CROSS SECTION OF EXPECTED STOCK RETURNS IN ISE

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Abstract: The capital asset pricing model developed by Sharpe (1964), Lintner (1964) and Black (1972) stipulate that the expected return on a stock is determined by the risk free interest rate and a risk premium. Early empirical tests of the model generally supported its main prediction as beta being the only explanatory factor in explaining the cross sectional variation across stock. However, more recent empirical work on asset pricing has identified a number of variables that help explain cross sectional variation in stock returns in addition to the market risk variable. The validity of the capital asset pricing model, as well as the firm specific factors that explain stock returns in Istanbul Stock Exchange (ISE) have not been addressed before. The objective of this study is to investigate the cross section of stock returns in the Turkish market for the period 1992-98. A methodology similar to that of Fama and French (1992) is employed, by taking into account the constraints imposed by a smaller sample both in time and in terms of number of stocks. Our findings indicate that book-to-market and firm size explain stock returns, whereas no significant earnings– price ratio effect is encountered. Market beta has no explanatory power, even in models where it is the only variable in the model.

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1. Introduction

The capital asset pricing model developed by Sharpe (1964), Lintner (1964) and Black (1972) stipulate that the expected return on a stock is determined by the risk free interest rate and a risk premium, which is a function of the stock's responsiveness to the overall movements in the market, i.e. its beta coefficient. Early empirical tests of the model generally supported its main prediction as beta being the only explanatory factor in explaining the cross sectional variation across stock portfolios (e.g. Black, Jensen and Scholes, 1972, and Fama and MacBeth, 1973). However, more recent empirical work on asset pricing has identified a number of variables that help explain cross sectional variation in stock returns in addition to the market risk variable. Notably, firm size (Banz, 1981; Keim, 1983), leverage (Bhandari, 1988), P/E ratio (Basu, 1983; Ball, 1988), ratio of cash flow to stock price (Rosenberg, Reid and Lastein, 1985), book-to-market equity (Fama and French, 1992), and past sales growth (Lakonishok, Schleifer and Vishny, 1994), are among those that are found to have significant explanatory power in asset pricing tests.

In their seminal work on the American market, Fama and French (1992), find out that book-to-market equity stands out as the most significant factor in explaining cross section of returns. Market risk measured by beta, on the other hand, has no explanatory power even in models where it is the only explanatory variable. Chan, Hamao and Lakonishok (1991) reach the same conclusion on book-to-market in the Japanese market. As an alternative to the capital asset pricing model, Fama and French (1993) suggest a three-factor empirical model that can explain most of the empirical anomalies cited in the literature. Yet, Daniel and Titman (1997), by looking at the covariance structure of returns together with certain firm characteristics, argue

that the three factors in Fama and French (1993 and 1996) are not priced, hence they cannot be considered as risk factors.

Research on stock returns in emerging markets indicate that these markets are characterized by high volatility and high returns. It has been shown that they are not integrated to the developed markets of the World as evidenced by very low correlation with the rest of the World and among themselves (Bekaert and Harvey, 1997). Investor interest in emerging markets exploded during the last decade as a result of the quest for higher returns and further international diversification. Yet little is known about the nature of stock returns in those markets. At the aggregate level, variables like average P/E ratios, book-to-market ratios and dividend yields are reported to have some explanatory power for average market returns (Bekaert et. al., 1997). There is, however, much more to be understood at the individual stock level in emerging markets.

The objective of this study is to investigate the cross section of stock returns in the Istanbul Stock Exchange (ISE) for the period 1992-98. ISE is highly representative of an emerging market with rapid growth in terms of market capitalization, trade volume and number of listed companies. A detailed analysis of stock returns in this market will undoubtedly shed light on other emerging markets with similar characteristics. Moreover, small sample both in time and number of stocks, coupled with high inflation experienced during the period of study pose additional challenges in employing the traditional methodology adopted in similar studies for developed markets. To this end, a methodology similar to that of Fama and French (1992) is employed, by taking into account the constraints imposed by a smaller sample both in time and in terms of number of stocks. Our findings indicate that book-to-market and firm size explain stock returns, whereas no significant

earnings– price ratio effect is encountered. Market beta has no explanatory power, even in models where it is the only variable in the model.

The organization of the paper is as follows. The data is described in Section two. The findings on size, beta, book-to-market, and E/P are presented in sections 3,4 and 5. Results are discussed in Section 6. Section 7 concludes the paper.

2. The Data

The study covers all nonfinancial companies during the period between January 1992 and December 1998. We chose to exclude banks, insurance companies, holding companies and other finance companies in order to have consistent interpretations on certain firm characteristics like earnings and size. Sample size concerns imposed the limitation of the time period to post 1992. Hence our sample size ranges between 80 companies for 1992 and 150 for 1998. Monthly return data is downloaded from Datastream. All returns are adjusted for cash and stock dividends. Financial statement data are obtained from various publications of Istanbul Stock Exchange (ISE).[1] Companies listed on ISE are required to file financial statements quarterly, however interim statements are not audited with the exception of semiannual statements. Moreover, it has been observed that some companies have serious delays in reporting their interim statements. We also know the presence of significant seasonal factors for some industries and companies. We, therefore, chose to employ end-of-year financial statements in our analysis.

In order to make sure that financial statement information is available to the public when they are included in our analysis, we used end of year t-1 figures starting June of the following year, t. Market price data, on the other hand, is the end month closing price in the same month. Hence E/P ratio and book to market ratio measures

between July of year t-1 and June of year t employ financial statement data for end-of-December of year t-2 and market data for the same month. For example, E/P ratio for a company for April1995 is computed by dividing EPS based on December 1993 income statement by the end of April 1995 closing price. Values of accounting variables and beta as of the end of a month are later matched with stock returns in the following month throughout the analysis.

2.1 Estimation of Betas

We estimate beta coefficient for each stock in a two stage process. First a time series beta is estimated via OLS for each month and stock using monthly data for the previous 24 months. For that purpose, we regress monthly returns on a stock on the contemporaneous and one-month-lagged return on ISE Composite Index, which is a value-weighted index of 100 stocks. The beta estimate for that month is found as the sum of the regression coefficients of ISE index return and its lagged value. According to Dimson (1979), the sum-beta, calculated this way, is regarded as an adjustment for nonsynchronous trading in the absence of autocorrelation in market returns. Ljong-Box test statistic for the presence of autocorrelation in monthly returns on ISE index fails to reject the null hypothesis of no autocorrelation.

For a given month in the sample period, once a beta coefficient is estimated for each stock using data for the previous 24 months, stocks are ranked on estimated betas. The ranked stock sample is divided into five equal groups and the average beta coefficient for each quintile is calculated. The average portfolio beta is then assigned to individual stocks in that beta quintile for that month. The beta estimation process is repeated for each month in the period 1992-98. Hence we allow for stock betas change in time, yet assign each stock to a beta-group in each month, restricting fluctuation in individual stock betas to one of five portfolio beta categories in that

month. We repeated our analyses by arbitrarily dividing our sample period into two subsamples of equal length. This way it is possible to check if the overall results based on the full sample are determined by a dominant subsample. We report our findings for both subsamples as well as the full sample.

3. Size and Beta

We first explore the impact of size and beta on average monthly returns. As explained above, stocks were ranked with respect to their time series betas and assigned into one of five beta portfolios each month. Then average values of E/P, book-to-market and size in each beta portfolio in that month, as well as average rate of return for the following month are computed. After repeating the same process for each month in the sample between January 1992 and December 1998, we take the weighted average of monthly averages under each beta portfolio. Panel A in Table 1 reports the overall average values of monthly returns, E/P, book-to-market and size for each beta portfolio. The value of average beta ranges between 0.38 and 1.63 in five groups. Average monthly returns, which hover around 7% per month, do not vary with beta at all, a finding consistent with Fama and French (1992). Firm size, book-to-market and E/P do not display much difference between beta portfolios either. Similar results hold for the two subsamples. It looks as if market beta does not distinguish any stock characteristic at all.

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Insert Table 1 here

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To investigate the size effect, we rank companies with respect to size in a month and assign them to one of five size quintiles. Average returns, beta, E/P, and

book-to-market for each size portfolio, computed in a similar way described for beta portfolios, are presented in Table 2. In all three panels, market beta does not display any pattern across size portfolios. Average returns over the full sample, on the other hand, generally decrease with size. Portfolios of smaller firms earn higher returns on the average. This result is totally in agreement with findings in developed capital markets. However, size effect almost disappears during the second subperiod, despite a strong manifestation in the earlier period. Book-to-market is negatively related with size. This is clearly seen in Table 2 where average book-to-market of size portfolios get smaller with larger firm size. E/P values of size portfolios display a weaker trend within the size portfolios, although we observe a reverse U-shape.

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In order to explore the interaction between size and beta, we first tabulate the percentage of beta portfolios that fall under a size group in every month. In the top panel of Table 3, the percentages in the body of the table represent the proportion of stocks in a beta portfolio that are within a particular size group. For example, 30% of stocks which were classified in the lowest beta quintile were among the largest group of companies. Similarly, 22.5% of smallest firms are high beta companies. A careful analysis of the table suggests that with the exception of low beta – large size combination, the distribution of stocks among the cells of the table is almost even, i.e. around 20 percent in most of the cells. This is something that we expected considering the equality of average beta values across size portfolios. Second, we tabulate average monthly returns corresponding to size and beta portfolio

combinations in the bottom panel of Table 3. Each cell in the table represents average monthly returns of stocks in a size group that fall within a particular beta portfolio. In each beta group, we generally observe higher returns for smaller size portfolios, but this relationship is weak. Highest average returns are found for smallest size portfolios in each beta classification. No pattern can be detected when the returns are examined row wise. This is another indication of the lack of beta effect in average stock returns. In short, Table 3 demonstrates a weak size effect in returns and almost total independence of average returns and firm size from market beta.

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4. Book –to-market and E/P Ratio

We next turn our attention to two variables that come up as significant factors in explaining stock market returns. These are the ratio of book value of equity to its market value (book-to-market) and the ratio of earnings per share to market price of stock (E/P), the reciprocal of the well known price-earnings ratio. Initially, in each month stocks are ranked according to their book-to-market values and grouped into five book-to-market portfolios. Average values of E/P, beta and size in each book-to-market portfolio in that month, as well as average rate of return for the following month are computed and reported in Table 4. For the full sample, the lowest average book-to-market value is 8.2%, highest average is 79% (the ratio of market to book values of 12 times and 1.27 times respectively). Market beta slightly increases with higher book-to-market portfolios, a result obtained in both subperiods. However, the differences are rather small. Other factors, namely, average monthly returns, E/P and

size have very clear patterns as book-to-market varies. Most important of all, average returns vary directly with book-to-market. The lowest book-to-market portfolio earns 5.4% per month, the highest portfolio has a return of 9%, with returns getting larger steadily with increasing book-to-market. This is in agreement with the findings of well known studies in developed markets, such as Fama and French (1992) and Chan, Hamao and Lakonishok (1991). On the other hand, similar to the size effect, the trend in average return disappears in the second period. We will elaborate on this anomaly together with other findings later on in Section 4. In Table 4, we also observe that average firm size and E/P values for book-to-market portfolios have patterns. Average firm size gets smaller with higher book-to-market. Average E/P ratio, however, becomes larger as book-to-market increases. Results from the two subsample periods display the same properties.

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We repeat the same exercise in developing Table 4 to obtain a similar table for E/P values. Hence, for each month, stocks are sorted with respect to E/P values and grouped into five E/P portfolios such that stocks with the smallest E/P values make up the first portfolio, the fifth portfolio containing those with highest E/P values. After repeating the process every month in the sample, average values of monthly size, book-to-market, beta and one month ahead returns are computed. Results are presented in Table 5. The average value of E/P for the first portfolio is negative. For the full sample, reported in Panel A, the fifth portfolio has an E/P of 0.138, which corresponds to a price-earnings ratio of 7.25. As we found before, market beta slightly declines with E/P values. Yet we cannot see the decline in beta in the second

subperiod. Average book-to-market does not display any regularity across different E/P portfolios. We suspect that allowing for negative E/P stocks in the sample may hinder a relationship. Sample size concerns forced us to keep stocks with negative earnings in the analysis. Nevertheless, average returns and market size display a consistent trend across E/P portfolios. Larger the average E/P value the smaller is the average monthly return. Monthly returns display a U-shape, with larger returns in both high and low E/P portfolios, but smaller average return in portfolios with medium E/P values. As with size and book-to-market, E/P effect is not observable during the second subperiod either

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Insert Table 5 here

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As both book-to-market and E/P emerge as potential determinants of average returns, it is natural to ask which factor dominates in explanatory power. We set up a cross tabulation similar to what we did with beta and size in Table 2. This time, we first sort cross sectional returns in a month according E/P and compute the percentage of stocks within each book-to-market portfolio. The first number in the body of the top panel of Table 6 indicates that 34% of stocks classified in the lowest E/P portfolios have book-to-market values that are in the lowest quintile. In contrast, only 1.3 percent of lowest book-to-market stocks are in largest E/P quintile. To gain a better insight into the relative power of E/P and book to market, one has to look at the bottom panel of Table 6. In this panel, average monthly returns are cross tabulated with respect to both variables, E/P and book-to-market. When we examine the returns

by glancing the numbers column wise, we do not observe any clear trend: after controlling for book-to-market, returns are no longer related with E/P.

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Insert Table 6 here

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Next we examine the bottom panel of Table 6 row wise to see the impact of book-to-market after controlling for E/P. We can observe a weak trend here. For lowest and highest E/P portfolios, average returns increase with book-to-market. Yet in medium E/P portfolios, no book-to-market effect is visible. We have to remember that the sample size in each cell of the cross tabulation gets too small for certain effects to present themselves. Nevertheless when book-to-market and E/P effects are taken together, it will not be wrong to argue that book-to-market dominates E/P in explaining cross section of returns in the Turkish market.

For completeness, a similar cross tabulation of returns with respect to size and book-to-market is also undertaken. Both of these factors, when taken alone, came up with significant explanatory power. Cross tabulation, on the other hand, seems to remove the individual effects. In the bottom panel of Table 7, we cannot observe a trend row wise or column wise. Reduction in sample size as a consequence of cross tabulation has to be responsible for the removal of trends observed individually.

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Insert Table 7 here

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5. Fama - MacBeth Regressions

The discussion above has been confined to tabular analysis of cross section of stock returns. Although simple, the preceding analysis has uncovered significant clues to explain the nature of stock returns in the Turkish market. In this section, we will adopt a more formal approach to test the factors that came up in previous analysis. We employ the well known time series – cross section regression method of Fama and MacBeth (1973). Their methodology first requires the estimation of stock betas using time series data. Stocks are ranked on estimated betas and then ranked stock sample is divided into five portfolios. The average portfolio beta is then assigned to individual stocks. In the second phase, cross sectional regressions are run for each month in the sample. The dependent variable of cross sectional regressions is the stock returns which are regressed against a set of explanatory variables, including the beta estimated during the first stage. Cross sectional regressions are repeated for every month in the sample period. Finally, time series averages of estimated regression coefficients are computed and tested for significance via a simple t-test. Most direct and indirect tests of the Capital Asset Pricing Model of Sharpe, Lintner and Black employ a variant of Fama – MacBeth algorithm. The model predicts that only the coefficient of market beta should be positive and significant, other explanatory variables should not be priced in the market, i.e. their regression coefficients are not expected to be significantly different from zero.

We have already obtained the time series estimates of market betas (please refer to section 2). Hence we run the following cross sectional regression models for every month *t*:

$$R_{i,t+1} = \lambda_0 + \lambda_1 \beta_{it} + \varepsilon_{it}$$

$$R_{i,t+1} = \lambda_0 + \lambda_1 \beta_{it} + \lambda_2 \ln(ME)_{it} + \varepsilon_{it}$$

$$R_{i,t+1} = \lambda_0 + \lambda_1 \beta_{it} + \lambda_2 \ln(ME)_{it} + \lambda_3 \ln(BM)_{it} + \lambda_4 (E/P)^{+}_{it} + \lambda_5 (DEP^{-})_{it} + \varepsilon_{it}$$

where $R_{i,t+1}$ is the rate of return month $t+1$; ME_{it} is the market value of equity; BM_{it} is the ratio of book value of equity to its market value; E/P^{+}_{it} is the earnings to price ratio for company i with positive earnings; DEP^{-}_{it} is a dummy variable that takes a value of 1 for firms with negative earnings, zero otherwise, in month t. λ_0, λ_1, λ_2, λ_3, λ_4 and λ_5 are regression coefficients and ε_{it} is the error term; *ln* denotes the natural logarithm operator. The regression models above are estimated 84 times for every month t between January 1992 to December 1998. Hence we have 84 estimates for each λ in every model. The average value of each λ over 84 estimates are found and tested for significance via t-test. We report our results for the full sample as well as the two subperiods.

Results of Fama-MacBeth regressions are given in Table 8. In the table, rows represent models and figures in the body of the table are time series averages of regression estimates; t-statistics are in parentheses. In the model where beta is the only explanatory variable, the coefficient cannot be distinguished from zero, rejecting the central prediction of the capital asset pricing model. In the next model where firm size is added as an explanatory variable along with beta, beta still remains insignificant whereas size variable has explanatory power with a negative sign. This finding is a manifestation of the well known "size effect" in the literature. The negative sign of the size variable is consistent with the results of the tabular analysis above (see Table 2). The coefficient remains to be significant, albeit with a lower t-statistic, even in the second subperiod. When all variables are entered into the model, book-to-market, size and negative E/P dummy[2] have significant coefficients, with

positive values for book-to-market and dummy, and negative value for the size variable. While beta keeps lacking significance as before, explanatory power of E/P ratio vanishes when other variables (book-to-market, size and negative E/P dummy) are added into the regressions. Fama-MacBeth regressions confirm our earlier findings. Expected returns can best be explained with book-to-market and size of stocks. E/P ratio has an explanatory power when only beta and itself are in the regression (not reported), whereas market beta plays no role at all in determining the cross section of expected returns[3]. Stocks with negative earnings command a higher return. The results of the earlier subperiod are in line with the full sample. Yet, as we have demonstrated in the tabular analysis above, the second period that covers 1995-98, the relationship between stock returns and explanatory variables totally disappears. Negative E/P dummy remains to be an exception, while book-to-market and size cease to be significant although they keep their signs as before.

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Insert Table 8 here

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6. Discussion

The major findings of this study are consistent with the results of similar studies carried out in major developed markets (e.g. Fama and French, 1992 and Chan, Hamao and Lakonishok, 1991). Research on emerging markets, that are characterized by high average returns, high volatility and low correlations with other markets, report similar findings with developed markets. However, unlike this study, emerging market results are obtained on aggregate national data, as opposed to

individual stocks. For example, Bekaert, Erb, Harvey and Viskanta (1997) report that average market returns in emerging markets vary inversely with market capitalization, P/E and book to market.

It is now a well established fact that book-to-market and firm size are two characteristics that best explain stock returns in the US and Japan. However, the former, i.e. book-to-market varies directly with returns and the latter is inversely related to stock returns. E/P, though not as powerful as these two, has also strong positive relationship with returns in developed markets. Although we obtain similar findings over the full sample, our results depart from those in the literature in one significant way. The relationship between stock returns and explanatory variables disappear during the second subperiod. This segment of data covers the period between July 1995 and December 1998. Firm size, book-to-market and E/P cease to be significant in this period, after displaying a strong explanatory power during the earlier subperiod. It is clear that overall results are dominated by the relationships found in this segment of data. At this point we do not have any readily available explanation for the disappearance of the relationship. However we can offer some clues that may help us understand our findings.

First line of explanation can attack data and sample problems. One can argue that our findings in general are sample specific, due to the short period and smaller number of companies. Yet one must also remember that we included all non financial firms and went back as far as possible in time, to 1990. The time period we excluded belongs to the initial development stage of Istanbul Stock Exchange, which started its operations only in 1986. Therefore any meaningful replication of our study to see if the results reported here were sample specific should wait for some more years for new data to become available.

Our explanation is based upon the changing trading strategies in the market.[4] After opening up for foreign investors following financial liberalization in 1980s, Turkish market has gone a long way towards integration to the World capital markets. This is hardly surprising when we consider the investor profile in the Turkish Stock Market. It has been reported that almost one half of the stocks being traded in the market is held by foreign investors. Domestic investors of the stock market are mostly individuals who are known to speculate in the short term. Hence although they own less than half of the shares outstanding, they account for 90% of the trading. Most of the foreign investors, on the other hand, are institutions who try to diversify internationally. These investors follow similar indicators across different markets, contributing to the integration process. However, with the publication of consistent empirical regularities in academic literature, investors increasingly follow the same indicators, like P/E and book-to-market. The natural outcome of similar investment behavior based on empirical regularities is the self destruction of such anomalies. There are already indications of disappearance of certain calendar anomalies. The so-called January effect, for example, does not appear in recent years. Similarly, small firms earning higher returns has not been observed consistently over the recent time period. We believe that our findings in the more recent 1995-98 period is the initial signs of the self destruction process. Yet it has to be confirmed in other markets for similar empirical regularities.

7. Summary and Conclusions

This paper investigates the cross section of stock returns in the Turkish stock market. The methodology adopted in the study is similar to Fama and French (1992). We include all non financial companies over the period January 1992 – December

1998. We examine the impact of market risk measured by beta, firm size, book-to-market and earnings-to-price (E/P) ratio on monthly stock returns. Cross tabulation of monthly returns indicate that stock returns vary directly with book-to-market and inversely with firm size, market beta has no effect at all. These findings are confirmed with the Fama-MacBeth algorithm that employs time series and cross sectional regression. Significant explanatory factors, namely book-to-market, size and E/P, cease to have an explanatory power during the second period that covers between 1995 and 1998. Although our study does not offer any clues for the underlying reasons for this anomaly, we nevertheless suggest some insights. Specifically, we point out changing trading strategies based on well publicized empirical regularities as potential reasons for our findings.

It is evident that much has yet to be done to understand the nature of stock returns in an emerging market. As a first step, additional variables like leverage and cash flow – price ratio can be included in a similar analysis. Then proposed reasons for anomalous findings can be further elaborated. Depending on the availability of data, investigation of investor profile in different time periods and stocks may yield interesting clues.

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Endnotes

[1] We would like to express our thanks to Alternatifbank for providing the ISE financial statement data in electronic medium.

[2] On the average %10.7 of the firms have negative E/P values.

[3] In order to investigate the effect of high inflationary environment on our findings we repeated Fama-Mcbeth regressions with inflation adjusted accounting data. We adjusted monthly values of EPS and book values according to changes in CPI. The results that we obtained from inflation adjustment on accounting variables are in line with our earlier findings, hence they are not reported.

[4] For a brief exposure on the development of Istanbul Stock Exchange and its main indicators, readers can refer to Aydoğan and Muradoğlu (1998).

Table 1

Properties of Portfolios Formed on Betas

Each month beta coefficient is estimated for each stock using monthly data for the previous 24 months and then stocks are ranked on estimated betas for each month. The ranked stock sample is divided into five equal groups and the average beta coefficient for each quintile is calculated. The average portfolio beta is then assigned to individual stocks in that quintile. Then average values of E/P, book-to-market and size in each beta portfolio in that month, as well as the average rate of return for the following month are computed. This process is repeated for each month and the weighted average of monthly averages under each beta portfolio are reported in the body of the table. Panel A reports the values for the full sample, January 1992-December 1998, Panel B reports the values for the period January 1992-June 1995 and Panel C reports the values for the period July 1995-December 1998. Market size (ME) is in millions of US dollars.

Panel A: Full Sample January 1992 – December 1998					
	β_1	β_2	β_3	β_4	β_5
Return	0.0653	0.0795	0.0803	0.0658	0.0732
β	0.3797	0.8429	1.0869	1.3028	1.6324
ME	184.541	118.642	128.487	143.835	143.792
B/M	0.3105	0.3543	0.3415	0.3264	0.3270
E/P	0.0210	0.0440	0.0482	0.0479	0.0421
Panel B: Sub Sample January 1992 – June 1995					
	β_1	β_2	β_3	β_4	β_5
Return	0.0834	0.1287	0.1211	0.0912	0.1061
β	0.4164	0.9058	1.1566	1.3719	1.6992
ME	126.076	106.166	120.275	110.055	141.936
B/M	0.3793	0.3854	0.4070	0.3656	0.3360
E/P	0.0026	0.0264	0.0177	0.0193	0.0131
Panel C: Sub Sample July 1995 – December 1998					
	β_1	β_2	β_3	β_4	β_5
Return	0.0526	0.0452	0.0521	0.0480	0.0501
β	0.3538	0.7991	1.0384	1.2547	1.5857
ME	225.720	127.316	134.190	167.323	145.092
B/M	0.2622	0.3327	0.2960	0.2992	0.3206
E/P	0.0339	0.0562	0.0693	0.0678	0.0624

Table 2

Properties of Portfolios Formed on Size

Stocks are ranked with respect to size (stock price times shares outstanding) in a given month and assigned to one of five size quintiles. Then average values of E/P, book-to-market and beta in each size portfolio in that month, as well as the average rate of return for the following month are computed. This process is repeated for each month and the weighted average of monthly averages under each size portfolio are reported in the body of the table. Panel A reports the values for the full sample, January 1992-December 1998, Panel B reports the values for the period January 1992-June 1995 and Panel C reports the values for the period July 1995-December 1998. Market size (ME) is in millions of US dollars.

Panel A: Full Sample January 1992 – December 1998					
	ME_1	**ME_2**	**ME_3**	**ME_4**	**ME_5**
Return	0.0972	0.0719	0.0675	0.0597	0.0591
β	0.9311	0.8321	0.8694	0.9188	0.8332
ME	7.689	20.801	44.044	93.310	499.003
B/M	0.5232	0.3760	0.3134	0.2415	0.2004
E/P	0.0099	0.0513	0.0653	0.0542	0.0447
Panel B: Sub Sample January 1992 – June 1995					
	ME_1	**ME_2**	**ME_3**	**ME_4**	**ME_5**
Return	0.1344	0.1096	0.1044	0.0802	0.0755
β	1.0184	0.8541	0.8948	0.9543	0.8059
ME	5.329	17.777	44.772	93.175	417.153
B/M	0.5991	0.4085	0.3331	0.2479	0.2621
E/P	-0.0428	0.0210	0.0618	0.0464	0.0347
Panel C: Sub Sample July 1995 – December1998					
	ME_1	ME_2	ME_3	ME_4	ME_5
Return	0.0699	0.0445	0.0408	0.0449	0.0472
β	0.8666	0.8162	0.8509	0.8929	0.8532
ME	9.434	23.009	43.514	93.409	559.047
B/M	0.4672	0.3524	0.2991	0.2369	0.1552
E/P	0.0488	0.0735	0.0680	0.0600	0.0521

Table 3

Proportion of Stocks in Beta and Size portfolios and Average returns for These Portfolios for the Full Sample January 1992-December 1998

In the top panel the percentages in the body of the table represent the proportion of stocks in a beta portfolio that are with in a particular size group. In the bottom panel, values represent average monthly returns of stocks in a size group that fall within a particular beta portfolio.

	β_1	β_2	β_3	β_4	β_5
ME_1	0.1885	0.1806	0.2026	0.2139	0.2275
ME_2	0.1916	0.2147	0.1718	0.1707	0.1912
ME_3	0.1493	0.1979	0.2244	0.1830	0.2049
ME_4	0.1671	0.2049	0.2265	0.2171	0.2086
ME_5	0.3033	0.2017	0.1745	0.2150	0.1676

	β_1	β_2	β_3	β_4	β_5
ME_1	0.0887	0.1109	0.1035	0.0909	0.1052
ME_2	0.0622	0.0759	0.1032	0.0577	0.0612
ME_3	0.0787	0.0627	0.0653	0.0880	0.0704
ME_4	0.0380	0.0902	0.0764	0.0395	0.0599
ME_5	0.0586	0.0636	0.0561	0.0548	0.0629

Table 4

Properties of Portfolios Formed on Book-to-Market

Stocks are ranked with respect to book-to-market values in a given month and assigned to one of five book-to-market portfolios. Then average values of E/P, size and beta in each book-to-market portfolio in that month, as well as the average rate of return for the following month are computed. This process is repeated for each month and the weighted average of monthly averages under each book-to-market portfolio are reported in the body of the table. Panel A reports the values for the full sample, January 1992-December 1998, Panel B reports the values for the period January 1992-June 1995 and Panel C reports the values for the period July 1995-December 1998. Market size (ME) is in millions of US dollars.

Panel A: Full Sample January 1992 – December 1998					
	$(B/M)_1$	$(B/M)_2$	$(B/M)_3$	$(B/M)_4$	$(B/M)_5$
Return	0.0540	0.0604	0.0682	0.0831	0.0895
β	0.7470	0.8397	0.9120	0.9488	0.9416
ME	302.042	138.790	101.552	78.086	53.924
B/M	0.0821	0.1728	0.2583	0.3756	0.7889
E/P	0.0218	0.0409	0.0518	0.0675	0.0617
Panel B: Sub Sample January 1992 – June 1995					
	$(B/M)_1$	$(B/M)_2$	$(B/M)_3$	$(B/M)_4$	$(B/M)_5$
Return	0.0648	0.0850	0.0908	0.1287	0.1398
β	0.7496	0.8648	0.9541	0.9809	1.0159
ME	231.183	130.424	94.405	73.101	63.812
B/M	0.0878	0.1828	0.2881	0.4364	0.9117
E/P	0.0281	0.0322	0.0317	0.0519	0.0134
Panel C: Sub Sample July 1995 – December1998					
	$(B/M)_1$	$(B/M)_2$	$(B/M)_3$	$(B/M)_4$	$(B/M)_5$
Return	0.0465	0.0430	0.0522	0.0506	0.0538
β	0.7452	0.8219	0.8820	0.9259	0.8889
ME	352.525	144.768	106.643	81.648	46.890
B/M	0.0782	0.1658	0.2371	0.3323	0.7017
E/P	0.0175	0.0471	0.0663	0.0787	0.0961

Table 5

Properties of Portfolios Formed on E/P

Stocks are ranked with respect to their E/P values in a given month and assigned to one of five E/P portfolios. Then average values of size, book-to-market and beta in each E/P portfolio in that month, as well as the average rate of return for the following month are computed. This process is repeated for each month and the weighted average of monthly averages under each E/P portfolio are reported in the body of the table. Panel A reports the values for the full sample, January 1992-December 1998, Panel B reports the values for the period January 1992-June 1995 and Panel C reports the values for the period July 1995-December 1998. Market size (ME) is in millions of US dollars.

Panel A: Full Sample January 1992 – December 1998					
	$(E/P)_1$	$(E/P)_2$	$(E/P)_3$	$(E/P)_4$	$(E/P)_5$
Return	0.0871	0.0614	0.0574	0.0759	0.0738
β	0.9366	0.9002	0.8687	0.8597	0.8414
ME	181.878	171.745	133.595	96.634	88.311
B/M	0.3191	0.2711	0.2834	0.3166	0.4652
E/P	-0.0646	0.0291	0.0506	0.0740	0.1380
Panel B: Sub Sample January 1992 – June 1995					
	$(E/P)_1$	$(E/P)_2$	$(E/P)_3$	$(E/P)_4$	$(E/P)_5$
Return	0.1183	0.0805	0.0737	0.1256	0.1090
β	1.0149	0.9130	0.8756	0.9361	0.8083
ME	96.846	160.929	126.492	110.490	89.964
B/M	0.4404	0.3097	0.2863	0.3261	0.4939
E/P	-0.1231	0.0228	0.0415	0.0609	0.1193
Panel C: Sub Sample July 1995 – December1998					
	$(E/P)_1$	$(E/P)_2$	$(E/P)_3$	$(E/P)_4$	$(E/P)_5$
Return	0.0643	0.0476	0.0457	0.0398	0.0481
β	0.8793	0.8910	0.8638	0.8041	0.8658
ME	244.102	179.637	138.742	86.524	87.101
B/M	0.2304	0.2430	0.2813	0.3097	0.4442
E/P	-0.0219	0.0337	0.0573	0.0837	0.1518

Table 6

Proportion of Stocks in Book-to-Market and E/P portfolios and Average Returns for These Portfolios

In the top panel the percentages in the body of the table represent the proportion of stocks in a book-to-market portfolio that are with in a particular E/P group. In the bottom panel, values represent average monthly returns of stocks in a E/P group that fall within a particular book-to-market portfolio

	$(B/M)_1$	$(B/M)_2$	$(B/M)_3$	$(B/M)_4$	$(B/M)_5$
$(E/P)_1$	0.3397	0.1691	0.1400	0.1283	0.1905
$(E/P)_2$	0.3798	0.2067	0.1518	0.1306	0.1324
$(E/P)_3$	0.2064	0.2960	0.2084	0.1714	0.1257
$(E/P)_4$	0.0606	0.2421	0.2827	0.2584	0.1619
$(E/P)_5$	0.0134	0.0861	0.2170	0.3114	0.3895

	$(B/M)_1$	$(B/M)_2$	$(B/M)_3$	$(B/M)_4$	$(B/M)_5$
$(E/P)_1$	0.0576	0.0642	0.0985	0.1092	0.1306
$(E/P)_2$	0.0508	0.0570	0.0652	0.0824	0.0759
$(E/P)_3$	0.0606	0.0393	0.0674	0.0771	0.0531
$(E/P)_4$	0.0514	0.0825	0.0766	0.0747	0.0754
$(E/P)_5$	0.0427	0.0535	0.0379	0.0845	0.0912

Table 7

Proportion of Stocks in Book-to-Market and Size portfolios and Average Returns for These Portfolios

In the top panel the percentages in the body of the table represent the proportion of stocks in a book-to-market portfolio that are with in a particular size group. In the bottom panel, values represent average monthly returns of stocks in a size group that fall within a particular book-to-market portfolio

	$(B/M)_1$	$(B/M)_2$	$(B/M)_3$	$(B/M)_4$	$(B/M)_5$
ME_1	0.0705	0.1203	0.1728	0.2222	0.4130
ME_2	0.1172	0.1535	0.1958	0.2730	0.2443
ME_3	0.1308	0.1818	0.2678	0.2312	0.1845
ME_4	0.2309	0.2784	0.2111	0.1818	0.1018
ME_5	0.4504	0.2658	0.1521	0.0916	0.0562

	$(B/M)_1$	$(B/M)_2$	$(B/M)_3$	$(B/M)_4$	$(B/M)_5$
ME_1	0.0429	0.0646	0.1118	0.0945	0.1065
ME_2	0.0704	0.0421	0.0718	0.0936	0.0712
ME_3	0.0588	0.0635	0.0642	0.0872	0.0641
ME_4	0.0445	0.0760	0.0436	0.0614	0.0816
ME_5	0.0551	0.0508	0.0555	0.0575	0.1424

Table 8

Average Slopes from Month-by-Month Cross Sectional Regressions of Stock Returns on Beta, Size, Book-to-Market and E/P

Cross sectional regressions of stock returns on beta, size , book-to-market and E/P are run for each month in the period of 1992-1998. Time series averages of estimated regression coefficients are computed and reported in the body of the table: t-statistics are in parentheses.

Panel A: Full Sample January 1992 – December 1998					
Intercept	**β**	**ln ME**	**ln (B/M)**	**E/P^+**	**DEP^-**
0.0725 (10.1082)	0.0006 (0.1033)				
0.1137 (10.1606)	-0.0011 (-0.1810)	-0.0100 (-5.1009)			
0.1238 (10.16)	-0.0070 (-1.07)	-0.0063 (-2.94)	0.0130 (2.87)	0.0397 (0.50)	0.0283 (2.65)

Panel B: Sub Sample January 1992 – June 1995					
Intercept	**β**	**ln ME**	**ln (B/M)**	**E/P^+**	**DEP^-**
0.0912 (7.19)	0.0026 (0.25)				
0.1478 (7.63)	0.0018 (0.17)	-0.0149 (-4.40)			
0.0796 (6.12)	-0.0122 (-1.05)	-0.0092 (-2.44)	0.0232 (2.79)	0.1914 (1.31)	0.0351 (1.88)

Panel C: Sub Sample July 1995 – December1998					
Intercept	**β**	**ln ME**	**ln (B/M)**	**E/P^+**	**DEP^-**
0.0543 (7.84)	-0.0013 (-0.21)				
0.0804 (7.01)	-0.0040 (-0.64)	-0.0052 (2.57)			
0.0796 (6.12)	-0.0020 (-0.31)	-0.0036 (-1.64)	0.0031 (0.82)	-0.1085 (-1.71)	0.0216 (2.05)