expect both inflation and dividend yield accurately, so that there is no significant differences when announcing the actual rates, and therefore, when announcing the actual rates the market does not react as expected.

4.2 Industry Portfolio Level

The results of regression analysis at the level of the industry portfolio show that interest-rate has a positive influence on seven industries portfolio returns, *CHEM, GL_CE, PHAR, TOBA, EN_CO, FO_BE* and *MI_EX*, and a negative impact on three industries return, *PR_PA, ELEC* and *TEXT,* at a level of significance less than 0.1. It is well known that when interest rates go up, investors direct their savings toward depository institutions to take advantage of higher interest rates, and as a response to that, the stock market works to adjust the expected return on stocks as an attempt to withdraw back savings to the capital market, leading the interest rates to associate positively with the stock returns. However, if the market fails to adjust the expected return on stocks, the increase in interest rates will reduce the profitability of firms and thus stock prices go down, because the investors will deposit their savings in bank accounts rather than investing in stock market, leading the interest rates to associate negatively with the stock returns.

For inflation, the results show no effect of *UIF* on portfolio returns of all industries except for *TOBA* and *TEXT*, where the probability value for *UIF* is greater than 0.1 for all industry portfolios except for *TOBA* and *TEXT*. This result confirms the previous result of this study at the level of the market portfolio, where the study concluded that unexpected inflation rate has no effect on the stock returns due to the fact that the investors' expectations regarding inflation rates are too accurate. As for the negative relationship between inflation and return on each of the *TOBA* and *TEXT*, it can be interpreted as the stock price is directly associated with the firms' performance. In cases when inflation increases, the firm's value will also subside. This will adversely affect the stock prices and certainly the stock returns.

Surprisingly, the results show that money supply has a different impact on the industry portfolio returns, while it has a positive impact on all of *CHEM, GL_CE, TOBA, PR_PA, ELEC and TEXT* portfolio returns, the results show a negative impact for the M0 on the returns of *PA_CA, PHAR and EN_CO* portfolios. Whereas the positive effect of the *M0* is consistent with the real activity theorists view that the increase in the growth rate of money supply enhances the rate of increase in stock prices, the negative effect of *M0* on stock prices and therefore on stock returns is not clear and needs further study and research.

Results of the analysis show that the *RkP* is directly proportional with the stock returns of all industries portfolios at a significant level less than 0.1. Indicating that investors demand more risk premium for holding additional risks that they cannot diversify. This result is consistent with the capital asset pricing model (CAPM), and with the risk-return tradeoff theory.

The regression analysis results show that the probability value for *UDY* is greater than 0.1 for all industry portfolios, indicating that *UDY* does not have any impact on any of the industry portfolio returns, this finding supports the previous result of this study which concludes that *UDY* does not have any influence on the market portfolio return.

Productivity growth of the industry seems to have different impact on the industry portfolios returns, while it associates positively with *GL_CE, PA_CA, TOBA, EN_CO, FO_BE and TEXT* returns, and negatively with *PHAR* and *MI_EX.*

5. Conclusion

The results indicate validity and applicability of the *APT* in *ASE*, as evident from the statistically significant relation between the tested variables and the stock returns. At the market level, the macroeconomic variables along with the market indicators explained 84% of the variation in the return on market portfolio. The results showed that four out of the six tested variables, *IRST, M0, RkP* and *PGI,* were able to explain 84% of the change in the stock returns of the Jordanian industrial companies during the study period, and these variables were directly proportional to the market portfolio returns.

Another finding of this study is that the effect of variables that have been tested varies between industries, while the factor is directly proportional to the stock return in a particular industry, it is associated inverse relationship in another industry (e.g. *IRST* associated positively with the returns of *CHEM, GL_CE, PHAR, TOBA and MI_EX* and negatively with *PR_PA, ELEC and TEXT*).

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Table 1. Firms Classification

Industry	Notation	Count
All Manufacturing Firms Index	AMFI	
Chemical		70
Glass and Ceramic	CHEM	
Paper and Carton	GL_CE	11
Pharmaceutical	PA_CA	2
Tobacco	PHAR	3
Engineering and Construction	TOBA	6
Printing and Packaging	EN_CO	2
Electrical	PR_PA	9
Food and Beverage	ELEC	2
Mining and Extraction	FO_BE	5
Textiles	MI_EX	10
	TEXT	14
		6
Total		70

Table 2. Notation and measure of the macroeconomic and industry-specific variables

Variables	Measure	Notation
Interest-rates term structure		IRTS
Unpredictable inflation rate	$\mathrm{IRTS_t = JGB_t - T.B_t}$	UIF
Money supply	$\mathrm{UIF_t = Inf_t - E(Inf_t)}_{t-1}$	M0(M Zero)
	Cash and assets that could quickly be converted into currency	
The risk premium	$\mathrm{RkP_t = LwGB_t - JGB_t}$	RkP
Unpredicted dividend yield	$\mathrm{UDY_t = DY_t - DY_{t-1}}$	UDY
Productivity growth of the industry	$\mathrm{PGI_t = IP_t - IP_{t-1}}$	PGI

JGB; the 25 years Jordanian government bond, T.B; one month rate of the Jordanian Treasury bill. Inft; the actual inflation rate for the period t, E(Inft)t-1; the expected inflation rate for period t on period t-1. LwGBt; the return on the low grade corporate bond, JGBt; the return of the 25 years Jordanian government bond. DY; the dividend yield. IP; the Productivity of the industry.

Table 3. Pearson correlation coefficients matrix between the tested factors

Variables	IRST	UIF	M0	RkP	UDY	PGI
	1					
IRST						
Sig.(2-tailed)	.541**	1				
UIF	.000					
Sig.(2-tailed)	-.347	-.017*				
M0	.170	.049	1			
Sig.(2-tailed)	.647*	.075				
RkP	.041	.138	.594**	1		
Sig.(2-tailed)	.271**	.083*	.000			
UDY	.000	.039	.297	.309**	1	
Sig.(2-tailed)	.030**	-.179**	.317	.000		
PGI	.005	.002	.419**	-.283**	.493**	1
Sig.(2-tailed)			.009	.007	.000	

All variables are in logarithm.

Factors definitions are given at Table 2

*, **; correlation is significant at 0.05, 0.01 respectively

Table 4. Pearson correlation coefficients matrix between the industry portfolio returns

	AMFI	*CHEM*	*GL_CE*	*PA_CA*	*PHAR*	*TOBA*	*EN_CO*	*PR_PA*	*ELEC*	*FO_BO*	*MI_EX*
AMFI	1										
Sig.(2-tailed)											
CHEM	.785**	1									
Sig.(2-tailed)	.000										
GL_CE	.716*	.771*	1								
Sig.(2-tailed)	.023	.023									
PA_CA	.831**	.850**	.985**	1							
Sig.(2-tailed)	.000	.000	.000								
PHAR	.665*	.577*	.887**	.988**	1						
Sig.(2-tailed)	.041	.027	.000	.000							
TOBA	.763*	.860*	.986**	.859**	.803**	1					
Sig.(2-tailed)	.032	.047	.000	.000	.000						
EN_CO	.998**	.681	.414*	.385*	.332*	.518*	1				
Sig.(2-tailed)	.000	.051	.047	.045	.046	.036					
PR_PA	.630*	.922**	.950**	.987**	.777**	.978**	.433	1			
Sig.(2-tailed)	.015	.000	.000	.009	.000	.000	.067				
ELEC	.672*	.546**	.431*	.102	.415**	.207	.824**	.826**	1		
Sig.(2-tailed)	.019	.003	.013	.097	.000	.072	.000	.000			
FO_BO	.998**	.526	.550	.506	.875**	.410	.473*	.388*	.806**	1	
Sig.(2-tailed)	.000	.078	.097	.063	.000	.084	.037	.047	.000		
MI_EX	.963**	.531	.437	.393*	.112	.529*	.996**	.627**	.770*	.420*	1.
Sig.(2-tailed)	.000	.061	.074	.046	.068	.029	.000	.000	.023	.021	
TEXT	.790**	.593*	.480*	.446**	.402*	.576**	.997**	.485**	.783**	.402**	.997**
Sig.(2-tailed)	.009	.029	.048	.000	.048	.003	.000	.000	.000	.000	.000

All variables are in logarithm.

portfolio definitions are given at Table 1

**, **; correlation is significant at 0.05, 0.01 respectively*

Table 5. The results of regression analysis for the impact of macroeconomic factors on the stocks returns
At the level of the market and the level of each industry portfolio

Factor \ portfolio	AMFI	CHEM	GL_CE	PA_CA	PHAR	TOBA	EN_CO	PR_PA	ELEC	FO_BO	MI_EX	TEXT
Constant												.007
	.0013	.814	.0076	.578	.147	.0465	.0081	.6741	.914	.0001	.3651	
Factors												
IRST												-.047**
												.027
UIF	.031**	.023**	.107***	.001	.077*	.107**	.001**	-.004*	-.084*	.005**	.001**	-.007*
	.043	.041	.007	.193	.059	.027	.031	.053	.089	.033	.017	.067
M0	.412	.005	.042	.007	.089	-.031*	.091	.084	.197	.074	.001	.064***
	.271	.124	.581	.817	.317	.094	.725	.142	.217	.157	.252	.007
RkP	.071*	.071*	.009*	-.011*	-.002**	.019*	-.006**	.0142***	.097*	1.24	.027	.047**
	.063	.069	.063	.054	.031	.084	.079	.003	.062	.341	.481	.042
UDY	.103***	.037**	.003**	.109**	.207***	.096**	.087**	.173*	.004**	.083***	.173*	.011
	.003	.017	.029	.031	.007	.035	.032	.064	.017	.006	.074	.571
PGI	.076	.043	1.87	.009	.081	.017	.003	.019	.163	.360	.047	.183*
	.169	.137	.782	.741	.487	.192	.104	.374	.352	.274	.192	.079
	.047**	.125	.068*	.033*	-.011*	.082**	.040*	1.31	.912	.008*	-.043*	.602
R-Square	.017	.437	.094	.058	.073	.037	.067	.571	.341	.091	.086	.580
Adjusted R-Square	.839	.713	.501	.492	.261	.662	.801	.293	.572	.641	.772	6
	.830	.697	.474	.465	.221	.644	.790	.255	.549	.621	.759	113
df	6	6	6	6	6	6	6	6	6	6	6	119
Regression	113	113	113	113	113	113	113	113	113	113	113	28.48
	119	119	119	119	119	119	119	119	119	119	119	.000
Residual	98.14	46.78	18.90	18.24	6.651	36.88	75.80	7.80	25.16	33.62	63.78	
Total	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
F.												
Sig.												

All variables are in logarithm.

Industry portfolios definitions are given at Table 1; Factors definitions are given at Table 2; *, **, ***; significant at 0.1, 0.05, 0.01 respectively; First line estimated coefficients, Second line t. Sig. (2-taild).