علاقة المخاطرة والعائد:
دليل من واقع سوق الأسهم السعودي

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ملخص البحث. تحاول هذه الدراسة اختبار نموذج تسعير الأصل الرأسمالي (CAPM) باستخدام بيانات عن سوق الأسهم السعودي والذي يتسم بخصائص متميزة تعطي فرصة أخرى لفحص الفرضيات التي يتبناها عدد من الدراسات السابقة المتعلقة بمدى مطابقة نموذج تسعير الأصل الرأسمالي مع واقع الأسواق المالية.

ومن أهم النتائج التي توصلت إليها هذه الدراسة هي: أولاً، أن ثلثي العينة تدل على وجود علاقة طردية ومعنوية إحصائيًا بين عائد السهم الواحد وعائد السوق ككل. ثانيًا، بإجراء الاختبار عبر مختلف قطاعات الأسهم ومختلف الأشهر فإن المخاطرة المنتظمة أو غير المنتظمة لم تظهر تأثيرًا على العوائد. ثالثًا، عندما تم فحص مدى تأثير الموسمية فإن عوائد السوق لم تظهر تغيرًا موسميًا واضحًا. أما بالنسبة لموسمية علاوة المخاطرة فقد اتضح أن علاوة المخاطرة المنتظمة ملحوظة في شهرين فقط هما شهر يناير وشهر مارس. بينما ظهرت علاوة المخاطرة غير المنتظمة في شهر يناير فقط.

وبالإجمال فلا يوجد دليل قياسي كافٍ يؤكد على القبول المطلق لافتراض أن نموذج تسعير الأصل الرأسمالي قادر على تفسير سلوك أسعار الأسهم السعودية.

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Annex 1.

List of Shares Companies*

Al-Jazira Bank (0.81)
Saudi Investment Bank (0.79)
Saudi French Bank (0.44)
Saudi British Bank (4.78)
Saudi Cairo Bank (0.94)
Saudi American Bank (0.72)
Saudi Holland Bank (0.11)
United Saudi Commercial Bank (1.06)
Arab National Bank (0.94)
SABIC (0.93)
National Gas & Industrial Co. (0.36)
Refineries (0.47)
Industrial (0.44)
Saudi Vegetable Oil Co. (0.42)
Saudi Fertilizers Co. (0.71)
NADEC (0.16)
Al-Qassim Agriculture Co. (0.70)
HADCO (0.65)
TADCO (0.23)
Saudi Fisheries Co. (1.52)
Saudi Con Elect Co. (Cent.) (0.03)
Saudi Con Elect Co. (West.) (0.14)
Saudi Con Elect Co. (East) (0.21)
Arabian Cement Co. (0.87)
AD-Dammam Cement Co. (0.80)
Southern Cement Co. (0.88)
Saudi Ceramic (0.63)
Al-Qassim Cement (–.07)
Al-Yamama Cement Co. (2.23)
Saudi Bahraini Cement Co. (0.28)
Saudi Kuwaiti Cement Co. (0.21)
Saudi Hotels Co. (0.37)
Saudi Real-Estate Co. (0.56)
National Shipping Co. (Old) (.005)
National Shipping Co. (New) (0.57)
Saudi Public Transport Co. (0.29)
Saudi Automobile Service Co. (0.46)
Assir for Trade (0.14)
Saudi Livestock Co. (0.43)

*The numbers in parentheses are the Betas

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cally significant in nearly two third of the sample. However, this relation becomes fully evident, when portfolios are used instead. The intercept is not different from zero whether we use individual securities or portfolios. Second, the monthly cross sectional results seem to suggest that neither the systematic risk nor the unsystematic risk seem to have influence on returns over the entire period or for each month. Third, when testing for seasonality, the empirical results indicate that market returns exhibit very low seasonality. Market returns are abnormally low in April and September and no January effect seems to be statistically evident. As regards risk premium seasonality, systematic risk premium is evident only in two specific months (i.e., January and March), while the unsystemtic risk premium is significant only in January. Overall, the hypothesis that the CAPM explains the pricing of stocks in the Saudi Stock Market does not seem to be fully evident.

The overall empirical findings of this study must be interpreted in the proper context and with a number of caveats. Aside of the problems of using ex post variables as proxies for the ex ante values of the variables of the theory, the empirical tests were conducted under data limitations.

The data base was limited both in terms of the time period covered and the insufficient number of securities available. Actually, as it has already been pointed out, for any period shorter than the long run, there is nothing in the CAPM which says that there should be any particular relationship between risk and return on an ex post basis. This is worth mentioning because this study relied upon data from a period shorter than a decade (i.e., five years). So caution is needed when conflicting interpretations are present. Furthermore, the question of what would be an appropriate market index also cast some doubts on the results.

Any conclusions from this study should primarily be made against the data and the statistical limitations for this kind of analysis. Nevertheless, these difficulties do not vitiate certain conclusions. The Saudi Stock Market is growing in size and economic impact, and results of future work can be improved significantly, if adequate data (i.e., longer series on stock prices, dividends and other relevant variables) are made available. Moreover, the results concerning the risk-return link developed in this stock do not necessarily imply that the market is inefficient. In other words, even if the CAPM turns out to be invalid, the capital market can still be efficient. Future studies inquiring into the Saudi market efficiency are expected. Notwithstanding these limitations, this study may, hopefully, provide some useful inputs to future empirical research on the emerging Saudi stock market.

Table 7.

Risk premium seasonality[a]

$\delta_{jt} = \phi_1 + \Sigma\, \phi_i D_i + e'_{jt}$ (4)′

	δ0	δ1	δ2
January (ϕ_1)	–0.0233 (–1.067)	0.007 (2.046)	–0.000 (–2.596)
February (ϕ_2)	0.023 (1.064)	–0.006 (–1.641)	–0.000 (–0.440)
March (ϕ_3)	0.016 (0.757)	0.006 (1.887)	0.000 (0.243)
April (ϕ_4)	–0.009 (–0.441)	–0.003 (–0.851)	0.000 (0.333)
May (ϕ_5)	0.0266 (1.315)	–0.000 (–0.014)	0.000 (0.637)
June (ϕ_6)	–0.003 (–0.146)	0.000 (0.056)	0.000 (0.253)
July (ϕ_7)	0.011 (0.544)	–0.003 (–1.070)	–0.000 (–0.001)
August (ϕ_8)	–0.005 (–0.238)	0.004 (1.413)	–0.000 (–0.269)
September (ϕ_9)	–0.011 (–0.549)	–0.000 (–0.034)	–0.000 (–0.547)
October (ϕ_{10})	0.002 (0.103)	–0.002 (–0.697)	–0.000 (–0.294)
November (ϕ_{11})	0.019 (0.900)	0.002 (0.492)	–0.000 (–0.200)
December (ϕ_{12})	0.006 (0.261)	–0.0002 (–0.059)	–0.000 (–0.027)
F-statistic	0.527	1.354	0.608

(a) The t statistics are presented in parentheses.

6. Concluding Remarks

The important results contained in this paper include the following. First, the relation between individual stock returns and market return is positive and statisti-

Table 6.

Market return seasonality[a]	
	$R_{mt} = \alpha_1 + \Sigma\, \alpha_i D_i + e_t$ (4)
January (α_1)	–0.023 (–1.081)
February (α_2)	0.016 (0.752)
March (α_3)	0.024 (1.113)
April (α_4)	–0.032 (–1.645)
May (α_5)	0.025 (1.257)
June (α_6)	–0.002 (–0.107)
July (α_7)	0.006 (0.282)
August (α_8)	–0.0008 (–0.039)
September (α_9)	–0.034 (–1.597)
October (α_{10})	–0.001 (–0.048)
November (α_{11})	0.027 (1.257)
December (α_{12})	0.005 (0.249)
F-statistic	1.049[b]

(a) The t statistics are presented in parentheses.
(b) The F-statistic is insignificant.

unsystematic risk premium estimate δ_2 has just the estimated coefficient ϕ_1 (January) statistically significant, but negative. The resulting negative and significant unsystematic risk premium in January may be explained by its negative correlation with the systematic risk premium (i.e., securities with high betas tend to exhibit below average level of unsystematic risk).

Table 5.

$R_i = a + b_1\beta_i + b_2SE_i + b_3\beta_i^2 + E_i$ (a)
$R_i = -0.001 + 0.0018\beta_i + 0.0000SE_i$
(−0.474) (3.060) (0.520)
R^2=0.34 F=6.29 DW=1.77
$R_i = 0.001 - 0.0027\beta_i + 0.0000SE_i + 0.0003\beta^2 i$
(0.389) (−1.234) (0.567) (2.142)
R^2=0.41 F=6.30 DW=1.68

(a) t-stats are in parentheses. All the regressions results are obtained after correction for serial correlation.

When linearity was also tested (see Table 5), the regression results were rather ambiguous, because including β^2 in the estimation yielded an insignificant and negative δ_1. This result induces us to suspect multicolinearity.

5.3 Market Return Seasonality Test

Using Eq. 4, an equality test was run, to find evidence for any monthly seasonality caused by abnormally high return in a particular month. The F-value shown in Table 6 is too low to reject the hypothesis of equal mean market returns across all months. In other words, the mean market returns are statistically equal across all months. However, when the t-stats for each coefficient are examined instead, seasonality in the market rate becomes slightly evident. Only the coefficients for April and September are negative and statistically significant at nearly 11%, thus suggesting lower mean market returns during these two months than in January. The lack of evidence for a January effect may be explained by the absence of taxes in Saudi Arabia. Overall, the weak seasonality in market returns can be attributed to the weak seasonality of the trading periods in the Saudi Stock Market.

5.4 Risk Premium Seasonality

In order to test the hypothesis of equal month-to-month average intercept and slope coefficients of the three parameters model, we run Eq. 4′. From Table 7, it can be seen that the estimated coefficients ϕi's alternate in sign. Regarding the zero-beta rate δ_0, its estimated dummy coefficients are statistically insignificant from January to December. However, with respect to the systematic risk premium δ_1, only ϕ_1 (January) and ϕ_3 (March) are positive and statistically significant at 6%, while ϕ_2 (February) is statistically significant at 10% level, but negative. The fact that the risk premium is not significantly lower than January, with the possible marginal exception of February, is evidence against any January Effect in Saudi Arabia. Likewise, the

Table 4.

Four factors model: linearity[a]

$$R_{it} = \delta''_{ot} + \delta''_{it}\beta_{it} + \delta''_{2t}SE_{it} + \delta_{3t}\beta^2_{it} + \varepsilon''_{it} \quad (3)$$

Average over	δo	δ″1	δ″2	δ3	Sample
All months	0.007 (0.042)	0.0019 (0.180)	–0.0001 (–0.133)	0.000 (0.156)	76
January	–0.003 (–0.209)	–0.003 (–0.194)	0.0007 (0.164)	–0.0003 (–0.161)	6
February	0.004 (0.512)	0.013 (0.377)	–0.0032 (–0.448)	–0.0000 (–0.109)	6
March	–0.010 (–0.031)	0.054 (0.558)	–0.0032 (–0.393)	0.0000 (0.069)	6
April	–0.041 (–0.178)	0.042 (0.609)	–0.0034 (–0.617)	–0.000 (–0.269)	7
May	0.016 (0.191)	0.018 (0.305)	–0.0012 (–0.299)	–0.0000 (–0.359)	7
June	–0.016 (–0.112)	0.004 (0.405)	–0.0002 (–0.375)	0.0000 (0.059)	7
July	0.012 (0.404)	–0.018 (–0.753)	0.001 (0.663)	0.0000 (0.207)	7
August	0.008 (0.175)	0.009 (0.276)	–0.0003 (–0.142)	–0.0000 (–0.532)	6
September	–0.025 (–1.344)	–0.014 (–0.302)	0.0009 (0.320)	–0.0000 (–0.613)	6
October	–0.006 (–0.603)	0.013 (0.889)	–0.001 (–0.925)	–0.0000 (–0.483)	6
November	0.034 (0.927)	–0.006 (–0.246)	0.0005 (0.353)	–0.0000 (–0.011)	6
December	0.008 (0.362)	–0.005 (–0.152)	0.0003 (0.152)	–0.0000 (–0.015)	6

(a) The t statistics are presented in parentheses.

When the second pass cross-sectional regression equation was estimated using average realized return as shown in Table 5, the systematic risk premium appeared positive and statistically significant at 2%, while both the risk-free rate and the unsystematic risk premium were not significantly different from zero.

Table 3.

Three factors model[a]

$$R_{it} = \delta'_{ot} + \delta'_{it}\beta_{it} + \delta'_{2t}SE_{it} + \varepsilon'_{it}\ (2')$$

Average over	δ'_o	δ'_1	δ'_2	Sample
All months	0.0004 (0.176)	0.0001 (0.055)	–0.000 (–0.317)	76
January	–0.0018 (–0.131)	0.0005 (0.145)	–0.000 (–0.169)	6
February	0.0018 (1.079)	–0.0005 (–0.246)	–0.000 (–0.097)	6
March	0.0013 (0.724)	0.0005 (0.741)	–0.000 (–0.084)	6
April	–0.0008 (–0.108)	0.0003 (0.582)	–0.000 (–2.288)	7
May	0.0025 (0.524)	–0.000 (–0.063)	–0.0000 (–0.355)	7
June	–0.0003 (–0.161)	0.0000 (0.176)	0.000 (0.0726)	7
July	0.001 (0.0189)	–0.0003 (–0.464)	0.000 (0.180)	7
August	–0.0004 (–0.110)	0.0004 (0.817)	–0.000 (–0.538)	6
September	–0.0009 (–1.71)	0.0001 (0.014)	–0.000 (–0.619)	6
October	0.0002 (0.088)	–0.0002 (–0.309)	–0.000 (–0.391)	6
November	0.0016 (0.793)	0.0001 (0.329)	–0.000 (–0.038)	6
December	0.0005 (0.353)	–0.000 (–0.019)	–0.000 (–0.010)	6

(a) The t statistics are presented in parentheses.

it is less likely that the second pass test would fully support it, because of any error in the estimate of beta from the first pass. Moreover, the choice of a market index may be another source of distortion. Nonlinearities and heteroscedasticity are also other possible sources of estimation difficulties.

Table 2.

$$R_{it} = \delta_{ot} + \delta_{it}\,\beta_{it} + \varepsilon_{it} \quad (2)$$

Average over	δ_o	δ_1	Sample
All months	–0.0007 (–0.143)	0.0011 (0.1022)	76
January	–0.031 (–0.112)	0.0082 (0.1404)	6
February	0.022 (1.088)	–0.0065 (–0.247)	6
March	0.017 (0.659)	0.007 (0.747)	6
April	–0.031 (–0.187)	–0.003 (–0.062)	7
May	0.021 (0.473)	0.0004 (0.070)	7
June	–0.002 (–0.175)	0.0012 (0.1743)	7
July	0.004 (0.051)	–0.003 (–0.4715)	7
August	–0.006 (–0.026)	0.005 (0.8303)	6
September	–0.034 (–1.766)	0.000 (0.0259)	6
October	0.001 (0.1439)	0.002 (0.2966)	6
November	0.025 (0.8049)	0.002 (0.3347)	6
December	0.006 (0.3615)	–0.000 (–0.0194)	6

(a) The t statistics are presented in parentheses.

insight into the degree of consistency of the model adopted which fails to be a better description of market returns.

Several reasons may be at the source of this failure. One of the first considerations here is that, if the first pass test showed a partial consistency with the CAPM, with smaller, and less diversified companies may also contribute to explain the dominance of unique factors as opposed to market effects.

Table 1.

Descriptive summary of beta coefficients							
$R_{it} = \alpha + \beta R_{mt} + U_{it}$ (1)							
#Firms	Mean	Std dev	Min	Max	Skewness	Mean	Std dev
	β's	β's	β's	β's		R^2	R^2
41	0.67	0.79	–0.07	4.8	3.77	.067	.0638

Portfolios were also used to test the market model. They were formed on the basis of a combination of low and high values of individual stocks' betas. Given the limited number of securities, the size of each portfolio was not so large. Five portfolios comprise six companies each, while two portfolios count only five each. When Eq. 1′ was estimated, only slope figures (portfolio beta) appeared with the correct sign and statistically significant at 1% level, but very large in magnitude. Though still very low, R^2 values for portfolios were far greater than those obtained for individual securities. This may suggest that high levels of unsystematic risk for individual securities were somewhat ironed through portfolio diversification.

5.2 The second pass test

The monthly cross-sectional regression results reported in Tables 2, 3 and 4 seem to indicate that the term representing the intercept (δ_0) exhibits different signs in different months, and is not significantly different from zero for any particular month. Moreover, its size would seem to be lower than any reasonable estimate of a risk-free rate. Likewise, δ_1 changes sign over alternative months, and is not significantly different from zero. In terms of magnitude, it is even lower than one could reasonably expect. The residual risk premium (δ_2) was largely negative, extremely small in magnitude and statistically insignificant. The diversifiable risk is evident in no particular month. This finding seems to be in line with theoretical expectation. However, it may be argued that the Saudi Stock Market is not a fair game with respect to any information contained in δ_{2t}. Over the entire period (from April 1985 to July 1991) the relationship between returns and both systematic and unsystematic risk is respectively positive and negative but not statistically significant.

Overall, the cross sectional regression results seem to indicate that neither the systematic risk nor the unsystematic risk has influence on returns. This gives us some where D_i are the monthly dummy variables, representing the months of the year from February ot December (i.e., D2 through D12). The intercept α_1 is the mean market return in January, and the dummy coefficients α_i indicate the market mean return differences between January and the other months. If the market mean returns are all the same for all months of the year, the estimates of α_2 through α_{12} should not differ from zero, and the F-statistic measuring the joint significance of the dummy variables should be insignificant. In addition, to test for the risk premium seasonality, the following equation is estimated:

$$\delta_{jt} = \phi_1 + \Sigma\, \phi_i D_i + e'_{jt} \tag{4'}$$

where j = 0, 1, 2; and i = 2, 3, ...,12. Likewise, the coefficient ϕ_1 is a measure of the risk premium, in January while ϕ_2 through ϕ_{12} are a measure of the difference between average δ_k in February to December and average δ_k in January.

5. Results and Interpretation

5.1 The first pass test

The systematic risk (beta) of each security is obtained from Eq. 1 using a time-series of monthly individual security returns. The results reveal that the slope (beta) is positive and statistically significant in 63% of the cases, while the intercept (alpha) is not significantly different from zero. In terms of the market model, the expected positive relation between stock returns and the market return is partially evident. But the intercept, which is a proxy for the riskless rate, is insignificant.

Estimated intercept and slope from Eq. 1 are not reported here because of space constraint.(2) However, Table 1 summarizes the distribution of the estimated beta coefficients. The average beta for the whole sample is 0.67, with a sample dispersion of 0.79. The less than unity average beta can be explained by a bias due to thin trading and/or to possible lags in the adjustment of prices to changes in market levels, perhaps as a result of imperfect dissemination of information.(3)

The explanatory power of the market index is very low compared to the U.S., with an average R^2 of 17%. This can be attributed to measurement error in stock prices, which is likely to be the case in Saudi Arabia where data on share prices may not be completely consistent. Moreover, the characteristics of the Saudi economy,

(2) They may be supplied from the author upon request.

(3) See Fowler *et al.* [20].

systematic risk), but cannot diversify away the market risk (systematic risk).

Similarly, returns on portofolio can be specified as:

$$R_{pt} = \alpha' + \beta' R_{mt} + U_{pt} \tag{1'}$$

where the subscript p refers portfolios, and α' and β' are respectively the estimated risk free rate and the systematic risk on portfolio p. The objective here is to contrast between risks on individual securities and portfolios.

4.2.2 Zero-beta rate, systematic risk-premium and unsystematic risk premium

Since the study uses ex post data, the empirical counterpart to the CAPM can be seen as a simple linear regression equation taking the alternative forms:

i. A two factor model

$$R_{it} = \delta_{ot} + \delta_{it}\,\beta_{it} + \varepsilon_{it} \tag{2}$$

where δ_{ot} and δ_{it} represent the zero beta rate and the systematic risk premium respectively. ε_{it} is the disturbance term with the usual assumptions.

ii. A three factor model

$$R_{it} = \delta'_{ot} + \delta'_{it}\,\beta_{it} + \delta_{2t}\,SE_{it} + \varepsilon'_{it} \tag{2'}$$

where the standard error computed from the market model (i.e., Eq. 1), SE_{it}, is added to capture the unsystematic risk (i.e., diversifiable risk), and δ_{2t} is meant to measure the unsystematic risk premium. ε'_{it} is the disturbance term with the usual assumptions.

iii. A four factor model: test for linearity

$$R_{it} = \delta''_{ot} + \delta''_{it}\beta_{it} + \delta''_{2t}SE_{it} + \delta''_{3t}\beta^2_{it} + \varepsilon''_{it} \tag{3}$$

where β^2 is the squared betas included in the estimation to test for nonlinearity. A statistically significant δ_{3t} is evidence for a nonlinear risk-return link.

iv. Market return and the risk premium seasonality

$$R_{mt} = \alpha_1 + \sum^{12} \alpha_i D_i + e_t \tag{4}$$

on stock i in month t and t–1 respectively. Because of lack of adequate data on dividends, returns were simply proxied by capital gains. Actually, ignoring dividends may not be a source of major concern, because a number of published studies [17, 18 and 19] have not accounted for dividends in the computation of stock returns.(1)

The market index used in this study is computed as an equally weighted index (EWI). Market indices provide a useful way of summarizing the wide array of information generated by the continuous buying and selling of stocks. Their use presents, however, some problems. First, different indices compete for attention. Second, they differ in construction and interpretation. The market index could be value weighted or trade weighted or equally weighted. We expect that an equally weighted index will exhibit less variability.

4.2 Estimation and testing method

Efforts on testing the empirical validity of the CAPM have emphasized several testing procedures. One involves first, estimating β's (Betas) via Eq. 1, and subsequently using these estimates in the second pass test to obtain estimates of the risk free rate and the systematic risk premium via Eq. 2 (see [3, 4 and 8]). To test if investors in securities can also be compensated for taking on unsystematic risk (see [4 and 7]), another methodology calculates the variances of the residual error terms via Eq. 1, to obtain some measure of the unsystematic or diversifiable risk of the stocks in the sample. Finally, the question of whether the risk-return relationship is linear can be investigated by including the squared betas in the regression equation (see [11]).

4.2.1 Risk-free rate and systematic risk

The return on the i^{th} security is assumed to be given by:

$$R_{it} = \alpha + \beta R_{mt} + U_{it} \qquad (1)$$

where R_{it} is the return on the individual stock i, Rmt the return on the market index in month t as proxied by an equally weighted index (EWI), and Uit the error term with the usual assumptions (e.i., a zero mean spherical random disturbance term). α ($\alpha = E(R_{it} - \beta R_{mt})$ is a measure of the risk-free rate and β ($\beta = Cov(R_{it}, R_{mt})/Var(R_{mt})$ is a measure of the systematic risk. This form has been tested extensively, and stands up fairly well. If the CAPM holds, investors can diversify away the residual risk (un-

(1) Although the dividend valuation model argues that the only cash flows that matter to an investor in common stock are the expected dividends, yet, many investors buy stocks for the expected capital gains. In fact, many of them buy stocks that pay no dividends, with the plan to sell them later for a profit.

the CAPM. In another study, F-B used a grouping technique to minimize errors associated with the estimated β's. Their cross-sectional regression results revealed a linear relationship between realized return and systematic risk, but they failed to be consistent with the implications of the CAPM. They finally, concluded that their results did not lend support to the S-L version of the CAPM and cast doubt on the Black version.

Fama and MacBeth [10] and Fama [2, 11] modified the basic Black version of the CAPM to include a term for capturing possible nonlinearities and another term for measuring the potential impact of unsystematic risk on returns. Their results indicated that the estimated coefficients of the cross-sectional regression equation were not stable over time, but rather varied from month to month.

Hawawini *et al.* [12] examined the validity of the CAPM in light of the Belgian market anomalies. When both the size effect and risk-premium seasonality are ignored, the behavior of common stock prices is in line with the CAPM. However, when they are accounted for, the validity of the CAPM cannot be accepted, even in January, and despite the evidence for a positive systematic risk premium and the lack of an unsystematic risk premium.

Cadsby [13] found little evidence for a January Effect on Canadian stock returns. He instead, found evidence for both a Turn-Of-The-Year Effect and a Turn-Of-The-Month Effect on stock returns. Tinic and West's study [14] is one example of this phenomenon. It showed that even when the two-parameter CAPM was extended to account for residual risk and nonlinearities, important seasonal anomalies remain evident in the market [15]. It found that the relation between stock returns and systematic risk was positive and significant in January and in the United States only.

4. Data and Testing Methodology

4.1 Data

Monthly stock prices were obtained from the Saudi Monetary Agency (SAMA) for the period from March 1985 to July 1991 [16]. Among the firms listed in the Saudi Stock Exchange and because of price quotations, only 41 securities were selected. Monthly returns for each stock were then computed as:

$$R_{it} = \ln (P_{it}/P_{it-1})$$

where R_{it} is the return on stock i in month t and P_{it} and P_{it-1} are the observed prices

Speculation

Speculation has increased, particularly, among firms which have issued more shares than expected, hoping to gain from stocks overvaluation. Stock prices of a number of firms have increased significantly, and several times before shares have even been supplied for trade. This has led to an increase in the number of operators entering the market in search for a quick return. Moreover, most of the actual conduct of shares exchange is performed outside the banking channel.

Seasonality

Some seasonal variations occur in the stock market, particularly, at the end of the year, perhaps because of firms distributing dividends, or deciding to raise their products' prices. Moreover, an unusual level of trading is often noticed on Thursday thus suggesting a day of the week effect. However, during the summer season, the stock market activity is rather slow.

3. Review of Previous Studies' Empirical Results on the CAPM

Sharpe's empirical work [3] was not on testing the CAPM but rather the capital theory itself. His finding were generally consistent with the implications of capital market theory, though his regression equation did not match exactly the empirical capital market line. Later, Jensen's study [4] revealed a significant positive relationship between the realized return and the estimated systematic risk. However, Douglas [5] found that average quarterly returns of common stocks were in most cases a linear function of total risk, rather than systematic risk alone. Also, Lintner's findings [6] implied that investors were compensated not only for taking on systematic risk, but also for the unsystematic risk.

Miller and Scholes [7] argued that Douglas and Lintner's studies [5, 6] suffered certain statistical problems, such as the measurement errors in the β's (betas) of individual stocks and the skewness in returns which may be at the source of inconsistency in their results. They also, found that returns were related to both systematic and unsystematic risk.

Black *et al.* [8] applied a technique to reduce the bias caused by errors in measuring the β's. Their results were rather inconsistent with the Sharp-Lintner (S-L) version of the CAPM.

Blume and Friend [9] (F-B) found a negative systematic risk-return relationship for the period as a whole, but an unstable risk-return link for two distinct subperiods. Their results were incompatible with the implications of capital market theory and

2. Institutional Features of the Saudi Stock Market

The Saudi Stock Market where stocks are traded through a dozen of unlicensed brokers, has been informal and unofficial for some time. By 1983, a royal decree announced that trading and registration of shares would be taken over by the country's domestic banks. At the end of 1984 some rules regulating trading in shares through local banks were formulated. But until now, the market continues to be lacking in uniform stock quotations, and news announcement. Effort is however, being made to achieve a homogeneous market.

The Saudi Arabian Monetary Agency (SAMA) exerts a strict control over the market. It has established the shares control section to determine office hours for dealing in shares at banks and with the daily trading transactions coming to it from banks, to supervise the appointment at the trading unit, to register and handle any shareholders' complaints and to publish shares' prices in local papers.

The Saudi Stock Market, as a western developed economy oriented market, is restricted by both government rules and the public's social values. On the one hand, the rules such as full cash payment, are imposed as a precaution against crises such as the one experienced by the Kuwaity Manakh Stock Exchange. On the other hand, an important proportion of the public is reluctant to invest in shares, either because of insufficient knowledge, or islamically illegal practices of Shares Companies, such as dealing with interest rate.

The Saudi Stock Market exhibits particular features. It is a thin, sensitive, speculative and seasonal market.

Thinness

The number of firms participating in stock market activities is rather small. Most of the active traders are important investors in this market, holding a substantial share, and continuously purchasing shares when prices go down. This naturally, has influenced the volume of traded shares compared to issued ones.

Volatility

Given the thinness of the market and its exposure to both external and domestic events (e.g., changes in interest rate in Europe and the United States of America, and any disturbance in international financial places such as the one that occurred in October, 1987, and the 1990 Gulf war), stock prices and trading are not completely insulated from sudden shocks. For instance, the 1990 Gulf crisis had a depressing impact on share prices and trading volume.

tested either in its traditional or revised form using Saudi market data; this can be attributed mainly to the lack of adequate data on Saudi common stocks or perhaps because the market was not yet well developed to deserve empirical interest.

The CAPM which provides a measure of normal performance has also, important implications for the evaluation of the Saudi market performance and efficiency relative to other markets.

This study attempts to test the CAPM using data on 41 securities active in the emerging Saudi Stock Market (see annex 1.), which distinctive institutional features offer an interesting opportunity to examine the hypotheses suggested in the literature regarding the empirical status of the CAPM. Actually, some of the features of the Saudi stock market appear to be at variance with the main assumptions of the CAPM. First, the Saudi stock market does not have all the characteristics of a genuine stock market. It is not yet well developed to merit such an appellation. Second, the information dissemination process is not adequate to allow all investors to be equally well informed, and stock prices do not seem to adjust correctly to reflect all available information. Third, investors do not seem to exhibit homogeneous expectations (i.e., identical subjective means, variances and covariances of returns among assets) as required by the CAPM. However, this cannot be regarded as a serious problem, because as argued by Lintner [1] and Fama [2], even if expectations are heterogeneous, market can still reach equilibrium, though the resulting equilibrium becomes a complicated function of investor's utility function and thus, cannot be tested empirically with readily available data. Fourth, the fact that a large number of shares is not traded and that transactions are restricted to be only for cash may also limit the empirical validity of the CAPM in the Saudi context. In fact, thin trading is recognized to be a source of some potential bias. Finally, the absence of taxes in Saudi Arabia satisfies one of the CAPM's assumption (i.e. "a no tax world").

Despite all these limitations, the need to inquire into the risk-return link issue is still legitimate, and the major questions to be addressed are: How does the CAPM fit the data on the Saudi Stock Market? Do the empirical findings provide additional insight on the CAPM's ability to explain the pricing of Saudi stocks? As a by product of the study, issues of nonlinearities and seasonality are also examined.

This paper is organized into five sections. Section 2 examines the main characteristics of the Saudi Stock Market. Section 3 reviews the main results of the previous studies. Section 4 describes the data and the method of estimation. Seciton 5 presents the findings and interprets them. Finally, section 6 concludes the paper.

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The Risk-Return Link: Evidence from the Saudi Stock Market

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Abstract. This paper attempts to test the CAPM (capital asset pricing model) using data on the emerging Saudi Stock Market, which distinctive features offer an interesting opportunity to examine the hypotheses suggested in the literature regarding the empirical status of the CAPM.

The important results contained in this paper include the following: First, the relation between individual stock returns and market returns is positive and statistically significant, in nearly two thirds of the sample. Second, the monthly cross-sectional results seem to indicate that neither the systematic risk, nor the unsystematic risk have influence on returns. Third, when seasonality is accounted for, it has been found that market returns exhibit very low seasonality. Finally, as regards seasonality, the systematic risk premium is evident only in January and March, while the unsystematic risk premium is significant only in January.

Overall, the hypothesis that the CAPM explains the pricing of stocks on the Saudi Stock Market does not seem to be fully evident.

Introduction

Capital asset pricing model (CAPM) theory asserts that in equilibrium, the expected return on a security is equal to the risk free rate of return plus the security's relative market risk premium. Thus, after adjusting for risk, abnormal returns on a security cannot be achieved. This theory is however, widely contested. Observed structure of security returns do not generally match the model's predictions.

In recent years, much evidence has been accumulated for the risk-return link and the existence of abnormal returns. Conflicting results and differences regarding conclusions are still prevailing. Moreover, most of the empirical testing has relied largely on U.S. data as a basis of empirical verification. The theory has never been