RELATION BETWEEN SYSTEMATIC RISK
AND
FUNDAMENTAL VARIABLES OF THE FIRM

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ABSTRACT

In this thesis the relationship existing between fundamental firm variables and the beta coefficient, which is the systematic risk measure, is studied. Capital asset pricing model is used for this analysis. 20 firms are taken as sample. And the sample time is chosen to be 10 years. First of all the beta coefficient of each firm is estimated via simple regression analysis. For this study the expected return rate of each firm, the market rate of return and risk free rates for ten years are calculated. The regression analysis has not given any reliable result therefore it is concluded that there is no correlation between the expected return of the common stock and the market. This means that in Turkey the expected return does not fluctuate according to the market movement. Therefore the capital asset pricing model is not applicable. Not being able to estimate the value of beta coefficients leads us to set another hypothesis. It is thought that the expected return of the common stock is directly related to the fundemental variables of the firms. The variations of the expected returns are dependent on the changes of the management policies. Relation between expected return asset size ratio and the variables of the firm (such as liquidity, dividend payout asset size ratio, and earning variability asset growth ratio) is found.

In spite of these results, to relie on these findings will be very optimistic in an economic environment where a capital market does not exist, where correct data are impossible to find, and where investors do not have any risk concept.

With an unstable economic environment, with an always changing industry characteristics and with discontunities of management policies it is impossible to base upon past data where the time lap is very large as 10 years and therefore it is not possible to make future expectation.

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I INTRODUCTION

The nature of investment risk and its role in asset pricing are extremely important but controversial topics in modern financial theory. Much of the current work in finance is based upon Sharpe-Linter two parameter capital asset pricing model. This theory asserts that a stock's beta coefficient which depicts its sensivity to changes in the overall market portfolio, is the sole relevant measure of that stock's investment risk. In contrast, work in stock valuation theory shows that investment risk can be depicted by several, different measures determined by the firm.

The purpose of this study is to examine the relationship existing between the beta coefficient and the fundemental variables of the firms. The effects of relevant fundemental variables are incorporated similtaneously into the analysis. This will be done by relating beta to several fundemental variables via multiple regression analysis. At the end of this work it is expected to set variables related to the beta of a firm. The percentage change in beta coefficient by the unit change in each variable is found. These percentages differ from country to country because of the different responsiveness of stockholders to these variables. And also after a certain level the marginal utility of each unit, increased or decreased, can have different effects on the change in beta coefficient.

Having this information the stockholders can diminish their risk in investing in common stocks by being aware of the reasons why the beta coefficient of the specific stock is high or low. The policy of the firm will give to the stockholders an idea about the future risk in investing into the common stock of the firm. The stockholder will be able to promote his investment and get maximum return having minimum risk. These findings have important implications for corporate managers. Knowledge concerning the potential effects of changes in fundemental variables may help the corporate manager to assess the potential market reaction to major corporate decisions.

II LITERATURE REVIEW

Recently several connecting links between these two views of risk and asset pricing have appeared in the literature. The attempt to relate the beta of a stock to fundemental firm variables was performed by Beaver, Kettler and Scholes for the periods (1947-56) and (1957-1965) in United States of America. They examined the relationship between seven firm variables and the beta on a company's stock. They found a positive relationship between β and asset growth, leverage and earning variability while a negative relationship was seen for divident payout, liquidity and asset size. Some of the results are reported in Table I

Variables	Period (1957-1965) 1-Stock Portfolio	5-Stock Portfolio
Dividend Payout	-0.24	-0.45
Growth	0.03	0.07
Leverage	0.25	0.56
Liquidity	-0.01	-0.01
Size	-0.16	-0.3
Earnings Variability	0.36	0.62
Earnings Beta	0.23	0.46

TABLE I Correlation Between Accouting Measures of Risk and Market Beta
Source : ELTON AND GRUBER Portfolio Theory and Investment Analysis pp. 121

Another step in developing fundemental betas was taken by Thomson and Rosenberg which was to incorporate the effects of relevant fundemental variables simultaneously into the analysis. This is done by relating beta to several fundemental variables via multiple regression analysis.

William I.Breen and Eugene M. Lerner (1971) tried to establish a link between β and $\hat{\beta}$, the estimate of β and then a link between β and corporate decision variables. Since β is unobservable, direct interferences about the relation of β and estimate $\hat{\beta}$ are not possible . Therefore they derive the estimate of β by relating the price changes of a specific security to the changes in a market index. After this step they wanted to know whether the important variables do effectively describe the changes that take place through time in a firm's β value. Thus the independent variables they studied to explain the variations in values are:

- The ratio of debt to equity
- The ratio of debt to equity squared
- The growth of earnings
- The stability of the growth in earnings
- Size of company
- Dividend payout ratio
- Number of shares traded

They calculate the depentent variable by using :

$$r_{it} = \alpha_i + \beta_i R_{I,t} \qquad \text{Equation I}$$

The monthly value of the expected return r_i , defined as $\frac{\Delta P_t}{P_t}$ which is the price change divided by the market price of the common stock was calculated for each of 1400 companies for period (1965-1970). The companies were those on the compustat tape. The monthly value of R_I, defined as the percentage change of the New York Stock Exchange (NYSE) Index, was calculated. Using these monthly r_i and R_I observations as inputs, β_i's were estimated according to equation I for both 24 and 36 month periods using ordinary least squares.

They found two points of interest. First, many of the reported coefficients were not significantly different from zero. The second point of interest was that the overall unadjusted r^2 for the estimated equation is not high.

An examination of the data shows that the signs of the coefficients of the financial variables that were studied, usually behave the way that the traditional corporate finance literature suggests that they should. Thus, the stability of earnings growth, company size and the payout ratios have predominately negative coefficients while the growth rate and the number of shares traded have predominately positive coefficients.

In all of these studies it is assumed that the beta is stationary and the variability of the error term of the ordinary-least squares regressions is used as a measure of unsystematic risk which can be diversified and which is independent of the firm. SON-NAN CHEN and ARTHUR J. KEOWN (1981) in their study examined the relationship between the process of diversification and the subsequent portfolio risk reduction while allowing for nonstationarity in betas. They showed that when non-stationarity of betas is allowed for, what is idendified as unsystematic risk or residual risk by the ordinary least square technique can be further decomposed into pure residual risk and variability resulting from beta's nonstationarity. They showed that the risk decomposition using the O.L.S. method is an inapropriote method with which to represent the real components of the total risk when the beta coefficient is non-stationary over time. They tested the relationship between portfolio diversificution and risk decomposition. Over the period, February 1970 through December 1977, a sample of monthly prices of 811 firms adjusted for cash and stock dividends and stock splits was obtained from the Compustat PDE tape and used to calculate logarithmic price relatives. Using this sample 80 random portfolios of varying size from one to 100 securities were formed and the variance of each portfolio was calculated and residual risk, risk due to beta nonstationarity. The results show that for a single security variability due to beta nonstationarity accounts for approximately one-third of that security's total variability, while pure residual risks accounts for only 19 percent. However, after 10 securities have been randomly chosen for a portfolio, the proportinate contribution to total risk of variability due to beta nonstationarity and pure residual risk has fallen to 8 and 4 percent respectively, and for portfolios of size 30 their respective contributions drop again by one-half. They stated that the initial contribution to the O.L.S. measured unsystematic risk of risk due to beta nonstationarity is approximately 74 percent greater than the contribution of pure residual risk.

III THEORETICAL ANALYSIS

3.1, Risk and Capital Asset Pricing Model

To predict the behavior of capital markets a body of positive microeconomic theory dealing with conditions of risk is needed. The investor can obtain a higher expected rate of return on his holdings only by incurring additional risk. The more variable is the expected future returns, the riskier is the investment.

There are two types of risk. One that is diversifiable and the other non-diversifiable. In portfolio theory the part that can be reduced through diversification is defined as unsystematic risk and the part that can not be eliminated is defined as systematic risk; thus:

Total Risk = Unsystematic risk + systematic risk

In a broadly diversified portfolio the risk inherent is largely systematic and arises because of general market movements. The systematic risk reflects general economic environment, industry characteristics and management policies. This type of analysis provided the foundation for the development of the capital asset pricing model (CAPM). To construct this model some assumptions are made. They are as follows:

- The transactions cost do not exist. There is no cost of buying and selling. Therefore the return of any asset is not related to whether or not the investor owned it before decision period.

- The assets are infinitely divisible. The size of the wealth of the investor is not important, be can participate in any investment he wants.

- The personal income tax does not exist. Therefore the form of the expected return does not matter for the investor.

- The buying and selling action of an investor does not affect the price of any stock. Only the investors in the capital market as a whole can affect the prices.

- The investor can sell any amount of any shares.

- The investors are making decisions being aware of the expected return and the risk of their portfolios.

- The investor can lend or borrow any amount of assets at least for the riskless rate.

- The expectations of all investors are the same. They have identical expectations about the expected returns, the variance of returns.

- All assets can be sold and bought on the market.

In the capital asset pricing model, beta is the systematic risk measure of the well diversified portfolios. Beta determines how returns fluctuate in relation to variations in overall market returns. Beta provides a link between corporate behavior and the market for corporate shares.

Under the CAPM assumptions the portfolio of risky assets lies at the tangency point between the original efficient frontier of risky asset and a ray passing through the riskless return (on the vertical axis) as shown in Figure I

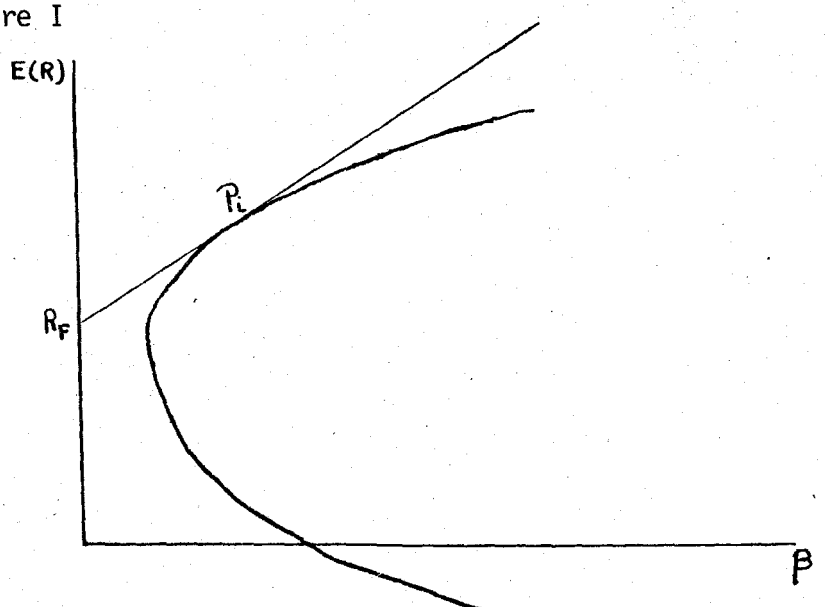

Figure I: The efficient frontier with lending and borrowing

Investors satisfy their risk preferences by combining P_i , the efficient portfolio, with lending and borrowing. All investments and all portfolios of investment must lie along the straight line. Any investment lying above or below that line can have the opportunity to a better, riskless arbitrage. The straight line is the capital market line. All investors will hold combinations of two portfolios; the market portfolio (M) and a riskless security. The equation of the capital market line can be identified by two points. Under the assumptions of CAPM everybody will hold the market portfolio. This is the first point to designate the capital market line. The market portfolio has $\beta = 1$. The correlation between itself is 1.

The equation for a straight line is :

$$R_i = a + b\beta_i$$

The first point where $\beta = 1$ is

$$R_M = a + b\ (1)$$

$$R_M - a = b$$

The second point is the point where the systematic risk has zero value. This occurs for the riskless asset where $\beta = 0$. Thus ;

$$R_F = a + b\ (0) \quad \text{or} \quad R_F = a$$

Putting these together and substituting into Equation yields

$$R_i = R_F + \beta_i (R_M - RF) \qquad \text{Equation II}$$

This is illustrated in Figure II

straight line would be our best estimates. The estimates are subject to errors. Furthermore because of the non-stationarity of beta to obtain accurate estimates is not possible. We would expect changes in beta value as the fundemental characteristics of the firm change.

b- Adjusting Historical Beta

To improve the estimation of betas, it is assumed that betas tend to converge to one, the market value, in successive time periods. The estimated betas that are larger than one will tend to converge to one in the next period. Betas that are smaller than one will tend to have higher betas. This was showed by Blume and Levy for the periods (1984-1954) and (1955-1961). Blume's technique results in a continued extrapolation of the upward trend in betas observed in the earlier periods. He calculated betas of each stocks for two different time periods. Regressing betas for one period to the other period he obtained the following equation:

$$\beta_2 = 0.343 + 0.667\ \beta_1 \qquad \text{Equation III}$$

Using this equation we can adjust beta for the succeeding periods.

Vasiek's technique to adjust historical beta was to adjust beta toward the average beta. To move each historical beta towards the average he took one half of the historical beta and added it to one half of the average beta.

Both cases led to more accurate forecasts of future betas than did the unadjusted beta. When Blume and Vasieck's techniques are compared to unadjusted historical betas, they decrease the error coming from the overestimation of high beta and underestimation of low beta.

c- Fundamental Betas

The risk of a firm should be stated by the combination of the firm fundementals and market characteristics of the firm's stock. This is done

by combining the firm's variables with beta. The relation between beta and the firm's variable, each one separately, is examined. To improve this, beta is related via regression analysis to the fundemental variables. The estimated equation is:

$$\beta_i = a_0 + a_1 X_1 + a_2 X_2 + \ldots\ldots + a_n x_n + e_i \qquad \text{Equation IV}$$

The advantage of betas on historical return data is that they measure the response of each stock to the market movement but the changes in the characteristics of the firm are not reflected immediately. Fundemental betas respond quickly to these changes but they are considered as if they react in the same manner as the other betas. Fundemental betas are assumed to have similar behavior in all sectors of the market and in all firms without considering the side factors.

IV , METHODOLOJY

In Turkey there are about 40 firms whose securities most regularly being traded in the capital market. Twenty of them are chosen to be processed in this thesis. The list of the firms to be analyzed is given in Appendix Table 1. Firms from different sectors are chosen. For the regression analysis, data are taken annually for a period of 10 years. It would be more accurate to take data on monthly basis but because of the non-existence of a real capital market it is impossible to find any record of the market price of a common stock at each month, more over each common stock is not necessarily traded monthly. The stock market price of 20 firms for 10 years (1974-1983) is taken from the stock exchange bulletin, the bulletin of Iş Bankası and Banker Semih which is one of the earliest financial institutions existing on the capital market (Appendix Table 2). To prevent the ambiguity of the stock price with and without dividend payout the common stock market price is taken on December of each year.

The expected return of each common stock is partitioned into two parts. The first one is the percentage of the dividend payout on the common stock market price and the second one is the rate of return from the change of the market price of the common stock from one year to the other.

The first one, the dividend payout rate is on the nominal price basis (Appendix Table 3) which differs from one firm to the other, therefore the dividend rate is calculated on the market price basis of each common stock (Appendix Table 4).

$$\frac{Dit}{P_{i\,(t-1)}}$$

For each dividend payout received at time t the common stock must have been bought at time t-1

The second part of the expected return rate is calculated for each year for each firm (Appendix Table 5).

$$\frac{P_{it} - P_i(t-1)}{P_i\ (t-1)}$$

After these calculations they are summed up to determine the real expected return of each firm for each year (Appendix Table 6).

$$E_{Ri} = \frac{D_{it}}{P_i(\ t-1)} + \frac{P_{it} - P_i\ (t-1)}{P_i\ (\ t-1)}$$

For the risk-free rate government bonds interest rates are taken into consideration. The interest rate is calculated for a full year on weighted average method, because of the change of the interest rates at any time in the year (Appendix Table 7).

While the capital asset pricing model is developed with respect to all capital assets, applications have been restricted to equity securities of 40 firms. The data for dividend rate and market price of the common stock is taken from Banka ve Ekonomik Yorumlar Journal. (1)

In order to calculate the expected market return, the market index, calculated by Doç. Dr. Mehmet Ş. Tekbaş and published in the Banka ve Ekonomik Yorumlar Journal January 1985 is used (Appendix Table 8). The market index is calculated using the weighted average method by considering each firm's capital. It must be more accurate if it would be possible to determine how many have been traded of each commun stock and calculate the market index accordingly. As it is impossible to determine this because of the lack of a stock exchange market, the capital contribution of each firm is accepted as a means to take weighted average. The market index calculated in the Banka ve Ekonomik Yorumlar Journal is only the price index of the

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(1). Doç. Dr. Mehmet Şükrü Tekbaş Sermaye Piyasası Banka ve Ekonomik Yorumlar Dergisi January (1976-1984)

common stock therefore it is necessary to calculate the rate of dividend payout to 40 firms with the same weighted average method for 10 years (Appendix Table 9). First of all the rate of dividend payout on nominal price is changed to the rate of dividend payout on market price of the common stock. After that, each firm's dividend rate is multiplied by its capital.

$$\frac{\sum_{i=1}^{n} \frac{D_{it}}{P_j\ (t-1} \times C_j}{\sum_{i=1}^{n} C_j}$$

The rate of market return from the price change of the common stock is calculated from the change of the market index. The market index change on December of each year is calculated (Appendix Table 10). This calculation is only a percentage change therefore the expected market rate of return of December 1981 is calculated for each firms and multiplied by their corresponding capital.

$$\frac{P_{1981} - P_{1980}}{P_{1980}} \times C_{1981}$$

After this calculation, all of them is added and the sum is divided by the total capital of the firms taken as the whole market. The result obtained is the expected market return from the price change of the common stock at 1981. Doing intrapolation for the preceding and coming years the rate of expected market return from the price change for each year is found

$$\frac{P_t - P(t-1)}{P(t-1)} \times 100 = \%\Delta P$$

Having the rate of expected market return from the dividend payout and from the price change the data for the regression analysis for the capital asset pricing model are ready. (Appendix Table 12)

$$E_{Ri} - R_F = B_i (E_m - R_F)$$

Where

E_{Ri} = expected rate of return of the firm

R_F = Risk - free rate

E_m = Market rate of return

$(E_{Ri} - R_F)$ and $(E_m - R_F)$ are listed in Table 13 and Table 14 in Appendix. These calculated data are used for the least sqware method to find the beta coefficient for the 20 firms taken in this thesis for analysis. To relate the beta coefficient of a stock to fundemental firm variables and the beta on a company's stock is examined. The effects of relevant fundemental variables is incorporated simultaneously into the analysis. This is done by relating beta to 6 fundemental variables via multiple regression analysis. The six variables used are:

(1) Dividend Payout (dividends divided by earnings)
(2) Asset Growth (annual change in total assets)
(3) Leverage (Senior securities divided by total assets)
(4) Liquidity (current assets divided by total assets)
(5) Asset size (total assets)
(6) Earning variability (standard deviation of the earnings price ratio)

These variables are calculated for each 20 firms and the result is listed in Appendix Table 15. Data needed for these calculations are tabulat at table 3,16,17,18,19 in the appendices section.

V , RESULTS AND DISCUSSION

The estimation of beta coefficients, for each 20 firm, is realized by regression analysis using past data. Their values and their statistical analysis is tabulated at the following Table II.

The regression analysis results show that the beta coefficient values are not significant. For eleven firms beta coefficient are negative. Negative values for B are not permitted in the capital asset pricing model. The coefficient of correlation (R^2) is too low and the standard deviation of the regression is too high. Therefore the strength of the relationship between the expected return and the market is not high enough to have any meaning. The firms having the highest R^2 are UNIROYAL and ÇELİK HALAT with a value of 22.4 per cent and 38 per cent respectively. Their standard deviations are too high and their values are too low to have any significance. The expected values of the firms vary a lot from year to year. The firms can't adapt themselves to the inflationary economic environment and to the governmer interest rate policy. Under these conditions to obtain any significant and reliable β values are impossible. The expected returns do not fluctuate according to the market movements. We can say that in Turkey there is no correlation between the market and the common stock expected return. The betas do not measure the response of each stock to the market movement. We can conclude that the capital asset pricing model is not applicable in Turkey. With these findings of beta coefficient it is impossible to continue for further analysis. We can think that the expected return of the common stock is related directly to the firm's fundemental variables. The return depends on the policy of the management. Variations of the return depend on the changes of the variables of the firm.

To prove this hypothesis a link between the expected return and some variables of the firm is searched. The relationship between four variable and the expected return asset size ratio on a company's stock is examined by using least square method. The data of the year 1983 for 20 firms are taken into consideration. The four independent variables used are:

(1) Dividend Payout / Total Asset
(2) Liquidity

(3) Leverage

(4) Earning Variability /Asset Growth

The linear form for the equation is estimated which is as follows:

$$E_{Ri} = C + AX_j$$

The regression analysis results and their statistical analysis are tabulated in Table III

Variables	Constant	Coefficient of the Variable	t_{coef}	R^2	F	Standard deviation
Dividend Payout / Total Asset	0.0074	13.96	2.147	0.69	40.04	0.0172
Liquidity	0.0126	20.94	2.75	0.753	54.84	0.0153
Earning Variability / Asset Growth	0.0131	122.37	29.19	0.48	16.65	0.022
Leverage	0.0128	76.47	17.84	0.492	17.42	0.022

TABLE III Correlation Between Variables of the Firms and their Expected Return Via Simple Regression Analysis

The statistical analysis shows us that the regression analysis is significant. The t values are greater than 2.101 (t values for a level of significance = 0.025) and F values are greater than 6.002 (F value for the confidence level 0.975) the standard errors are low too.

We can see that 75.3 per cent of variations of E (R)/ Total asset is explained by the liquidity. Dividend asset size ratio explains 69 per cent of the variations. The leverage and earning variability asset growth ratio explain 49.2 % and 48% respectively. To improve this regression analysis it is thought to put the variables simultaneously into the analysis

The relationship between the expected return asset size ratio and some combination of variables is examined via multiple regression analysis. The equation form estimated is linear. The best results of several regression analysis and their statistical results are presented in Table IV . All relations have significance . Their t,F values exceed the tabulated values. They are theoretically acceptable results. Analyzing the dividend payout asset size ratio, liquidity and earning variability asset growth ratio gives us a value of $R^2 = 0.778$. The improvement obtained is very small. The liquidity states that an increase in total asset without increasing the current ratio will lead the firm to a decrease of the expected return total asset ratio. We can think that the short-term solvency has a great effect on the expected return of the share in proportion to the size of the company.

The relationship existing between the dividend payout asset size ratio and the expected return asset size ratio must be important. A company having a high dividend payout for each unit of increase in total asset is interesting for the investors. That means that if the total asset increases, the dividend payout ratio of the company will increase and the investor will have the opportunity to get an increase on the market price of the asset.

If the total asset is increased by an increase in common stock the expected return can't be as high as expected because of the increase of the number of shares. Therefore the expected earning per share may not be attained because of the diversification of the dividend part of the profit. The existing positive relationship is not very reliable. According to this reasonning the choice of the third equation will be appropriate which is as follows:

$$\frac{\text{Expected Return}}{\text{Total Asset}} = 0.0088 + 3.9 \frac{\text{Dividend Payout}}{\text{Total Asset}} +$$

$$30.29 \frac{\text{Earning Variability}}{\text{Asset Growth}} + 13.22 \text{ (Liquidity)}$$

	R^2	F	Standard error
$Y = 0.0097 \quad 5.184\ X_1 \quad 14.35\ X_2$ $(t = 4.17) \quad (t = 6.05)$	0.764	27.47	0.015
$Y = 0.0109 \quad 35.63\ X_3 \quad 17.67\ X_2$ $(t = 26.61) \quad (t = 3.64)$	0.775	29.33	0.015
$Y = 0.0088 \quad 3.9\ X_1 \quad 13.22\ X_2 \quad 30.29\ X_3$ $(t = 4.33) \quad (t = 6.124) \quad (t = 28.605)$	0.778	18.73	0.015
$Y = 0.0173 \quad 4.28\ X_1 \quad 12.48\ X_2 \quad 20.25\ X_4$ $(t = 4.197) \quad (t = 6.194) \quad (t = 17.198)$	0.782	19.08	0.015
$Y = 0.0062 \quad 11.004\ X_1 \quad 29.137\ X_4$ $(t = 2.75) \quad (t = 17.98)$	0.729	22.908	0.017
$Y = 0.0108 \quad 17.513 X_2 \quad 22.88\ X_4$ $(t = 3.654) \quad (t = 16.509)$	0.777	29.57	0.015

$$Y = \frac{\text{Expected Return on Common Stock}}{\text{Total Asset}}$$

X_1 = Dividend Payout / Total Asset

X_2 = Liquidity

X_3 = Earning Variability / Asset Growth

X_4 = Leverage

TABLE IV Correlation Between Fundemental Firm Variables and Their expected return via multiple regression Analysis

Dividend Payout asset size ratio has an impact of 3,9 . For each unit increase of liquidity an increase of 13,22 and for each unit increase of earning variability asset growth ratio an increase of 30,29 is expected in expected return per share.

In the capital market in Turkey are the assets behaving according to this equation ? It is obligatory to ask this question in an environment where capital market does not exist. In a market where only 40 firms are being traded most regularly and where the investors are not conscious on the level of risk they are undergoing in investing in different assets, to have reliable results will be very optimistic. The investor, to make a trading profit, must have good information about companies peresent state and future plans. In Turkey instruments and facilities of distributing the informations about the companies do not exist. The investor, to take a speculative position, must have prior information and an estimate of the information elready discounted in the market price.

A great part of the investors are making their investments according to the dividend per share regardless of the dividend distributed according to its profit or the strength of the company. In general companies distributing high rate of dividends have the possibility that the market price of their shares will increase.

Investors in general are evaluating the profitability of shares according to their rate of dividend per share.

With an unstable economic environment, with an always changing industry characteristics and with discontinuities of management policies it is impossible to base upon past data where the time lap is very large as 10 years and to make future expectations.

VI, CONCLUSIONS

We can conclude that in Turkey expected return does not fluctuate according to the market movement. The capital asset pricing is not applicable in Turkey. The market model used to estimate systematic risk is misspecified for the Turkish economic conditions. In spite of the relation found between the expected return asset size ratio and the firm variables such as liquidity, dividend payout asset growth ratio and earning variability asset growth ratio it will not be very wise to relie on these results. In an environment where the information diffusion does not exist, where the investors do not have any risk concept, where there is no every-moth transactions, where there is no financial institutions and where a real capital market does not exist, to expect to find correct, reliable, not misleading results will be very optimistic. A correlation between the market and the company's common stock return can't be established as long as the companies can not adapt themselves to the everyday changing economic environment.

It is suggested that for future research more accurate result can be obtained if the time lap of the sampling can be shortened, if the market price of the common stock for each month can be found. The common stock that does not have any transaction during one year will have a nonchanging market price which does not help the analysis. To use monthly data will shorten the sampling period and therefore the effect of the nonstationarity of beta will diminish. An accurate calculation of the expected market price will lead the researcher to obtain more meaningful results. If he can find any record of the amount of shares transacted he can calculate the market expected return by using the weighted average method based cn the number of shares transacted.

I think that to obtain results by using the methods employed in this thesis, first of all, the capital market must be established in Turkey. The enlivement of the capital market is necessary to proceed for this type of study.

APPENDIX

TABLE 1

LIST OF THE FIRMS ANALYZED

1. Akçimento Ticaret A.Ş.
2. Alarko
3. Altaş El Aletleri A.Ş.
4. Uniroyal Endüstri A.Ş.
5. Rabak Elektrolitik Bakır ve Alüminyum Sanayi A.Ş.
6. Kordsa Kord Bezi Sanayi ve Ticaret A.Ş.
7. Nasaş Alüminyum Sanayi ve Ticaret A.Ş.
8. Kav Orman Sanayi A.Ş.
9. Pınar Süt Mamülleri A.Ş.
10. Meriç Tekstil Sanayi ve Ticaret A.Ş.
11. Nobel İlaç Sanayi ve Ticaret A.Ş.
12. Eczacıbaşı Yatırım Holding Ortaklığı A.Ş.
13. Ercan Holding A.Ş.
14. Otosan Otomobil Sanayi A.Ş.
15. Polylen Sentetik Iplik Sanayi A.Ş.
16. Türkiye Şişe ve Cam Fabrikaları A.Ş.
17. Lassa Lastik Sanayi ve Ticaret A.Ş.
18. Gübre Fabrikaları Türkiye A.Ş.
19. Çelik Halat ve Tel Sanayi A.Ş.
20 Ege Biracılık ve Malt Sanayi A.Ş.

TABLE 2

MARKET PRICE OF THE COMMON STOCKS (in TL)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AKÇİMENTO	1000	1000	1100	1100	1100	1275	1118	1118	1750	5000
ALARKO	560	560	520	520	520	520	520	625	700	1000
ALTAŞ	550	575	775	775	775	850	550	600	650	900
UNIROYAL	1400	850	750	2000	1750	1225	1225	950	1750	2000
RABAK	2950	4500	2700	4200	2500	2450	1550	2100	3100	5750
KOROSA	1800	1900	2500	2950	2950	3000	1900	3000	7000	33000
NASAŞ	1700	1825	1825	1825	2300	1950	1700	1700	1500	1850
KAV ORMAN	1300	1350	1400	1800	2300	2250	5000	4750	4625	10500
PINAR SÜT	1000	1100	1100	1150	1200	1300	1100	1200	1500	1800
NOBEL ILAÇ	1000	1000	1100	1200	1100	1200	1200	1000	1000	1000
ECZACIBAŞI	1000	1100	1100	1100	1000	1000	900	975	1200	1300
MERİÇ TEKSTİL	1000	1000	1000	1000	800	800	700	700	700	600
ERCAN HOLDİNG	1100	1100	1150	1150	1175	1200	1200	1250	1250	1400
OTOSAN			7500	11000	12750	7500	3250	3250	4200	20000
POLYLEN	1925	1950	1950	2200	2200	2600	2100	2200	3700	12000
T. ŞIŞE VE CAM	825	825	825	1150	1150	2500	2000	1850	3750	7500
LASSA	1000	850	900	925	1000	900	2500	1000	1000	1150
GÜBRE FAB.	625	900	1600	1100	1100	1100	1100	1100	950	1800
ÇELİK HALAT	2000	1700	1890	1890	5800	5800	5800	1950	3900	4500
EGE BIRACILIK	1200	1300	2000	2000	2600	2750	2500	2800	3100	5100

TABLE 3

DIVIDEND PAYOUT OF THE FIRMS (in TL)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
ÇIMENTO	100	100	100	125	150	0	250	250	250	100
ARKO	50	75	85	105	115	135	150	160	235	245
TAŞ	0	75	75	100	100	140	175	225	250	300
NIROYAL	67.15	0	93.8	75	200	70	125	600	340	200
ABAK	400	338	350	350	350	500	550	750	600	500
ORDSA			150	300	350	400	600	750	1790	2600
ASAŞ	0	200	200	250	300	320	650	500	68	250
AV ORMAN	67.5	87.5	125	250	400	400	1000	750	2500	1500
INAR SÜT	0	0	53.7	200	300	280	250	400	400	400
OBEL ILAÇ	0	150	0	0	200	0	250	250	250	550
CZACIBAŞI	160	175	190	200	250	240	500	500	300	300
ERİÇ TEKSTİL		50	81	0	0	280	350	350	350	300
ERCAN HOLDİNG	150	160	180	200	225	224	300	375	1300	1320
TOSAN	1250	1300	1930	3250	2400	800	1920	2725	3015	5180
OLYLEN	250	200	200	350	437.5	500	50	600	3000	2000
.ŞİŞE VE CAM		100	110	150	175	160	300	400	540	270
ASSA			0	0	0	100	0	0	101	200
GÜBRE FAB.	153	156.3	143	82.6	119	120	265	325	304.5	340
ELİK HALAT	70	250	300	350	400	370	500	500	1330	1000
EGE BIRACILIK	200	300	300	300	350	500	500	600	1000	600

TABLE 4

% of DIVIDEND PAYOUT ON MARKET PRICE OF THE COMMON STOCK

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
:IMENTO	10	10	10	11.36	13.6	0	19.6	22.4	22.3	5.7
ARKO	8.9	13.4	15.1	20.2	22.1	26	28.8	30.8	37.6	35
TAŞ	0	13.6	13	12.9	12.9	18	20.6	40.7	41.7	46.1
IROYAL	4.8	0	11	10	10	4	10.2	49	35.8	11.4
BAK	13.6	11.45	7.7	13	8.3	20	22.5	48.4	28.6	16
RDSA			7.9	12	11.9	13.6	20	39,5	59.6	37.1
SAŞ	0	11.76	11	13.7	16.4	13,9	33.3	29.4	4	16.7
V ORMAN	5.2	6.2	9.3	17.9	22.2	17.4	44.4	15	52.6	32.43
NAR SÜT	0	0	4.9	18.2	26	23.3	19.2	36.4	33.3	26.6
BEL ILAÇ	0	15	0	0	16.6	0	20.8	20.8	25	55
ZACIBAŞI	16	17.5	17.3	18.2	22.7	24	50	55.6	30.8	25
RİÇ TEKSTİL	0	5	8.1	0	0	35	43.8	50	50	42.9
CAN HOLDING	13.6	14.5	16.4	17.4	19.6	19	25	31.25	104	105.6
OSAN	16.7	17.3	25.7	43.3	21.9	6.3	25.6	83.8	92.8	123.33
LYLEN	13	10.4	21	18	19.9	22.7	1,9	28.6	136.4	54
ŞİŞE VE CAM	0	12.1	13,3	18.2	15.2	13.9	12	20	29.2	7.2
SSA			0	0	0	10	0	0	10.1	20
BRE FAB.	24.5		15.9	21.9	10.8	10.9	24	29.5	27.7	35.8
LİK HALAT	3.5	12,5	17.6	18.5	21.2	6.4	8.6	8.6	68.2	25.6
E BIRACILIK	16.7	25	23	18.2	17.5	19.2	18.2	24	35.7	19.4

TABLE 6

EXPECTED RETURN RATE

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AKÇIMENTO	10	10	19.1	11.36	13.6	16	7.3	22.4	78.8	190.7
ALARKO	8.9	13.4	8.1	20.2	22.1	26	28.8	50.8	49.6	77.8
ALTAŞ	0	18.1	47.8	12.9	12.9	27.6	-14.7	76.2	50	84.6
UNIROYAL	4.8	-39.3	-0.8	176	-2.5	-26	10.2	26.5	120	25.7
RABAK	13.6	63.95	-32.3	68.5	-32.2	18	-14.2	83.9	76.2	101.5
KORDSA		5.5	39.5	30	11.9	15.3	16.6	97.5	192.6	408.5
NASAŞ		19.16	11	13.7	42.4	-1.3	20.5	29.4	15.8	40
KAV ORMAN	5.2	10,1	13	39.32	49.9	15.2	144.4	14	50	159.43
PINAR SÜT		10	4.9	22.7	20.3	31.6	3.3	45.4	58.3	46.6
NOBEL İLAÇ		15	10	9	8.3	9	20.8	0.8	25	55
ECZACIBAŞI	16	27.5	17.3	18.2	13.7	24	40	63.9	53.8	33.3
MERİÇ TEKSTİL	0	5	8.1	0	-20	35	31.3	50	50	28.6
ERCAN HOLDING	13.6	14.5	20.9	17.4	21.8	21.1	25	35.45	104	117.6
OTOSAN	16.7	17.3	25.7	89.9	37.9	-34.7	-31	83.8	121	499.33
POLYLEN	13	11.7	21	30.8	19.9	40.7	-17.3	33.4	204.6	278
T. ŞIŞE VE CAM	0	12.1	13.3	57.6	15.2	131.3	-8	12.5	131.9	107.2
LASSA		-25	17.6	2.7	8	0	177	-60	10.1	35
GÜBRE FAB.	24.5	69	92.9	-8.4	10.8	10.9	24	29.5	14.1	125.3
ÇELİK HALAT	3.5	-2,5	28.8	18.5	22.81	6.4	8.6	-57.8	253.9	41
EGE BIRACILIK	16.7	33.3	50	39.4	47.5	25	9.2	36	36.7	83.9

TABLE 7

INTEREST RATES OF GOVERNMENT BONDS

Years	R_F
1974	9
1975	9.5
1976	11
1977	11
1978	12.75
1979	16.66
1980	19
1981	34
1982	36
1983	36

TABLE 8

MARKET PRICE INDEX

Years	
1974	95.26
1975	109.2
1976	117.44
1977	141.93
1978	141.58
1979	107.81
1980	94.64
1981	94.18
1982	133.33
1983	242.03

TABLE 9

EXPECTED MARKET DIVIDEND PAYOUT RATE

Years	%
1974	8.3
1975	9.52
1976	9.98
1977	8.97
1978	10.09
1979	13.34
1980	15.779
1981	37.76
1982	52.35
1983	18.2

TABLE 10

RATE OF PRICE CHANGES OF COMMON STOCKS

Years	% P
1974	
1975	9.20
1976	-7.54
1977	20.85
1978	-0.25
1979	-23.85
1980	-12.21
1981	-0.48
1982	41.64
1983	81.50

TABLE 11

EXPECTED MARKET RETURN FROM THE PRICE CHANGES

Years	%
1974	9.076
1975	10.404
1976	10.911
1977	13.186
1978	13.154
1979	10.0166
1980	8.793
1981	8.75
1982	12.394
1983	22.494

TABLE 12

EXPECTED MARKET RETURN RATE

Years	%
1974	17.376
1975	19.924
1976	20.891
1977	22.156
1978	23.244
1979	23.257
1980	24.572
1981	46.51
1982	64.744
1983	40.694

TABLE 13

EXPECTED RETURN OF THE FIRM (E_{Ri}) - RISK-FREE RETURN RATE(R_F)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AKÇIMENTO	1	0.5	8,1	0.36	0.85	-0.66	-11.7	-11.6	42.8	154.7
ALARKO	-0.1	3,9	-2.9	9.9	9,35	9.34	9.8	16.8	13.6	41.8
ALTAŞ	-9	8.6	36.8	1.9	0.15	10.94	-33.7	42.2	14	48.6
UNIROYAL	-4.2	-48.8	-11.8	165	-13	-42.66	-8.8	-7.5	84.	-10.3
RABAK	4.6	54,45	-43,3	57.5	-44.95	1.34	-33.2	49.9	40.2	65.5
KORDSA		-4	28.5	19	-0.85	-1.36	-35.6	63.5	56.6	372.5
NASAŞ		9.66	0	2.7	29.65	-17.96	1.5	-4.6	-20.2	4
KAV ORMAN	-3.8	0.6	2	28.32	37.15	-1.46	125.4	-20	14	123.43
PINAR SÜT		0.5	-6.1	11,7	7.55	14,94	-15.7	11,4	22.3	10.6
NOBEL ILAÇ	0	5.5	-1	-2	-4,75	-7.66	1.8	-33,2	-11	19
ECZACIBAŞI	5	18	6,3	7,2	-0.95	7,34	21	29.9	17.8	-2.7
MERİÇ TEKSTİL	0	-4.5	-2.9	-11	-32,75	18,34	12.3	16	14	250
ERCAN HOLDING	4.6	5	9.9	64	9.05	4,44	6	1,45	68	81.6
OTOSAN	7.7	7.8	14,7	78.9	25,15	18.04	-50	49,8	85	463
POLYLEN	4	2.2	10	19.8	7,15	24,04	-36,3	-0,6	168.6	242
T. ŞIŞE VE CAM	-9	2.6	2.3	46.6	2,45	114,64	-27	-21.5	95.9	71.
LASSA		-34.5	66,6	-8.3	-4,75	-16,66	158	-94	-25.9	-1
GÜBRE FAB.	12	59.5	81.9	-19.4	-1.95	-5.76	5	-4,5	-21.9	89.
ÇELİK HALAT	-5,5	-12	17,8	7.5	215.35	-50,26	-10.4	-91,8	217.9	5
EGE BIRACILIK	7.7	23,8	39	28.2	34.75	8,34	-9.8	2	0.7	47.9

TABLE 14

EXPECTED MARKET RETURN RATE (E_M) - RISK - FREE RETURN RATE (R_F)

Years	E_M-R_F
1974	8.376
1975	10.424
1976	9.891
1977	11.156
1978	10.494
1979	6.697
1980	5.572
1981	12.51
1982	28.744
1983	4.694

TABLE 15

VARIABLES OF THE FIRMS FOR 1983

	Dividend Payout	Asset Growth (Millions)	Leverage	Liquidity	Asset size (Millions)	Earning Variability	B
AKÇIMENTO	4.11	2877	0.36	0.80	8429	0.0508	-0.37
ALARKO	2.412	255	0.85	1.55	1190	0.070	-0.19
ALTAŞ	3.65	198	0.30	1.25	1218	0.0512	0.33
UNIROYAL	2.499	3015	0.277	1.17	10191	0.0423	4.535
RABAK	2.685	10326	0.205	1.22	24.188	0.0344	1.4712
KORDSA	9.865	6596	0.422	1.48	17.525	0.0806	-2.81
NASAŞ	2.755	5768	0.263	1.06	18800	0.0678	-0.842
KAV ORMAN	9.499	372	0.87	7.7	1291	0.1545	-2.896
PINAR SÜT	3.179	2024	0.356	1.94	5146	0.0256	0.895
NOBEL ILAÇ	1.88	390	0.153	0.94	2364	0.0357	-0.839
ECZACIBAŞI	2.102	266	0.74	1.10	737	0.1790	0.529
MERİÇ TEKSTİL	9.576	750	0.337	1.32	2254	0.083	-3.424
ERCAN HOLDING	2.75	2502	0.62	1.23	4.954	0.0833	1.593
OTOSAN	0.891	6284	0.26	0.99	21003	0.4902	-2.625
POLYLEN	10.364	1717	0.507	1.78	6180	0.049	3.867
T.ŞIŞE VE CAM	9.102	13320	0.45	0.56	27281	0.1418	2.172
LASSA	2.366	6719	0.46	1.51	26939	0.039	-3.54
GÜBRE FAB.	1.831	2465	0.396	1.43	18.028	0.0315	-2.64
ÇELİK HALAT	4.186	599	0.69	3.60	4112	0.0633	9.447
EGE BIRACILIK	4.242	3968	0.51	1.22	12202	0.043	-0.806

TABLE 16

NET SALES REVENUE OF THE FIRMS (Million TL)

	1975	1976	1977	1978	1979	1980	1981	1982	1983
AKÇIMENTO	361.4	563.9	640.5	1183.4	1080	2960	4793	9957	13037
ALARKO	18.9	21.0	33.5	73.4	84.5	142	113	242	278
ALTAŞ	59.1	85.6	126.8	150.3	230.4	227	446	741	1041
UNIROYAL	647.7	866.6	1107.6	2106.5	3117	6400	8215	11735	16554
RABAK	960	1123.9	1424.5	1545.8	3239	3555	10655	15659	29162
KORDSA				898.3	1837.2	4449	6616	10734	17640
NASAŞ	374.1	604.3	911	1334.6	1745	4211	6152	8692	16774
KAV ORMAN	60.9	76.2	115.2	173.6		741	752	1389	1646
PINAR SÜT	68.7	233.8	337.1	484.5	771	1371	2651	4574	7593
NOBEL ILAÇ	83.4	81.9	104.9	101.1	126	392	508	705	973
ECZACIBAŞI	16	22.3	34.7	53.2	108	302	333	339	446
MERİÇ TEKSTİL	12.8	145.2	79.5	113.8	371	1143	1470	2278	2738
ERCAN HOLDING	31.2	36.2	119.6	94.5	160.3	220	174	761	1565
OTOSAN	108.2	238.3	410.4	234.4		9495	13884	23090	31970
POLYLEN	162.3	222	410.3	568.7	1065	1888	2576	3915	4770
T.ŞIŞE VE CAM	6.3	19.3	65.6	64.3	553	682	1927	1441	3498
LASSA				692.1	3582	9000	8895	13514	3811
GÜBRE FAB.	188.3	961	902.6	1128.2	2920	9327	15857	18451	26779
ÇELİK HALAT	173.7	229.8	293.4	486.7	778	1233	1854	33387	4316
EGE BIRACILIK	199.2	268.1	373.3	524	1035	2316	4964	6273	8797

TABLE 17

NET PROFITS OF THE FIRMS (in Million TL)

	1975	1976	1977	1978	1979	1980	1981	1982	1983
AKÇIMENTO	24.3	63.8	76.6	182.1	150	132	226	238	147
ALARKO	11.2	13.1	17.5	46.8	53	96	75	187	204
ALTAŞ	8.2	13.4	21.9	12.5	22.5	18	22	38	60
UNIROYAL	(Z)	38.6	56.7	166.2	11	78	309	510	453
RABAK	65.4	98.5	202.5	167	265	346	490	557	924
KORDSA				226.8	550.8	512	581	1338	1950
NASAŞ	65	106.2	159.7	254.2	215	449	297	75	448
KAV ORMAN	8.5	19.4	51.7	96.7	63.2	81	75	292	355
PINAR SÜT	(Z)	10.1	35.6	40.1	64	41	147	319	231
NOBEL ILAÇ	3.8	—	5.6	10.2	2	14	13	15	33
ECZACIBAŞI	15.4	21.2	33	49	74	177	205	188	238
MERİÇ TEKSTİL	3.6	5.3	1.6	2.3	35	29	33	30	25
ERCAN HOLDING	28.3	33.2	112.8	79.3	140	171	120	728	1477
OTOSAN	109.9	236.1	422.7	240.7	161	365	724	870	444
POLYLEN	25.3	26.5	65.8	70.4	128	59	178	827	605
T.ŞIŞE VE CAM	6.3	19.3	65.6	64.3	553	682	1927	1441	3498
LASSA				(Z)	200	(142)	(294)	836	1060
GÜBRE FAB.	148.7	110.0	38.7	63.6	202	557	964	878	1052
ÇELİK HALAT	21.9	48.9	72.5	146.9	134	171	149	686	677
EGE BIRACILIK	35.7	48.2	61.3	87.6	147	162	318	948	883

TABLE 18

EARNING (NET PROFIT) / SALES REVENUE

	1975	1976	1977	1978	1979	1980	1981	1982	1983	X_M
AKÇIMENTO	0.0672	0.113	0.1196	0.1539	0.1389	0.0446	0.0552	0.0239	0.0113	0.0676
ALARKO	0.593	0.624	0.522	0.638	0.627	0.676	0.664	0.773	0.734	0.650
ALTAŞ	0.1387	0.1565	0.1727	0.0832	0.0976	0.0793	0.0493	0.0513	0.0576	0.0985
UNIROYAL		0.0445	0.0512	0.0789	0.0353	0.0122	0.0376	0.0435	0.0274	0.0735
RABAK	0.0681	0.0876	0.1421	0.108	0.0818	0.0973	0.046	0.0356	0.0316	0.0742
KORDSA				0.2525	0.30	0.115	0.0878	0.12465	0.1105	0.165
NASAŞ	0.174	0.176	0.1753	0.1904	0.1232	0.1066	0.0483	0.0086	0.0267	0.1143
KAV ORMAN	0.140	0.255	0.449	0.557		0.1093	0.0997	0.2102	0.2157	0.2545
PINAR SÜT		0.0432	0.1056	0.0828	0.083	0.03	0.0555	0.0697	0.0304	0.625
NOBEL ILAÇ	0.0455	—	0.0534	0.1009	0.0159	0.0357	0.0256	0.0213	0.0339	0.0369
ECZACIBAŞI	0.9625	0.95	0.951	0.921	0.685	0.586	0.617	0.555	0.534	0.7513
MERİÇ TEKSTİL	0.281	0.0365	0.02	0.02	0.094	0.025	0.0225	0.01317	0.00913	0.0579
ERCAN HOLDING	0.907	0.904	0.943	0.839	0.873	0.777	0.69	0.956	0.942	0.8702
OTOSAN	1.015	0.990	1.03	1.0269		0.0384	0.0521	0.0378	0.139	0.5255
POLYLEN	0.1559	0.1193	0.1604	0.1238	0.1202	0.0313	0.069	0.211	0.127	0.1242
T.ŞIŞE VE CAM	0.287	0.403	0.576	0.568	0.651	0.359	0.349	0.525	0.206	0.436
LASSA					0.0558	(0.015)	(0.0327)	0.0619	0.0445	0.0229
GÜBRE FAB.	0.136	0.1146	0.043	0.0564	0.069	0.0597	0.0608	0.0476	0.0393	0.0696
ÇELİK HALAT	0.126	0.2128	0.247	0.302	0.172	0.139	0.0803	0.203	0.1569	0.1821
EGE BIRACILIK	0.1792	0.1798	0.1642	0.1672	0.1421	0.0699	0.0641	0.1511	0.1004	0.1353

TABLE 19

DATA OF THE FIRMS (Millions TL)

	TOTAL ASSET 1982	TOTAL ASSET 1983	EQURTY 1983	CURRENT ASSET 1983	CURRENT LIABILIT 1983
AKÇIMENTO	5552	8429	3020	3493	4352
ALARKO	935	1190	1004	289	186
ALTAŞ	1020	1218	365	1019	818
UNIROYAL	7176	10191	2830	7574	6478
RABAK	13862	24188	4961	19634	16050
KORDSA	10929	17525	7399	10719	7241
NASAŞ	13032	18800	4937	10690	10116
KAV ORMAN	919	1291	1124	1089	148
PINAR SÜT	3122	5146	1836	2823	1455
NOBEL ILAÇ	471	737	113	684	623
ECZACIBAŞI	1504	2254	1668	631	479
MERİÇ TEKSTİL	1974	2364	798	1471	1566
ERCAN HOLDING	2452	4954	3080	1094	888
OTOSAN	14719	21003	5497	12809	12881
POLYLEN	4463	6180	3135	4073	2294
T.ŞIŞE VE CAM	13961	27281	12136	5506	9788
LASSA	20220	26939	12537	14693	9714
GÜBRE FAB.	15063	18028	7130	13964	9734
ÇELİK HALAT	3513	4112	2834	2655	737
EGE BIRACILIK	8234	12202	6242	4591	3749

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