ESSAYS IN EMPIRICAL ASSET PRICING:

TURKISH MARKETS

by
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ABSTRACT:

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KEYWORDS: Issuance, macroeconomic, factors, Turkish, stocks

The first part of this dissertation reviews the asset pricing literature on Turkish markets. After a general literature review, it focuses on studies associated with share issuance; next, it examines literature on the relationship between macroeconomic factors and stock returns. The second part of this dissertation investigates the predictive power of share issuance on stock returns on the Borsa Istanbul and tests its significance vis-à-vis the well-known factors of market equity, book-to-market and momentum by employing multivariate Fama-MacBeth regressions. The sign of the slope coefficients on book-to-market and market equity are consistent with prior literature; however, the slope coefficient on momentum is negative. In univariate settings, share issuance is not statistically significant because of the mechanical relation between rights offerings and book value; however, when considered jointly with book-to-market, market equity and momentum, share issuance predicts cross-sectional returns, especially for longer return horizons. The analysis shows that after three-month return regressions, share issuance is more significant than market equity and momentum, and is similar to book-to-market in terms of predictive power. The third part of this dissertation analyzes stock exposure to various financial and macroeconomic risk factors through univariate and multivariate

estimates of factor betas. It also investigates the performance of these factor betas in predicting the cross-sectional variation in individual stock returns quoted on the Turkish stock market over the sample period 1992-2011. The study contributes to the literature through its use of a two-step procedure. First, the factor betas are estimated using stock returns and macroeconomic factors; then, the sensitivities of these factor betas are calculated. The three most important findings are: (i) there exists a negative and significant relation between the interest rate beta of benchmark bonds and future individual stock returns; (ii) the addition of well-known market, book-to-market, size and momentum factors does not alter the statistical significance of the interest rate beta of benchmark bonds; and (iii) univariate portfolio analysis shows that these results are driven by debt/equity (leverage) ratio. In short, the study concludes that the sensitivity to the interest rate of benchmark bonds or leverage is a risk factor for the Turkish stock market.

AMPIRIK VARLIK FİYATLAMA UZERİNE CALIŞMALAR: TÜRK PİYASALARI

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ANAHTAR KELIMELER: Arz, makroekonomik, faktor, Turk, hisse

Tezin ilk kisminda Turk piyasalari hakkindaki varlik fiyatlama calismalari incelenmistir. Genel bir arastirmanin ardindan hisse arzi ilgili calismalara odaklanilmis; daha sonra makroekonomik faktorler ile hisse getirileri arasindaki iliskileri irdeleyen calismalar incelenmistir. Tezin ikinci kisminda hisse arzlarinin Borsa Istanbul'daki hisse getirileri uzerindeki etkisi incelenmis ve bu etki, iyi bilinen defter değeri, piyasa değeri ve momentum faktorleriyle, cok değiskenli Fama-MacBeth analizleri kullanilarak, karsilastirilmistir. Değer ve buyukluk faktorlerinin yonu gecmis calismalarla uyumlu gozukurken, momentumun yonu ters bulunmustur. Tek değiskenli modellerde hisse arzi, bedelli sermaye artirimlari ve defter değeri arasindaki mekanik iliski nedeniyle anlamli sonuclar vermemis ancak, defter değeri/piyasa değeri, piyasa değeri ve momentum ile beraber cok değiskenli analizler sonucunda, ozellikle uzun vadede, hisse arzinin kesitsel olarak hisse senedi getirilerini tahmin etmede istatistiksel olarak anlamli sonuc verdiği bulunmustur. Özellikle 3 aydan sonraki getirilerde hisse arzi değiskeni piyasa değeri ve momentumdan daha basarili olup istatiksel gucu defter değeri/piyasa değerine esdeğer bulunmustur. Tezin ucuncu kisminda 1992-2011 yillari arasinda hisse senedi getirileri ve makroekonomik ve finansal risk faktorleri arasindaki

iliskiler, tek değiskenli ve cok değiskenli analizler ile incelenerek, makroekonomik ve finansal faktorlerin Turk Hisse Senedi piyasasindaki hisse getirilerini tahmin etmedeki performanslari analiz edilmistir. Bu calisma, iki-adimli bir prosedur kullanarak literature katkida bulunmaktadir: İlk olarak, makroekonomik değiskenler ve hisse getirileri kullanilarak bu makroekonomik değiskenlerin betalari elde edilmis, daha sonra bu betalarin duyarlilik analizi yapilmistir. Bu calismanin en onemli uc sonucu asağidaki sekilde ozetlenebilir: (i) Gosterge tahvil faizi betasi ile gelecekte beklenen hisse senedi getirileri arasinda negatif ve istatistiksel olarak anlamli bir iliski bulunmaktadir. (ii) Defter değeri, buyukluk ve momentum gibi bilinen faktorlerin kullanilmasi gosterge tahvil faizi betasinin istatiktiksel anlamliliğini bozmamaktadir. (iii) Tek değiskenli portfoy analizlerinin sonucunda elde edilen sonuclarin sebebinin sirketlerin kaldirac orani olduğu ortaya cikmistir. Sonuc olarak kaldirac orani, Turk hisse senedi piyasasinda fiyatlanan bir risk faktorudur.

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LISTS OF SYMBOLS AND ABBREVIATIONS

BIST	Borsa Istanbul. (Formerly known as Istanbul Stock Exchange)
BIST-30	It is a capitalization-weighted index composed of largest thirty national market companies except investment trusts on Borsa Istanbul.
BIST-100	It is a capitalization-weighted index composed of largest hundred national market companies except investment trusts on Borsa Istanbul.
CMB	Capital markets board (of Turkey)
GARCH	Generalized autoregressive conditional heteroskedasticity model.
APT	Arbitrage pricing theory
CAPM	Capital asset pricing model
OLS	Ordinary least squares
VAR	Vector autoregression model
EBITDA	Earnings before interest, taxes, depreciation and amortization
IPO	Initial public offering
SEO	Seasoned equity offering
HML	Fama and French (1993) book-to-market factor
SMB	Fama and French (1993) size factor
UMD	Carhart (1997) momentum factor
CPI	Monthly inflation rate based on Turkish CPI
IP	Monthly growth rate of industrial production
USDTRY	Exchange rate of US Dollars in Turkish Lira
GDP	Monthly growth rate of gross domestic product
MKT	Monthly growth rate of BIST-100 index
M1	Monthly growth rate of money supply
FTB	Monthly growth rate of Turkish foreign trade balance
UNEMP	Monthly growth rate of Turkish unemployment

DEBT	Monthly growth rate of Turkish public debt
BOND	Benchmark bonds' interest rate
BRENT	Monthly growth rate of Brent oil prices
BM	The natural logarithm of the ratio of the book value of equity to the market value of equity
ME	The natural logarithm of market equity
MOM	The past 6 months’ stock return lagged one month
ISSUE	Share issuance measure
TSPAKB	Association of Capital Market Intermediary Institutions of Turkey
KOSGEB	Small and Medium Enterprises Development Organization

CHAPTER 1

LITERATURE SURVEY

1.1. Asset Pricing Literature in Turkey

1.1.1. Asset Pricing Models

The empirical asset pricing literature on Turkish market dates back to the establishment of the BIST in 1986. With increasing amounts of data available, in the 21st century, there has been major research conducted to test the significance of well-known factor models in Turkish markets, including the capital asset pricing model (CAPM), the Fama-French three-factor model and the arbitrage pricing theory (APT) multifactor model. Akdeniz et al. (2000), following Fama–French (1992) methodology, run Fama–MacBeth (1973) cross-sectional regressions for non-financial companies on the Borsa Istanbul for 1992–1998. They show that book-to-market ratio and firm size are important factors for stock returns. Moreover, they find that market beta has no significant explanatory power, even in the one-factor model. Aksu and Onder (2000) utilize time-series regressions of Fama–French (1993) on 16 size and book-to-market ratio-sorted portfolios of non-financial companies on the BIST. They find both size and book-to-market effects to be significant, although the former have higher explanatory power. They also evaluate the firm-specific risk and return characteristics of their extreme portfolios under different conditions in the Turkish economy and look at the relationship between the Fama-French factors and macroeconomic indicators. Dew (2001), performing a joint test of the Efficient Market Hypothesis and a multifactor capital asset pricing model, concludes that the capital asset pricing model (CAPM) applies and that Turkish securities markets are efficient.

Karan and Gonenc (2001) compare the returns of value and growth portfolios as well as small and big portfolios for the BIST from 1993 to 1998. The authors find that, inconsistent with the evidence from the developed markets, growth portfolios have superior performance over value portfolios. Moreover, they argue that monthly and annual small-big portfolio spreads favor big stocks.

Odabasi (2002) investigates the time variation of betas on the BIST from 1992 to 1999 and demonstrates that betas in Turkey are highly time-varying over four and eight-year estimation periods. Aga and Kocaman (2006) examine the relationship between the P/E ratios, Industrial Price Index (IPI), CPI and stock price behavior using "BIST-20 Index," which is formed using the twenty largest companies on the BIST. According to the results of their exponential generalized autoregressive conditional heteroskedasticity (GARCH) model, the authors conclude that while P/E ratios have significant explanatory power regarding stock returns, IPI and CPI are not good at explaining stock returns and volatility for the Turkish case.

Bildik and Gulay (2007) find that there are significant price, size, book-to-market and E/P effects in stock returns on the BIST, consistent with previous empirical work. They also examine the momentum and contrarian effects on stock returns on the BIST between 1991 and 2000 using the same methodology as Jegadeesh and Titman (1993). They find that, in contrast to developed markets, past losers outperform past winners, even in the short return horizons. They also show that a self-financing trading strategy, buying past loser stocks and selling past winner stocks, generates significant abnormal returns (approximately 15% annually) on the BIST. Moreover, they argue that the continuous profitability of contrarian strategies, both in very short (starting from one month) and in long holding periods (up to 36 months), appears to be related to country-specific factors.

Gokgoz (2007) applies the CAPM and the Fama-French three-factor model in a study of the BIST for the period 2001-2006. By utilizing time-series and cross-sectional regressions, the author finds that both the CAPM and the three-factor model are statistically significant for the BIST, however, the latter performs better. Aras and Yilmaz (2008) examine the predictive power of price-earnings ratio, dividend yield and market-to-book ratio using the stock returns of 12 emerging countries, including Turkey, during the period 1997-2003. Multivariate regressions show that while the results vary depending on the country, the market-to-book ratio has significant predictive power for one-year stock returns, which confirms prior research, while dividend yield is secondary. Atakan and Gokbulut (2010) investigate the validity of the Fama-French three-factor model on industrial companies traded on the Borsa Istanbul with panel data. Confirming prior research, the authors conclude that the three-factor model is a better alternative than the CAPM for the Turkish stock market. Korkmaz et

al. (2010a) test the validity of the CAPM utilizing the panel data analysis method for firms whose shares were included in BIST-100 Index from 1993 to 2007. The authors argue that the CAPM is valid for the selected period in the BIST-100 Index. Oran and Soytas (2010) examine the characteristics and stability of individual stock and portfolio betas of stocks listed on the BIST using daily return data of 500 individual stocks and 500 portfolios of 10 stocks each. The authors find significant relationships between market returns and both individual stock and portfolio returns but the evidence does not seem to support that these relationships are stable. Moreover, they argue that portfolio betas are not more stable than individual betas.

Yalcin and Ersahin (2010) test whether the CAPM can explain size, book-to-market, momentum and illiquidity effects using data from the BIST from 1997 to 2008. They argue that the CAPM fails for these standard asset pricing anomalies when beta is allowed to vary over time. Ondes and Bali (2010), using data from the BIST from 1990-2008, show that the contrarian strategies outperform momentum strategies for periods up to 60 months. Moreover, they argue that the momentum effect is not statistically significant except for the 60 months holding period. They also maintain that the addition of the volume data in the analysis may enhance the implementation of both strategies.

Kandir and Inan (2011) investigate the profitability of momentum strategies on the BIST using stock data from July 2000 to June 2010. They use the t-test, Jensen's alpha and Fama-French three-factor model to test 3, 6, 9 and 12-month holding periods (3x3, 6x6, 9x9, 12x12 diagonal portfolios). They find that for 3, 6 and 9 months the returns of the momentum strategy are negative, and significant especially for 3 and 9 months portfolios. The momentum strategy is profitable for only the 12x12 portfolio.

Unlu (2011) tests the four-factor model on the BIST using returns from non-financial companies for the period July 1992 to June 2008. The author utilizes the F-test of Gibbons, Ross and Shanken (1989) to evaluate the performance of the four-factor model. Although the slope coefficient of the momentum is significantly negative, the author argues that there is a momentum effect on the BIST as described by Jegadeesh and Titman (1993). Guzeldere and Sarioglu (2012) test the validity of the Fama-French three-factor model on the BIST within 1999-2011. Paralleling the aforementioned

studies, they find that the three-factor model is statistically significant and should be utilized in forecasting the cost of capital.

On the other hand, numerous articles examine the effect of macroeconomic variables on the BIST: Erdem et al. (2005) explore price volatility spillovers on BIST indexes from macroeconomic variables using monthly data from 1991 to 2004. The authors utilize the univariate exponential GARCH model and conclude that there are negative volatility spillovers from inflation to BIST indexes (except the services index), and positive spill overs from interest rate and exchange rate to BIST indexes. Gencturk (2009) analyzes the effect of macroeconomic factors on the BIST-100 Index using multivariate regressions focusing especially on financial crisis periods from 1992 to 2006. While in "normal" periods, CPI, gold prices, US dollars, money supply and T-bill rates are significant at the 95% level in explaining index returns, in crisis periods, only CPI is found to be significant.

Muzir et al. (2010) compare the predictive power of the arbitrage pricing theory (APT) model and the CAPM for the Turkish market using monthly data from 1996 to 2004. The authors first determine the BIST-100 Index and the logarithm of exports and interest rate on Turkish Lira deposits as the factors of APT, and then compare the results of this model to the CAPM. Muzir et al. (2010) conclude that APT outperforms the CAPM in explaining stock return variation and that its informative power during crisis periods is also slightly higher. However, they also recognize the problem of determining the correct macroeconomic variables for the APT model. Buyuksalvarci and Abdioglu (2010) examine the causal relationships between stock prices and macroeconomic variables in the Turkish stock market by using the long-run Granger non-causality test from 2001 to 2010. The authors find a unidirectional long-run causality from stock market to macroeconomic variables, which implies that the stock market can be used as a leading indicator for future change in exchange rate, gold price, money supply, industrial production and inflation in Turkey.

Furthermore, Cagli et al. (2010) examine the co-integration between macroeconomic variables and the BIST-100 Index utilizing the Gregory-Hansen test, which allows for structural breaks in the data. Using monthly data from 1998 to 2008, which capture the two crisis periods – late 2000 and 2007, the authors conclude that in

the presence of structural breaks in the data, gross domestic product, oil price and industrial production are co-integrated with the BIST-100 Index.

Ozcan (2012) investigates the univariate relationship between the BIST-Industrials Index and macroeconomic variables and concludes that gold price, exchange rate, oil price, interest rate, money supply, current account deficit and export volume all exhibit a long-run univariate relationship with the BIST-Industrials index. Iltuzer and Tas (2012) analyze the bidirectional causality between stock market and macroeconomic volatility utilizing the multivariate GARCH model in emerging stock markets, including Turkey. They conclude that industrial production and money supply are Granger-causes of the BIST.

On a slightly different subject, Misirli and Alper (2009) look at the impact of coskewness on the variation of portfolio excess returns on the BIST from July 1999 to December 2005. The traditional CAPM and the Fama-French three-factor model are tested in the multivariate testing procedure of Gibbons–Ross–Shanken (1989). Coskewness is introduced as a fourth factor and its incremental effect on the CAPM and Fama–French factors is examined through both multivariate tests and cross-sectional regressions. Multivariate test results indicate that coskewness reduces pricing bias, albeit insignificantly. They conclude that coskewness does not have a significant incremental explanatory power over the Fama–French three-factor model on the Borsa Istanbul. Ondes and Bali (2010) also investigate the impact of coskewness on the variation of portfolio excess returns on the BIST between 1996- 2009. The authors argue that coskewness contributes to the Carhart's four-factor model, especially for size portfolios but it does not have a significant incremental explanatory power over Fama-French factors.

1.1.2. Predictability of past returns

Apart from asset pricing models, there has been significant research on the predictive power of past returns: For example, Balaban (1994) finds significant day-of-the-week effects. However the author claims that these effects change in direction and magnitude over time. Moreover, Balaban (1995), using parametric and non-parametric

tests, find that daily and weekly index returns do not follow a random walk, whereas monthly returns do.

Bildik (2001) examines the intraday seasonalities of the stock returns on the BIST from January 1, 1996 to January 15, 1999 using 1, 5 and 15-minute interval data. The author argues that stock returns follow a W-shaped pattern over the trading day since there are two trading sessions a day: Opening and closing returns are significantly large and positive and the average intraday return is negative when the returns at the opening and/or closing intervals are excluded from the analyzes. Bildik (2004) also investigates seasonalities such as the day-of-the-week effect, turn-of-the-year and January effects, turn-of-the-month effect, intra-month, and holiday effects in stock returns as well as in trading volume on the BIST. Using daily closing values of the BIST-100 Index from 1988 to 1999, the author concludes that significant calendar anomalies still exist on the BIST both in stock returns and trading volume, consistent with international evidence. Bildik argues that the reasons for these anomalies are settlement procedures, window-dressing, information processing, and inventory adjustments, among others.

On the other hand, Demirer and Karan (2002) examine the day-of-the-week effect on the BIST using daily index returns and excess index returns over the risk-free rate. The authors argue that although Friday returns seem to be consistently high, they find no clear evidence for a weekend effect on the Turkish stock market for the period 1988-1996. Another significant finding is that the lag variable is consistently significant, which implies that yesterdays' return is a signal for todays' return and this relationship can be estimated through a first-order autoregressive model.

Dicle and Hassan (2006) establish a "session-of-the-week effect" by separately evaluating the mean returns of the two sessions on the BIST. They find negative morning returns on Mondays and positive afternoon returns on Fridays. Dicle and Hassan (2007) revisit day-of-the-week effect on the BIST, utilizing the AR-GARCH-M model for the period 1987-2005. Confirming prior literature, the authors find statistically significant negative returns for Mondays and positive returns for Thursdays and Fridays. Hamarat and Tufan (2008) investigate the day-of-the-week and month effects on the BIST-Tourism Index. Similar to Dicle and Hassan, they find negative Monday returns and positive Thursday and Friday returns. The authors state, too, that the January effect is also present in the data.

Georgantopoulos and Tsamis (2008) analyze five of the most common security price anomalies observed on international stock markets: day-of-the-week effect, January effect, turn-of-the-month effect, half-month effect and time-of-the-month effect. The empirical research is conducted using daily logarithmic returns of the BIST-100 Index over an eight-year period (4/1/2000–4/1/2008) by applying both OLS regression and GARCH (1, 1) models. Using the Wald test, they find that the day-of-the-week effect and the turn-of-the-month effect are strongly present on the Turkish stock market. These findings are in line with the vast majority of previous studies which suggest that the calendar anomalies do exist in Turkish markets.

Atakan (2008) examines the presence of calendar anomalies, particularly the January and the day-of-the-week anomalies on the daily returns on the BIST, covering the period 1987-2008 and utilizing GARCH models to test for the anomalous stock market behavior. The results show that the daily returns of the BIST-100 in January do not show a statistically significant difference from returns in other months. For the day-of-the-week anomaly, statistics indicate that BIST-100 daily returns on Fridays are higher, while returns on Mondays are lower compared to average returns.

Kucukkocaoglu (2008) analyze the behavior of the intra-daily stock returns in the context of close-end stock price manipulation in the BIST utilizing a standard OLS regression model, which looks for the effects of the size of the daily trader's net position in twenty-three stocks selected from the BIST-30 Index. The author finds that close-end price manipulation through big buyers and big sellers is possible on the BIST. On the issue of manipulation, Tas et al. (2012) investigate the efficiency and the presence of manipulative behavior of stock brokers on the BIST by utilizing the unique data of complete trading history of stocks over the period 2003-2006. The authors conclude that trades conducted by brokers can be identified as manipulative and manipulative trades earn significantly higher profits.

On the other hand, Barak (2008) researches the long-term reversion of Turkish stock returns by forming winner-loser portfolios by buying (selling) stocks that performed poorly in the previous 3-5 years and holding for 3-5 years. The author argues that significant returns are achieved on the BIST, thus confirming DeBondt and Thaler (1985).

Ergul et al. (2009) analyze the day-of-the-week effect using four sectoral indexes (BIST-Financials, BIST-Industrials, BIST-Services and BIST-Technology) for the sample period, 2000 to 2007. The authors find significant positive returns for Fridays for all the sectors; however, contrary to previous studies, they find negative Wednesday returns for Financials and Industrials. Kayali and Ozkan (2012) investigate the mispricing of the first-sector exchange trade fund in Turkey, the Non-Financial Istanbul 20 (NFIST). The authors argue that while mispricing is statistically significant, its economic significance is small.

Oran and Guner (2010) analyze day-of-the-week and session effects on the BIST, utilizing individual stock data for a 12-year period from 1991 to 2002. They show that the BIST displays the low-Monday and high-Friday effects common to many other markets. Moreover, they argue that bulk of the low-Monday returns come from afternoon sessions; in fact, all afternoon session returns are found to be lower than the corresponding morning session returns. Korkmaz et al. (2010b) analyze the daylight saving time anomaly on the BIST-100 Index from 1987 to 2009 with GARCH models. The authors find that the time adjustment in spring has a negative effect on index returns, but only at the 10% level of significance. Kamath and Liu (2010) examine day-of-the-week effect on the BIST for the period 2003-2007 using both the OLS and GARCH methods. The authors find significant negative returns on Mondays and significant positive returns on the last trading day of the week. However, they argue that this effect completely vanishes in the second half of the test period.

Aksoy and Dastan (2011) study short selling activities in relation to the day-of-the-week effect for the period 2005-2009 on the BIST. The authors find significant Monday and after-holiday effects for short selling; there is also a positive correlation between short selling and returns for all days of the week, but it is greatest on Monday. Ulusoy et al. (2011) investigate intraday effects on the BIST during the financial crisis from August 2007 to 2010. The authors test for the possible existence of intraday anomalies using both return and volatility equations, empirically applying GARCH models and find strong opening price jumps for daily and morning calculations.

Hepsen (2012) study the presence of calendar anomalies such as January effect, day-of-the-week effect and turn-of-the-month effect on the daily returns on the BIST real estate investment trusts (REIT) market from 2000 to 2010. The results reveal that

January returns behave differently from other months of the year and Monday returns are significantly lower than other days of the week. The author also finds that the average return in turn-of-the-month trading days is significantly higher than other days for the REIT market.

Oduncu (2012) explores the day-of-the-week effect on the Turkish Derivatives Exchange (TURKDEX). Using the GARCH model, the author concludes that the day-of-the-week effect is not present on the TURKDEX. Altin (2012) studies the effect of electoral periods on the stock market in 12 European countries, including Turkey, and Japan and the USA. The author argues that there are price anomalies for some electoral periods but overall the results are inconclusive.

1.1.3. Market efficiency tests

Several academics have tested the efficient market hypothesis in Turkish markets: Muslumov et al. (2006) look at the weak-form market efficiency of the BIST using individual stock data from 1990 to 2002 utilizing a GARCH model. Their results are mixed as 65% of their sample does not show random walk while the remaining part of the individual stocks exhibit significant random walk behavior. Altay (2006) examines the possible causes of autocorrelation and tests the feedback trading hypothesis by implementing GARCH and asymmetric GARCH models on the BIST. The author confirms the presence of positive feedback trading for BIST-All and BIST-30 indexes and the BIST returns provide negative autocorrelation when the volatility is high.

Aga and Kocaman (2008) form an "BIST-20 Index" using the largest twenty companies on the BIST. They then test the efficient market hypothesis by regressing their index over its past returns to conclude that the market is weak-form efficient. Hasanov and Omay (2008) probe the potential nonlinearity and cyclical behavior of Greek and Turkish stock markets. The authors find evidence in support of nonlinear adjustment of stock returns. When nonlinearity in the conditional mean is allowed, the out-of-sample forecasting power increases, which is in contradiction with the efficient market hypothesis. Ozdemir (2008) also studies the efficiency of the Turkish stock market from 1990 to 2005 utilizing econometric methods such as the augmented

Dickey-Fuller test, the runs test and the variance-ratio test, concluding that the BIST-100 Index is weak form efficient during the test period. On the other hand, Korkmaz and Akman (2010) examine the BIST-100 and BIST-Industrials Indexes for weak form efficiency using unit root and co-integration tests and find that these indexes are not weak form efficient.

Ergul (2010) investigates the validity of weak form efficiency of numerous American, European and Asian markets including Turkey. Utilizing augmented Dickey-Fuller and unit root tests, the author states that these markets are weak form efficient. Cevik (2012) also tests the weak form efficient market hypothesis with semi-parametric and parametric long memory models[1] (returns exhibit positive autocorrelation) considering 10 sector indexes. The author argues that the volatility of sector returns exhibit long memory properties, hence the BIST is not an efficient market. Akal et al. (2012) develop new market efficiency tests on the future markets of BIST-30, BIST-100, US Dollar and Euro currencies. All the results of the autocorrelation, normality, run and adopted-purchasing-power-parity test show that these future markets are not efficient. In short, the evidence of market efficiency is mixed and whether the BIST is weak form efficient remains an open question.

1.1.4. Miscellaneous variables

There is another line of research on Turkish markets concerning volatility patterns: Kiymaz and Girard (2009) explore the relationship between daily returns and trading volume for the stocks included in the BIST-30 Index using a GARCH model. The authors find that the persistence of conditional volatility is high, implying that current information can be used to predict future volatility. Moreover, when trading volume is included, this persistence decreases and the decomposition of volume into expected and unexpected components shows that the expected component significantly explains the variation in volatility. Cagli et al. (2011) also examine the impact of volatility shifts on volatility persistence for three major sector indexes of the BIST (financial, industrial and services indexes) and the BIST-100 Index from 1997 to 2009. They argue that volatility shifts should be included in correctly modeling volatility for Turkish sector indexes.

[1] Please see Phillips and Shimotsu (2005) and Phillips (2007) for further information.

In addition to these works, Muslumov (2008) examines the impact of insider trading on the volatility of stock prices volatility with event study methodology and finds that insider trading increases the volatility of the stocks in the trading announcement and post-announcement windows. On the other hand, Umutlu et al. (2012) examine whether there is a relationship between foreign equity trading and average total volatility, measured as the value-weighted average of stock-return variances on the BIST. The authors find that net foreign equity flow is positively correlated with average stock return volatility, even after controlling for market return, liquidity, market development and volatility persistency effects. Cankaya et al. (2012) analyze the relation between short selling and volatility on the BIST, focusing on intraday activities and find that short selling activity, especially at the beginning of opening sessions, significantly impacts volatility for the rest of the trading day.

Aside from such classical factors as size, value or momentum, the predictive power of many other factors such as ownership structure or foreign investors' activity are also tested for the BIST. The Turkish market is an emerging market, so the transactions of large foreign investors there are heavily scrutinized by both market professionals and scholars. Within this context, Adabag and Ornelas (2004) analyze the effects of foreign investors on the Turkish stock market using a vector autoregression (VAR) model with net foreign portfolio inflow and US Dollar returns on the BIST as endogenous variables. The authors argue that there is a monthly contemporaneous relationship between these variables and evidence of negative feedback trading suggesting that foreign investors adopt contrarian strategies when trading in the Turkish market. Sarac (2007) examines the trading data of foreign investors on the BIST and concludes that their trading decisions are based on fundamental analysis. Catikkas and Okur (2008) also look at the effect of foreign investors` trading on the BIST, for the period 1997-2007, using the Granger causality test. The authors find that foreign investor activity has an impact on both BIST-100 index returns and volatility and that the reverse is not true, which confirms that foreign investors are mostly contrarian. Okuyan and Erbaykal (2011) again examine the relationship between foreign transactions and subsequent stock returns, using monthly data from 1997 to 2009. The authors utilize the bounds testing approach developed by Pesaran et al. (2001) and find a positive relationship between foreign investors' transactions and equity returns in the long run; however, they argue that this relationship is insignificant in the short run.

Ulku and Ikizlerli (2012) utilize monthly foreign flows data from the BIST and employ a structural vector autoregression (VAR) model to analyze the interaction between foreigners' trading and stock returns. Confirming previous studies, they find foreign investor negative-feedback-trade with respect to past local returns on the BIST; nevertheless, their results are valid only in rising markets and especially under macroeconomic instability. They also argue that the price impacts are permanent; suggesting that foreigner trading incorporates information. Ozkan and Hepsen (2012) analyze the causes of capital inflows by a VAR model and utilize the BIST Index returns as the dependent variable. They also find that foreign investors follow contrarian strategies in the Turkish market, meaning that they tend to invest more when the BIST Index decreases and vice versa. However, when the NYSE Index increases, foreigners also tend to increase their investments on the BIST. Sevil et al. (2012) investigate the relationship between the BIST and foreign investors' decisions. Using vector error correction granger causality, the authors find that the buying of foreign investors has a causal impact on the BIST Index return but that the converse is not true. These findings support those of the aforementioned studies - that foreign investors are, in general, contrarian.

Aside from the activity of foreign investors, the predictive power of accounting variables is tested on the BIST. Aktas (2008) analyzes the relationship between financial ratios and subsequent stock returns using two sub-periods, 1995-1999 and 2003-2006. The author argues that there is some relationship between stock returns and cash flow from operations/book value, acid-test ratio, gross profit/sales and net profit/sales. Buyuksalvarci (2010) looks at the relationships between financial ratios and stock returns for the companies that make up the BIST-Manufacturing Index. Utilizing both linear and non-linear models, the author states that the relations between financial ratios and stock returns are mostly non-linear; hence, these models should be considered for future research to explore these relationships. Birgili and Duzer (2010) also analyze the relationship between financial ratios and stock returns using panel data analysis and conclude that liquidity and debt ratios are significant, along with past stock performance, in explaining stock returns on the BIST.

Ersoy et al. (2010) look at the relationships between CAPM's beta and accounting-based measures of risk for non-financial firms quoted on the BIST from 1988 to 2006. They find that firm size and current ratio explain 28.6% of the variance in

beta: beta is positively correlated to firm size and negatively correlated to current ratio. Bayrakdaroglu (2012) also tests the predictive power of financial ratios over stock returns from 1998-2007 using the panel logistic regression method and finds that while EBITDA, BM ratio and Tobin's q have some predictive power, their statistical significance is low. Zeytinoglu et al. (2012) test the impact of market-based ratios such as earnings per share, price-earnings ratio and market-to-book ratio on stock returns of insurance companies in Turkey by applying panel data regressions. The authors argue that these ratios have explanatory power especially in one period ahead stock returns. Ozlen and Ergun (2012) examine the relationship of financial ratios and stock returns on a sector basis. They find that book value is the most important variable in explaining stock returns for all sectors and that financial position of the company is very important for the electric and metal sub-sectors.

On a different subject, Canbas and Kandir (2009) test the relationship between investor sentiment and stock returns for the Turkish market from 1997 to 2005 by employing VAR analysis and Granger causality tests. Their findings suggest that while stock returns seem to affect investor sentiment, investor sentiment does not appear to forecast future stock returns and only the turnover ratio of the stock market seems to have forecasting potential.

With the integration of global capital markets, the relationship between the BIST and other markets has also become a popular research subject: Berument and Ince (2005) study the effect of the S&P500 Index on the BIST with a block recursive vector autoregression (VAR) model and conclude that daily returns on the S&P500 affect BIST returns positively up to four days. Dogan and Yalcin (2007) examine the effect of exchange rate movements on the BIST using a monthly VAR model for the period from 1997 to 2003. The authors find that while there is a positive relationship between currency depreciation and stock market in 1997-1999 sub-period. However, this relationship becomes negative in the latter sub-period. Eryigit (2009) utilizes the extended market model to determine the impact of oil prices on different sector indices on the BIST. The author argues that oil price changes have significant positive impacts on electricity, wholesale and retail trade, insurance, holding, investment, wood, paper, printing, basic metal, metal products, machinery and non-metal and mineral products indices at the 5% significance level. Kapusuzoglu (2010) investigates the long-term

relationships of the BIST and the exchange rate (US Dollars) and finds one-way Granger causality from the exchange rate to BIST-100 Index.

Vuran (2010) analyzes the relationship between Turkish stock market and eight developed and emerging equity markets using the Johansen co-integration technique, finding that the BIST is co-integrated with two developed (FTSE100, DAX) and three emerging (MERVAL, BOVESPA, IPC) market indexes. Berument et al. (2011) explore the relationship between US stock indexes (DJIA, NYSE, S&P500, AMEX, NASDAQ, Russell 200) and various sector indexes of the BIST. The study finds that a shock originating in the US stock market has both a contemporaneous and a first period effect on the Turkish stock market. The co-movements among the markets are positive and significant. Moreover, the authors find that Turkish stock market closely follows the movements of stock exchanges consisting of small-cap companies (e.g., AMEX).

Iscan (2011) analyzes the relationship of exchange rate and the stock market from 2001 to 2009; however, in contrast to previous results, the author finds no interaction between these variables. Turan (2011) also tests the relationship of the BIST-100 Index with the exchange rate (US Dollars) and CPI for the period 1986-2008, using the Vector Error Correction method and causality tests. The author states that there is a long-run negative relationship between the BIST-100 and the exchange rate and a positive relationship with CPI. Moreover he argues that the causality is from the exchange rate and CPI to the BIST-100 Index. Kapusuzoglu (2011) examines the long-term relationships of the BIST and Brent oil price using the Johansen co-integration test and Granger causality analysis. The author concludes that there is a co-integrated relationship and a one-way causality from the BIST to oil price, but oil price is not the causal of the stock index.

Mlodkowski and Tastulekova (2012) examine the relationship between European markets and the BIST using co-integration analysis and find that the performance of the BIST is strongly related to the London Stock Exchange while the co-integration with German market is less pronounced despite the high correlation between the FTSE and DAX. Onay and Unal (2012) investigate the long-term integration and bivariate extreme dependence between Bovespa and the BIST using dynamic co-integration tests and GARCH analysis. They find that while there are episodes of co-integration, the extremes of these markets possess asymptotic independence. Anlas (2012) explores the

relationship between changes in foreign exchange rates of Turkey and the Eurozone, England, Japan, and the US, among others, and the BIST. He concludes that there is a positive relationship between changes in U.S Dollar and Canadian dollar and the BIST while the Saudi Arabia Riyal has a negative relationship with the BIST. Bulut and Ozdemir (2012) study the relationship between the BIST and the Dow Jones Industrial Index using weekly returns from 2001 to 2010. They find that there is causality from DJI to the BIST and co-integration between the indexes, especially in the long run.

On a different subject, Yanik and Ayturk (2011) test the existence of a stock price bubble in the Turkish stock market using weekly returns from 2002 to 2010. The authors argue that while the descriptive statistics imply a potential for a rational speculative bubble on the BIST, results of non-parametric duration dependence test indicate that there is no such speculative bubble. Atilgan and Demirtas (2012) compare reward-to-risk ratios among various government debt security (GDS) indices and 25 sector indices on the BIST utilizing standard deviation, parametric and non-parametric value at risk as measures of risk. They find that all GDS indices outperform all the sector indices in terms of reward-to-risk ratios because of the substantially larger standard deviations of the sector indices. Moreover, the authors show that the best and worst performing sectors are similar across all reward-to-risk ratios and that these rankings are mostly driven by the mean returns.

1.2. Share Issuance

The stock return prediction literature began with the capital asset pricing model (CAPM (Sharpe 1964, Lintner 1965)), which was built on Markowitz' (1952) mean variance portfolio analysis. Fama-MacBeth (1973) test CAPM using two-parameter portfolio models on NYSE stocks and find that CAPM's beta and stock returns have a linear relationship and beta is the complete risk measure. This study generated a vast literature and also set an example with its methodology in empirical asset pricing:

For short horizons, French and Roll (1986) show that daily and weekly returns do not seem to justify the efficient market hypothesis. Lo and McKinley (1988) test the random walk model for weekly returns by comparing variance estimators. They reject

the random walk hypothesis for the entire sample finding significant positive autocorrelation in weekly returns; however, the rejection is mostly due to small stocks. Nevertheless, their results have been criticized because they don't account for non-synchronous trading.

For longer horizons, Shiller (1984) and Summers (1988) show that stock prices take large slowly decaying swings away from their fundamentals in the long run but that short-term autocorrelation is low. Debondt and Thaler (1985) find significant reversals in winner and loser stocks in three-to-five year horizons. Fama and French (1988a), confirming previous studies, show that there is significant negative autocorrelation in returns due to a slowly but eventually mean reverting component of stock prices. The autocorrelation is weak for daily and weekly returns, which is consistent with previous studies, but stronger for longer horizons. They show that past returns estimate 40% of three-to-five year returns for small stocks and 25% for large stocks. Fama and French (1988b) utilize dividend yield to predict returns on NYSE stocks from one month to four year holding periods. They estimate that while insignificant in monthly and quarterly returns, dividend yield explains more than 25% of variability in returns in 2-4 year horizons, and this effect is robust over all subsamples from 1927 to 1985 (contrary to Fama and French (1988a)). Fama and French (1989) show there are clear business cycle patterns in stock and bond returns. They argue that expected returns are lower when economic conditions are strong and higher when economic conditions are weak by giving three different explanations.[2]

Aside from past returns, numerous variables have been tested for their predictive power against stock returns: Banz (1981) find that stocks of firms with low market capitalization outperform those with high market capitalization (size effect). Stocks with high BM ratios also have unusually high average returns, as shown by Basu (1984) (BM effect). Fama and French (1992) state that while CAPM's beta used to some predictive power, it has weakened in recent past. Moreover, factors such as market equity, BM ratio, leverage, and earnings-price ratio also have significant explanatory power. Fama and French find that in multivariate analysis, size and BM effect are the most dominant factors in explaining stock returns. Fama and French (1993) enhance their previous study by exploring both stock and bond returns using term structure variables in

[2] According to Fama and French (1989), the explanations are consumption smoothing, risk based explanation, and explanation based on TERM factor.

addition to size and BM factors previously defined in Fama and French (1992). They use mimicking portfolios, SMB (small minus big) for size and HML (high minus low) for BM, to show that portfolios constructed to mimic size and BM captures strong common variation in stock returns, along with CAPM's beta which helps explaining the equity premium.

In a divergent study, Berk (1995) argues theoretically that size effect is not an anomaly but the result of market equity being used as the size proxy. Moreover, Daniel and Titman (1997) criticize Fama and French, arguing that size and BM are proxies for non-diversifiable factor risk. Daniel and Titman (1997) explain that the return premium on small cap and high BM stocks do not arise because of co-movements of these stocks with pervasive factors. They further state that it is the characteristics rather than covariance structure of returns that explain the cross–sectional variation in stock returns. Lakonishok, Shleifer and Vishny (1994), argue that value strategies outperform the market because of the suboptimal behavior of the investor and not because these strategies are fundamentally riskier. They find that value ratios such as BM, cash flow to price, earnings price and growth rate of sales are significant.

While the Fama–French three-factor model has been discussed in academia, Jegadeesh and Titman (1993) show that stocks with high past returns continue to outperform the losers in 3-12 month horizons (momentum effect). They find that the momentum profits are not due to systematic risk or delayed price reactions to common factors, and these returns dissipate in the following two years.

Fama and French (1996) argue that their three-factor model explains the patterns observed with BM; cash flow to price, earnings price and growth rate of sales recommended by Lakonishok, Shleifer and Vishny (1994) along with the long-term return reversals shown by Debondt and Thaler (1985). However, they admit that the three-factor model does not explain the momentum effect documented by Jegadeesh and Titman (1993).

Chan, Jegadeesh and Lakonishok (1996) investigate whether the predictability of future returns from past returns is due to the market's underreaction to information, in particular to past earnings news. Hong, Lee and Swaminathan (2003) examine the profitability of earnings momentum strategies based on analyst forecast revisions in eleven international equity markets. While analyst revisions exhibit persistence in all

countries, profitability of trading strategies based on these revisions varies. Interestingly, price momentum exists only in those countries where earnings momentum is profitable. In general, markets with high levels of corruption (low investor protection) exhibit weak momentum. Collectively, their findings suggest that both price and earnings momentums are related to information dissemination mechanisms within a country. Asem and Tian (2010) find that the profits are higher when the markets continue in the same state than when they transition to a different state. This suggests that investor overconfidence is higher when the markets continue in the same state (up or down) than when they reverse.

While academia accepts the momentum effect in addition to three–factor model, Amihud (2002), using the ratio of absolute return to dollar trading volume as a measure of illiquidity, shows that expected illiquidity positively affects ex ante excess returns, suggesting that expected returns represents an illiquidity premium. Pastor and Stambaugh (2003) argue that expected stock returns are cross–sectionally related to liquidity. By using their monthly aggregate liquidity measure, they show that stocks with high "liquidity beta" outperforms stocks with low "liquidity beta." Moreover, they find that when liquidity is added to the four-factor model (Fama–French's three factors plus the momentum effect); half of the momentum impact disappears. Schwert (2003) reports that the well-known size and value effects, along with the famous calendar anomalies such as the January and weekend effects have lost the predictive power once attributed to them in the literature. While the predictive power of the dividend yield has diminished, Schwert concludes that the momentum effect still persists.

Ang, Hodrick, Xing and Zhang (2006) find that stocks with high sensitivity to innovations in aggregate volatility have low average returns and stocks with high idiosyncratic volatility with respect to the Fama–French three-factor model have low returns. They show that size, BM, momentum and liquidity cannot account for these results.

In addition to these studies, others have shown that share issuance also has statistically and economically significant predictive power over stock returns. Loughran and Ritter (1995) find that companies issuing stock from 1970 to 1990, whether through an initial public offering (IPO) or a seasoned equity offering (SEO), significantly underperform the non-issuing firms for five years after the offering date. Ikenberry,

Lakonishok and Vermaelen (1995) examine the long-run firm performance following open market share repurchases. They discover significant abnormal 4-year buy and hold returns measured after the initial repurchase announcements whereby, the abnormal returns are even higher for 'value' stocks. Loughran and Vijh (1997), using 947 acquisitions from 1970 to 1989, show that during a five-year period following the acquisition, on average, firms that complete stock mergers earn significant negative excess returns of -25.0% whereas firms that complete cash tender offers earn significant positive excess returns of 61.7%.

However, Eckbo, Masulis and Norli (2000) raise doubts about the econometric foundation of Loughran and Ritter (1995), saying that they test the joint hypothesis that markets under react to SEO announcements and that the non–issuing control firms capture the true risk characteristics of SEO firms. They find that Loughran and Ritter (1995) and others do not sufficiently adjust for risk, hence, the negative abnormal returns may be the consequence of risk reduction as equity issuers lower leverage their exposure to unexpected inflation and default risk also decreases. Furthermore, they also show that equity issues significantly increase stock liquidity, which could further lower the expected returns due to lower liquidity premium relative to non–issuer stocks. Baker and Wurgler (2000), confirming previous studies, find that issuing firms tend to prefer equity finance before periods of low returns and tend to issue debt instead of equity before periods of high returns. They argue that using only excess returns in the methodology hides the fact that both issuers and benchmark firms often simultaneously experience low returns. This suggests that managerial timing is a significant determinant of stock issues. Ikenberry, Lakonishok and Vermaelen (2000) examine the Canadian market and observe that, consistent with previous findings in United States, share repurchases are followed by positive abnormal returns while abnormal stock returns are negative for issues. Moreover, given the unique legal requirement of the Canadian market whereby firms report their trading activity on a monthly basis, the authors find that monthly trading activity depends on price changes, suggesting that managers behave strategically.

However, Schultz (2003) challenges these findings with his pseudo–timing hypothesis, which says that since firms are more likely to issue equity after their stock prices have increased, there is a spurious ex-post relation between a firm's equity issues and its equity price.

In analogous literature on the legal framework of equity issuance, Kim, Schremper and Varaiya (2004) survey open market share repurchase regulations in the ten largest stock markets around the world. They find that in many nations, except the U.S., share repurchases are strictly regulated in terms of disclosure and execution, which hinders buybacks in international markets. In another survey, by Brav, Graham, Harvey and Michaely (2005), conducted with over 384 chief financial officers, the most popular reason stated for stock repurchases (86.6% of those agreed) is that the stock is cheap relative to its true value. Brounen, DeJong and Koedijk (2006) extend the survey to international markets; questioning 313 chief financial officers about their capital structure choices, the authors find that pecking order behavior is present, but at the same time, public firms use their stock price for the timing of new issues.

Fama and French (2005) state that the high frequency of both stock issues and repurchases suggests that the pecking order theory by Myers and Majluf (1984) has serious problems explaining the capital structure decisions of firms. The trade-off theory is also unable to explain the empirical evidence.

Butler, Grullon and Weston (2005) reinforce the pseudo–timing hypothesis by stating that in–sample evidence of predictability between equity issues and future stock returns largely depends on the periods of the Great Depression and the Oil Crisis and these economic shocks induce a spurious calendar time relationship between equity issues and ex–post future returns. Moreover, they argue that managers do not strategically intersubstitute debt and equity as the market timing hypothesis would predict. Daniel and Titman (2006) state that a composite equity issuance measure independently forecasts returns and that there is a negative relation between net stock issues and average returns.

Pontiff and Woodgate (2008), by using a share issuance measure developed using the same methodology as Stephens and Weisbach (1998), show that in the post-1970 era, share issuance exhibits a strong cross-sectional ability to predict stock returns. By using Fama-MacBeth regressions, they find that this predictive ability is more significant than the individual predictive ability of size, BM, or momentum and their results remain strong for holding periods ranging from one month to three years. While this result is related to research that finds long-run returns are associated with share repurchase announcements, seasoned equity offerings, and stock mergers, their

conclusions remain strong even after exclusion of the data used in these studies. They estimate the issuance relation pre-1970 and find no statistically significant predictive ability for most holding periods. They state that this discrepancy with the post-1970 period appears to be driven by the World War II time period.

Fama and French (2008a) verify previous studies by using sorted portfolio methodology and cross-sectional regressions on NYSE, Amex and NASDAQ stocks from 1963 to 2005. For net stock issues, the sorted portfolio method shows that in all size groups, extreme negative net issues are followed by strong positive equal abnormal returns in equal-weight portfolios; abnormal returns are smaller, but still statistically reliable for less extreme repurchases. However, they find that consistent negative abnormal returns are limited to the extreme quintile of issues. Cross-sectional regressions also confirm a strong and negative relationship between net stock issues and abnormal stock returns. Fama and French (2008b) claim that the evolution of BM ratio contains independent information about expected cash flows that can be used to improve estimates of expected returns. Controlling for the components of BM ratio, they find results similar to those of Pontiff and Woodgate (2008): a strong negative relationship between net share issues and average returns and no relationship for 1927–1963.

Hong, Wang and Yu (2008) investigate the ability of firms being buyers of last resort for their own stocks. They find that firms with greater ability to repurchase have lower short-horizon return variances than others after controlling for fundamental variance and this relation is stronger in countries where it is easier to conduct repurchase programs. Lyandres, Sun and Zhang (2008), building on the previous works of Cochrane (1991) and Zhang (2005a) argue that investment is likely to be the main driving force of the new issues puzzle. The reason for this is the negative relation between real investment and expected returns, derived from the q–theory of investment.[3] They show that the investment factor, long in low investment–to–assets stocks and short in high investment–to–assets stocks explains a significant part of the new issues puzzle. Moreover, when the investment factor is incorporated into standard factor regressions, it reduces 75% of the SEO underperformance, 80% of the IPO

[3] In this model, firms invest more when their marginal q – the net present value of future cash flows generated from one additional unit of capital – is high.

underperformance, 50% of the underperformance following convertible debt offerings and 40% of Daniel and Titman's (2006) composite issuance effect.

In a recent study, Bali, Demirtas and Hovakimian (2010) show, by using the NISA (Net equity issuance to assets ratio) measure, that the contrarian profits demonstrated previously in the literature soars when the extreme case of value repurchasers versus growth issuers is considered. They also find that value repurchasers are not riskier than growth issuers. Furthermore, time-series of realized growth rates, analysts' growth estimates and sensitivity of portfolio returns to investor sentiment support the misvaluation explanation. Green and Hanson (2010) utilize a different methodology, looking not at the abnormal returns of issuers or repurchasers, but rather at other firms with similar characteristics. They demonstrate that characteristics of stock issuers, i.e., which types of firms are issuing stock in a given year, can be used to forecast important common factors in stock returns such as those associated with BM, size and industry.

Billett, Flannery and Garfinkel (2011) observe that most of the previous studies evaluate a single type of external claim issuance without controlling for the sample firms' other financing activities. For example, if a firm both issues seasoned equity and borrows from a bank within the analysis window, research examining seasoned equity offerings would fail to observe the bank loan and vice versa. Thus, the same firm would affect the conclusions of both studies. The authors observe that the multiple–type issuances described above are not rare. Using a 36-month post-financing window, they account for 34.3% of the firm-month following security issuance. Billett, Flannery and Garfinkel (2011) find that while significant equity underperformance does not follow the issuance of any single security, there is substantial underperformance after the issuance of multiple security types.

McLean, Pontiff and Watanabe (2009)[4] extend the research to international markets and find that share issuance predicts cross-sectional returns in a pooled sample of stocks from 41 different countries (non-U.S.), including Turkey, from 1981 to 2006. They show that as in the U.S., the international issuance effect is robust across both small and large firms, but unlike the U.S., the effect is driven more by low returns after

[4] McLean, Pontiff and Watanabe (2009) has no Turkey-specific result, they use Turkish data in their pooled sample of 41 countries.

share creation rather than positive returns following share repurchases. They state that the return predictability of share issuance is stronger in countries with greater issuance activity, more developed stock markets and stronger investor protection, which, in turn, suggests that the share issuance effect is related to the ease with which firms can issue and repurchase their shares. McLean (2011) analyzes the share issuance-cash savings relation over a 38 year period and finds a statistically significant and increasing trend in the savings of share issuance proceeds as cash. He argues that increasing precautionary motives best explain this trend and not market timing theories. Fama and French (2011) test whether empirical asset pricing models capture the value and momentum patterns in international average returns and whether asset pricing seems to be integrated across North America, Europe, Japan and Asia Pacific regions.

As research has shifted to international markets, it was decided to extend the analysis to Turkish markets, hence the current study. Located within an emerging economy, the Turkish stock market has seen significant growth in the last decade, having withstood the 2008 crisis. The BIST and the CMB are taking new measures to increase the number of IPOs and to decrease the cost of changing the capital structure. This study is meant to contribute to the literature by analyzing the consequences of the changes in regulations.

Studies of the Turkish market generally focus on rights offerings or stock splits because other issuance events such as the seasoned equity offerings are very rare. Muradoglu and Aydogan (1999) examine two sub-periods (1988-1989 and 1990-1992) and find no significant price reactions beyond a one-day event window after the announcement of rights issues or stock dividends. However, significant price reactions to such information are observed on the BIST for a thirty-day event window during the period 1993-1994.

Balsari and Kirkulak (2003) study analyze the effects of financial crisis on the capital structure choice of a firm. They perform empirical analyzes on the Turkish non-financial firms listed on the BIST. Their sample period covers major financial crises in the Turkish economy from 1992 through 2003. To determine the effect of financial crises on debt and equity, short-term, long-term, and financial debt and trade payables, and rights issues of equity are analyzed separately. Analyzes of trade payables and financial debt reveal that tax shield and market-to-book ratio have a significant effect

only on financial debt and not on trade payables. Furthermore, firms which have fewer tangible assets, less profit, less debt and lower market to book ratios tend to raise their capitals through rights issues. Adaoglu (2005) uses event study methodology to investigate the market reaction to both "unsweetened" and "sweetened" (with simultaneous distribution of bonus issues) rights offerings during the announcement and subscription period from 1994 to 1999. Similar to what happens in the U.S, the market reacts negatively on the announcement day for "unsweetened" right offerings. However, it reacts positively to "sweetened" rights offerings, thus supporting the sweetener effect of bonus issues. The market also reacts positively during the subscription periods of both "unsweetened" and "sweetened" rights offerings.

Bildik and Yilmaz (2006), examines the long-standing IPO performance on the BIST by using new factors such as source of shares (new issue or sale of large shareholders), allocation of shares and dispersion of investors as well as existing factors such as market conditions (hot/cold), underwriters' reputation, and firm characteristics (firm size, E/P, and B/M ratios) in the period 1990-2000. The authors reach a number of conclusions. First, the magnitude of underpricing is significantly lower, while underperformance is higher. This is evidence of underpricing by positive initial excess returns (5.94%) and long-term underperformance up to the three-year holding period (-84.5%) on the BIST. Second, underperformance starts much earlier than in other markets, i.e., at the end of first month following IPO, because of the myopic behavior of investors seeking short-term returns. Third, the underperformance disappears for IPOs made in a cold market, and those made through the sale of large shareholders. They also find that the allocation of shares in IPOs and firm size also have an impact on after-market performance of shares. Eris (2007) analyzes both rights issues and stock splits on the BIST from 2003 to 2007 using event study methodology. The author breaks down rights issues into restricted and unrestricted pre-emptive rights and looks at (-20, 0) and (0, 20) abnormal returns and finds little evidence of abnormal returns in rights issue and stock split announcements.

Cun (2010) examines the rights issues of Turkish non-financial firms traded on the BIST during the period from January 1986 to June 2007. After looking at the returns of the firms employing rights issues in both the pre and post-issue period, he compares the returns of the issuing firms with those of matching non-issuing firms. This methodology is based on the calculation of the equivalent period returns of the non-

issuing firms matched with certain characteristics similar to the issuing firms in order to measure the performance of the issuers. The returns of non-issuers are used in the formula of buy and hold abnormal returns (ABHAR) as the expected return for issuing firms. This study finds some evidence of underperformance following rights issues. Tukel (2010) tests the long-term performance of initial public offerings in the Turkish market from 2000-2007 in the context of information asymmetries. Contrary to previous findings, the author finds significant positive abnormal returns, which persist till the 36-month returns horizon. Kirkulak (2010) examines the long-run performance of IPOs listed on the BIST from 1995 to 2004. The author states that the energy and financial industries have the highest average initial returns among all sub-sectors examined. Moreover, firms with high initial returns also have high long-run stock returns.

1.3. Macroeconomic Variables

Since Ross (1976), there has been extensive research done to identify the significant risk factors of the arbitrage pricing theory (APT) model. Macroeconomic variables are excellent candidates because they correlate with both the expected return and the cash flow component of stock returns. Economic conditions may affect the availability of real investment opportunities as well. Chen, Roll and Ross (1986) are among the first to associate macroeconomic variables as undiversifiable risk factors: Using Fama-MacBeth (1973) regressions, they find that the spread between long- and short-term interest rates, expected and unexpected inflation, and industrial production, and the spread between high- and low-grade bond risks are significantly related to stock returns while oil prices are not. Burnmeister and McElroy (1988) utilize both measured and unmeasured factors to estimate a linear factor model, the arbitrage pricing theory (ATP) model, and the capital asset pricing model (CAPM). They find that the CAPM restrictions on the APT are rejected while the APT restrictions on the linear factor model are not rejected. Chen (1991) finds that variables such as the lagged production growth rate, the default premium, the term premium, the short-term interest rate and the market dividend-price ratio are indicators of recent and future economic growth.

Fama and French (1989) show that term and default premium can predict economic cycles and stock returns. They state that expected returns also contain a risk

premium that is related to the longer-term aspect of business conditions. Clare and Thomas (1994), extending the analysis to the U.K., find that oil prices, two measures of corporate default or 'market risk,' the retail price index, UK private sector bank lending, the current account balance and the redemption yield on an index of UK corporate loans are priced in the U.K stock markets. Cutler, Poterba, and Summers (1989) find that industrial production growth is significantly positively correlated to real stock returns over the period 1926–1986, but not between 1946–1985. Although many studies find significant relations between macroeconomic variables and security returns, Chan, Karceski, and Lakonishok (1998) dismiss the relevance of macroeconomic factors and conclude that while factors associated with the market, size, past return, value and dividend yield help explain return co-movement, macroeconomic factors, other than the default premium and the term premium, perform poorly. Lettau and Ludvigson (2001) find that the conditional consumption CAPM performs far better than unconditional specifications and as well as the Fama-French three-factor model. Lamont (2001) shows that economic tracking portfolios that track the growth rates of industrial production, consumption, and labor income earn abnormal positive returns, while the portfolio that tracks the CPI does not.

In a more recent study on the direct relationship between macroeconomic factors and stock returns, Flannery and Protopapadakis (2002) use a GARCH model of daily equity returns where realized returns and their conditional volatility depends on 17 macro series' announcements. They conclude that stock market returns are significantly correlated with inflation and money growth but that the impact of real macroeconomic variables on aggregate equity returns has been difficult to establish, perhaps because their effects are neither linear nor time invariant. Avramov (2002) utilizes a Bayesian approach which assigns posterior probabilities to a wide-set of competing return-generating model. He then uses the probabilities as weights in the individual models to obtain a composite weighted model. He finds that several variables thought to be significant have little predictive power in the weighted forecasting model. He concludes that term premium and the market premium are useful predictors of future returns while dividend yield and BM have relatively small posterior probabilities of being correlated with stock returns. Vassalou (2003) shows that news related to future GDP growth are important factors for explaining the cross–section of book-to-market and size portfolios. A model that includes this factor along with the excess return on the market portfolio

can explain returns as well as the Fama-French three-factor model. Moreover, her analysis reveals that in the presence of the GDP news-related factor in the asset pricing model, SMB (small minus big) and HML (high minus low) lose almost all of their ability to explain returns. Since news related to future GDP growth is unobservable, the author creates a mimicking portfolio using both equity and fixed-income portfolios as base assets.

Boyd, Hu and Jagannathan (2005) argue that rising unemployment has different effects during economic expansions and contractions. They state that, theoretically, three factors determine stock prices: the risk-free rate of interest, the expected rate of growth of corporate earnings and dividends (growth expectations), and the equity risk premium. The authors show that interest rate effects appear to dominate stock price responses during expansions. For example, expected interest rates decline when the labor market weakens, which has a positive effect on stock prices. However, growth expectation effects appear to dominate stock price responses during contractions. Petkova (2006) finds that Fama and French factors HML (high minus low) and SMB (small minus big) proxy for innovations in state variables that predict the excess market return and the yield curve. A factor model where the factors are: excess market return and innovations in the aggregate dividend yield, term spread, default spread and one-month T-bill yield has a higher explanatory power than the Fama-French three-factor factor model; when these innovations factors are present, Fama and French factors lack significance and therefore are unable to account for the cross section of stock returns. Gunsel and Cukur (2007), performing OLS regressions on the stocks listed on the London Stock Exchange, find significant differences in the performance of macroeconomic models among industries. Aretz, Bartram and Pope (2010) show that book-to-market, size and momentum capture cross-sectional variation in exposure to a broad set of macroeconomic factors such as innovations in economic growth expectations, inflation, the aggregate survival probability, the term structure and the exchange rate. The performance of an asset pricing model based on the macroeconomic factors is comparable to the Fama-French three-factor model. However, the momentum factor is found to contain incremental information that is not explained by the macroeconomic or the Fama-French three-factor model.

In most of the reviewed studies, only direct relationships between various macroeconomic factors and stock returns are explored using ordinary least squares or

other statistical procedures. The current study looks at the "sensitivity of the sensitivities," i.e., first, macroeconomic variables and stock returns are regressed and then, a second regression between betas estimated in the first step and future stock returns is performed. So far, potential macroeconomic factors identified by previous studies include: industrial production, inflation, monetary aggregates, balance of trade, and employment.[5]

Bali, Brown and Caglayan (2011) analyze hedge fund exposures to various financial and macroeconomic risk factors using univariate and multivariate estimates of factor betas. They go on to investigate the performance of these factor betas in predicting the cross sectional variation in hedge fund returns from 1994 to 2008. They find that hedge funds with higher exposure to default risk premium in the previous month generate higher returns in the following month and hedge funds with lower exposure to inflation in the previous month generate higher returns in the following month.

For emerging markets, Mateev and Videv (2008) utilize a multifactor framework to investigate the explanatory power of five macroeconomic variables. They employ a "two-pass" approach by grouping sample stocks into portfolios and use three years of monthly returns to estimate the factor betas of these portfolios. They take the first-pass estimates of betas as independent variables and estimate the second-pass regression. They argue that the two-step approach increases the power of the tests; however, their results are inconclusive. Bai and Green (2011), analyzing a sample of companies from 13 emerging markets, find that the determinants of the country effects are clear. Macroeconomic variables, especially openness, exchange rate and interest rate, are among the major direct determinants of the country effects. Borys (2011) compares the CAPM with a macroeconomic factor model for stock returns in Visegrad countries (Czech Republic, Hungary, Poland and Slovakia) using Fama-MacBeth regressions. She finds that the CAPM is rejected in favor of the macroeconomic model based on excess market return, industrial production, inflation and excess term structure in all the countries.

With the development of the Turkish stock market, the relationship between macroeconomic variables and stock returns has become a popular research topic. For

[5] A comprehensive list can be found in page 32.

example, Akkum and Vuran (2005) investigate the effect of growth rate, industrial production index, exchange rate, inflation rate (PPI), money supply (M1), budget balance, export-import, trade balance, market interest rate and gold price on the BIST-30 Index for the period January 1999 to December 2002 on a monthly basis using the ordered multiple linear regression model. They find that while exchange rate has a negative impact on the stock returns, inflation has a positive one; the expected positive impact of money supply and negative impact of interest rate do not appear. Kandir (2008), using a multifactor regression model for portfolios based on market equity, the book-to-market equity, the earnings-to-price equity and the leverage ratio, shows that exchange rate, interest rate and world market return affect all of the portfolio returns, while inflation rate is significant for only three of the twelve portfolios. On the other hand, industrial production, money supply and oil prices do not appear to have any significant impact on stock returns.

Gunsel, Tursoy and Rjoub (2009), explore the relationship between macroeconomic variables and 13 stock market portfolios based on the industry; they discover significant pricing relationship between stock returns and the tested macroeconomic variables, namely, unanticipated inflation, term structure of interest rate, risk premium and money supply. Tunali (2010) utilizes the unit root test, co-integration test, vector autoregression (VAR) Model Test and variance decomposition analysis, respectively, on the BIST-100 Index, Dow Jones Index, foreign exchange rate, industrial production, gold prices, crude oil prices, producer price index and monetary aggregates. Their results reveal a long-run relationship between basic macroeconomic indicators in the Turkish economy and stock returns on different levels. Karacaer et al. (2010) also employ similar statistical procedures to show that there is a long-term relationship among stock price index and inflation, industrial output and exchange rate as there exists a co-integration relationship. Buyuksalvarci (2010) analyzes the effects of macroeconomic variables on the Turkish stock market within the APT framework. With the multivariate regression model, the author finds that interest rate, industrial production index, oil price and foreign exchange rate have negative effects on BIST-100 index returns while money supply positively influence BIST-100 index returns. On the other hand, inflation rate and gold price do not appear to have any significant effect on BIST-100 index returns.

Several studies utilizing different methodologies such as unit root tests or the vector auto-regression model have been conducted on both developed markets and the Turkish stock market. However, most of them focus only on the stock market index (either BIST-30 or BIST-100) as the dependent variable, and they only look at the direct possible effects of the specific macroeconomic factors. As mentioned previously, the aim of the current study is to provide a different methodology utilizing a two-step procedure. First, the factor betas are computed and then the sensitivities of these factor betas are estimated following the methodology used by Bali, Brown and Caglayan (2011).

Table I
Macroeconomic Variables Used in Previous Studies

Industrial Production	Chen, Roll and Ross (1986), Akkum and Vuran (2005), Gunsel and Cukur (2007), Kandir (2008), Tursoy et al. (2009), Buyuksalvarci (2010)

Gross Domestic Product	Akkum and Vuran (2005), Tursoy et al. (2009)
Inflation	Chen, Roll and Ross (1986), Burmeister and MacElroy (1988), Akkum and Vuran (2005), Gunsel and Cukur (2007), Kandir (2008), Tursoy et al. (2009), Kandir (2008),Buyuksalvarci (2010)
Interest Rates	Burnmeister and MacElroy (1988), Ikbal and Haider (2005), Akkum and Vuran (2005), Kandir (2008), Tursoy et al. (2009), Buyuksalvarci (2010)
Term Structure of Interest Rates	Chen, Roll and Ross (1986), Burmeister and MacElroy (1988), Akkum and Vuran (2005), Gunsel and Cukur (2007)
Risk Premium	Chen, Roll and Ross (1986), Burmeister and MacElroy (1988), Gunsel and Cukur (2007)
Money Supply	Clare and Thomas (1994), Akkum and Vuran (2005), Gunsel and Cukur (2007), Kandir (2008), Tursoy et al. (2009), Buyuksalvarci (2010)
Exchange Rates	Akkum and Vuran (2005), Kandir (2008), Tursoy et al. (2009), Buyuksalvarci (2010)
Current Account Balance	Akkum and Vuran (2005), Gunsel and Cukur (2007)
Gold Price	Clare and Thomas (1994), Akkum and Vuran (2005), Tursoy et al.(2009), Buyuksalvarci (2010)
Oil Price	Clare and Thomas (1994),Kandir (2008), Tursoy et al. (2009), Buyuksalvarci (2010)
Export	Tursoy et al. (2009)
Import	Kandir (2008), Tursoy et al. (2009)
Unemployment	Clare and Thomas (1994), Tursoy et al. (2009)

CHAPTER II

SHARE ISSUANCE AND CROSS-SECTIONAL RETURNS:

TURKISH CASE

2.1. Introduction

Stock return prediction literature began with the capital asset pricing model (CAPM, Sharpe 1964, Lintner 1965), which was built on Markowitz's (1952) mean variance portfolio analysis. Fama-MacBeth (1973) test the standard CAPM using two-parameter portfolio models on New York Stock Exchange (NYSE) stocks and find that the CAPM's beta and stock returns have a linear relationship and beta is the complete risk measure. This study led the way with its methodology in empirical asset pricing and engendered a vast literature. The explanation of stock returns by predictive variables is well researched, starting with Banz (1981), who shows the size effect, i.e., stocks of firms with low market capitalization outperform those with high market capitalization. However, Berk (1995) argues that, theoretically, size effect is not an anomaly but rather the result of market equity being used as the size proxy. Other well-known predicting relationships are: the value effect (Basu 1984, Fama-French 1992, 1993), where stocks with high book-to-market ratios have higher average returns, and the momentum effect (Jegadeesh-Titman 1993), where past winners outperform past losers over a 3-12 month horizon.

Moreover, other variables, such as the dividend yield (Fama-French 1988), and earnings-price ratio, leverage, term and default spreads (Fama-French 1993) are all shown to be significant predictors of stock returns. The wide-ranging literature of stock market prediction is summarized in the literature review.

In the same vein, Loughran and Ritter (1995) and Ikenberry, Lakonishok and Vermaelen (1995) find that higher share issuance predicts lower returns and vice versa. Loughran and Vijh (1997), using 947 acquisitions from 1970 to 1989, argue that acquirers that complete stock mergers experience negative long-run excess returns. Further studies by Daniel and Titman (2006), Pontiff and Woodgate (2008) and Fama-French (2008a) show that this "share issuance" effect is robust to size, value and momentum factors, and it is observed in both developed and emerging markets with only slight variations. Hence, share issuance, being at the crossroads of asset pricing

and corporate finance literature, also seems to be an important predictor of stock returns.

The present study tests the predictive power of stock issuance on the Turkish stock market using a methodology similar to the one used by Pontiff and Woodgate (2008): First, the share issuance measure (*ISSUE*) is constructed by adjusting shares outstanding for distribution events such as stock splits and rights offerings. Then univariate regressions are estimated to test the stand-alone predictive power of independent variables: book-to-market (*BM*) market equity (*ME*), momentum (*MOM*), and share issuance (*ISSUE*). The dependent variable in the regressions is the stock return for holding periods of one month, three months and six months, as well as the annual stock return in the first and second year. The results of the univariate regressions show that the sign of the slope coefficients on *BM* and *ME* is consistent with prior literature; the slope coefficient on *MOM* is negative, which contradicts prior studies on developed markets but confirms research on Turkish market. In any case, to test the robustness of the results and to account for possible nonlinearities in the relation, ordinal ranking is utilized for the *MOM* factor.

ISSUE is not statistically significant in univariate regression. This is because, different from US markets, the share issuance on the BIST is driven by rights offerings rather than seasoned equity offerings and stock mergers. As mentioned before, rights offerings are different from seasoned equity offerings because the money raised has to be added to the capital whereas in seasoned equity offerings it can be added or taken by the shareholders offering the equity. Hence, the book value increases mechanically in case of rights offerings. Therefore, because the issuance measure in the study is dominated by rights issues, there is a strong positive correlation between *BM* and *ISSUE*, which is taken into account in Fama-MacBeth regressions. Hence, in univariate analysis, the negative relationship between share issuance and stock returns is offset by the positive relationship between rising book-to-market and stock returns.

However, when multivariate Fama-MacBeth regressions are estimated to test the statistical significance of *ISSUE* along with other well–known factors of *BM*, *ME* and *MOM*, the results suggest that the statistical significance of *ISSUE* is greater than that of size and momentum and that its predictive power is equivalent to *BM* in long horizons.

Moreover, when the time-series of slope coefficients on share issuance are examined, the average slope exhibits a remarkable tendency to be negative except in the very early years of the BIST. This result is comparable to what Pontiff and Woodgate (2008) find, as they show large variation in the slope on share issuance during the 1940s in US markets. However, this phenomenon may be caused by higher costs associated with capital structure decisions in the early years hindering market timing tendencies when these markets are set up.

Next, the robustness of the predictive power of share issuance is tested by employing non-parametric portfolio approach as in Fama-French (2008); for this, quintile portfolios are estimated according to the study's share issuance measure (*ISSUE*). There is no significant return difference of portfolio 5 (highest issuance) minus portfolio 1 (lowest issuance) in any holding period, confirming the results of univariate Fama-MacBeth regressions. Finally, to separate out the correlation of *BM* and *ISSUE*, stocks are sorted into portfolios according to the residual component of ISSUE versus *BM* regression, which facilitates obtaining the component of *ISSUE* that is orthogonal to the explanatory variable. When stocks are sorted into portfolios according to the residual component of the *ISSUE* versus *BM* regression, the Newey-West t-statistics of 5-1 difference, sorted residual portfolios exhibit a significant negative correlation with ISSUE and subsequent stock returns at the 95% level, which becomes stronger especially after six-months return horizons. The results from non-parametric portfolio analysis, confirming the results of multivariate Fama-MacBeth regressions, also suggest that share issuance exhibits a strong cross-sectional ability to predict stock returns on the BIST from the period 1992 to 2011.

Overall, these results may be interpreted as evidence that share issuance predicts cross-sectional returns, especially for longer return horizons. When considered jointly with widely acknowledged *BM*, *ME* and *MOM* factors, after three-month return regressions, annual *ISSUE* has a larger t-statistic than ME and *MOM*, and is similar to *BM* in terms of predictive power. For second-year annual returns, *ISSUE* is the strongest variable in the analysis in terms of statistical significance. The *MOM* effect is seen to be negative; however, this finding is consistent with prior literature on Turkish markets.

This paper is organized as follows: Section 2 explores the legal framework in Turkey, which has a very important influence on the capital structure decisions on the

BIST. Section 3 describes the data and variables used in the empirical analysis. Section 4 explains empirical results for univariate and multivariate settings along with univariate portfolio analysis. Section 5 concludes the paper.

2.2. Regulations & Right Offerings

2.2.1. Turkish Markets

The study begins with a thorough review of the regulatory framework of the capital markets. This is done since, as in the case of many other developing nations, share issuance and repurchase in Turkish markets were either costly or illegal until recently, thus hindering data availability. In Turkish markets, there are a few seasoned equity offerings. Generally rights offerings are utilized as the issuance method. Hence, the analysis begins by examining the regulatory and corporate governance frameworks of Turkish markets. Then these results are compared with those of developed markets such as the U.S., England, Germany and France. These markets are selected because of their sheer size and the significant differences between their levels of law enforcement, and shareholder ownership and protection. In particular, although the U.K. and U.S. markets can be considered to be similar, there are significant differences across Continental Europe countries, which are to be discussed. The study also focuses on rights offerings as it is the primary method of share issuance on the BIST.

For a long time, Turkish markets have been subject to a complicated legal system, where capital structure decisions are regulated by the old Turkish Trade Law number 6762 ("Turk Ticaret Kanunu"), which was put into effect in 29.06.1956. Since then, provisional changes have been made by communiqués and bylaws of the CMB and the BIST. According to Article 329 of the old Turkish Trade Law, companies cannot buy back their shares; however, there are exceptions (e.g., if a company has decided to diminish its capital or if its shares have been inherited by the acquisition of another firm). The article concerning share repurchases and its exceptions is provided below:

Article 329: *It is forbidden for a joint stock company to buy back its own shares in exchange for any consideration or accept pledges thereon. Transactions in violation of this prohibition shall be null and void. There are circumstances and exceptions to this prohibition. The exceptions are as follows:*

(i) the share buyback for the purpose of share capital (equity capital) reduction to boost leverage -any money paid to company to acquire share is returned to the shareholder and any relevant shares are cancelled leading to decreased number of shares and increased value for per share earning-,

(ii) for the purpose of hedging corporate debt with company receivables other than subscription (equity participation contract),

(iii) through total transfer of assets or an establishment;

(iv) in the event the ordinary scope of activity of the company is engaging in such buyback transactions,

(v) in the event the board members, directors or officers of the company pledge their shares as security for their obligations,

(vi) In the event such buyback is made free and not in exchange for any consideration. The shares bought back pursuant to one of these exceptions shall not be represented in the general assembly of the company.

There are other exceptions; for example, foreign owned firms do not have to follow the aforementioned law and special arrangements can also be made by public companies. Even with these exceptions, there are very few firms that employed buyback programs until recently, when the CMB and BIST have issued new principles concerning share repurchases in line with Trade Law number 6102, where the new share repurchase principles are regulated by article 379.[6] According to the CMB's Communiqué number 27/748 dated 01.09.2009, exchange traded investment trusts and brokerage houses are given the right to buy back their own shares. This was followed by Communiqué 26/767 dated 11.08.2011,[7] through which the CMB expands the aforementioned buy back principle to all of the publicly traded firms, declaring that share repurchase would protect the shareholders from the volatility in the stock markets both in Turkey and abroad, and would improve transparency in the markets.

"In this framework, self-regulation of Capital Markets Board (01.09.2009 and No.27/748) that states rules for investment companies and intermediary institutions regarding share buybacks is abolished and a new self-regulation

[6] Full text in is Appendix C.
[7] Full text of related communiqué is in Appendix C.

about the share buybacks came into force, parallel to regulations in new TCC.
By the regulation, principles and essences for companies whose shares are traded in Borsa Istanbul (BIST) regarding purchase of their own stocks in BIST are regulated and harmonization with new TCC is achieved. Under the regulation, the buyback ratio has been determined as 10% of company's paid in capital.
Especially against intense price fluctuations observed lately in world stock exchanges and BIST, it is aimed to provide opportunity to companies towards lessening price fluctuations in stock prices, and also provide a more transparent medium for the companies trading in their own shares and informing investors in a better way.“

According to the new CMB decision, all BIST-listed companies may employ share repurchase programs but a board decision and subsequent approval from the general shareholder's meeting is required.

“By the regulation, principles and essences for companies whose shares are traded in Borsa Istanbul (BIST) regarding purchase of their own stocks in BIST are regulated as below:
a) Buyback transactions are to be performed by the board in the maximum period of 18 months by the share repurchase program approved by the board of directors.

Furthermore, only previously traded shares can be repurchased through the BIST; no “block trades,” which are done by special arrangement between buyer and seller, parties are allowed. The amount of repurchased shares is limited to 10% of the shares outstanding; any additional shares must be resold in the market within six months:

“b) The shares that are to be repurchased must be quoted in BIST and all transactions should be passed thorough BIST.
c) Under the regulation, the buyback ratio cannot be more than 10% of company's paid in capital. If this limit is breached these shares must be sold in the maximum period of 6 months.

Aside from the aforementioned rules, there are important limitations on how a company can apply the repurchase program to avoid affecting the share price in a manipulative manner, which can harm investors: No orders can be executed in the market in the last 15 minutes of trading for both sessions; no orders can be executed in

the first 15 minutes of afternoon session. The price of the repurchase order cannot exceed the last executed price, and the ask price and the amount of repurchased shares in one day cannot be higher than 25% of the previous three months' average volume:

> *d) In addition to the regulations of Borsa Istanbul (BIST) regarding purchase of their own stocks in BIST, other rules that must be followed are below:*
> *i. Buyback orders cannot be given in the first 15 minutes of the first session, and the first and last 15 minutes of second session.*
> *ii. The price of buyback order cannot exceed current price of buy orders or the last executed sell price.*
> *iii. The total amount of repurchased shares in one day cannot exceed the %25 of the average daily volume of the share in the last three months."*

Aside from the new share repurchase regulations, CMB also issued new measures for IPO's and SEO's, with Communiqué number 66 dated 03.04.2010 the prerequisites for entering the capital markets were relaxed for both equity and fixed income markets. While most of the articles remained the same, the CMB has amended the requirement of having three consecutive years of net profit to one year. The CMB also introduced new incentives in collaboration with the BIST, Association of Capital Market Intermediary Institutions of Turkey (TSPAKB) and Small and Medium Enterprises Development Organization (KOSGEB) in 04.02.2011, for small and medium sized firms to enter to the equity market for developing firms (Gelisen İsletmeler Piyasasi, GIP). With this incentive, up to 100,000 TL, which covers almost all the costs of IPOs, is granted by KOSGEB (Turkish Authority for Small and Medium sized Firms) to the member firms. In order to be qualified as a "small and medium sized firm" the total sales in one accounting year must be below 25 million TL.[8]

> *"According to the collaboration protocol signed on 04.02.2011 between CMB, KOSGEB, BIST and TSPAKB, an "Emerging Companies Market SME support program" established by KOSGEB to fund the Initial Public Offering costs for the companies that apply to be listed in Emerging Companies Market.*
>
> *"Emerging Companies Market SME support program" established by KOSGEB will fund maximum of 100,000 TL non-recourse grant according to the table below."*

[8] Please look at http://www.halkaarzseferberligi.com for further information.

In short, with the development of Turkish markets especially after the crisis period of 2008, Turkish legislators have begun taking new initiatives to ease both share issues and repurchases. Aside from the regulation changes that are stated above, the CMB and BIST have taken a liberal approach to simplifying the bureaucracy and speeding up the application process. These improvements seem to have been successful since more firms are applying for IPOs and SEOs. However, it must be noted that there are only a few share repurchase observations in our data set, because of the novelty of its application and it will be an interesting future work to repeat our research with a new data set that contains numerous repurchase events.

2.2.2. Developed Markets

The previous section provided information about the recent amendments in the legal framework of Turkish markets with regard to share issuance and repurchase events. This section we investigate the regulations of the developed markets, namely the US, the UK, France and Germany to determine where the BIST stands in terms of regulations and corporate governance frameworks. While the importance of share repurchases is growing around the world, most of the research focuses on US markets. The reason behind this is that the share repurchases are rare even in developed European markets because of different regulatory and cultural structures of each market. For example, while the UK and the US are common law countries, France and Germany are civil law countries. Moreover, the majority of United Kingdom firms have a diluted shareholder structure, whereas in France and Germany firms have more concentrated ownership structures. In Germany, firms have a lower level of ownership concentration and banks have significant voting power over a wide range of industries because shareholders sign over their voting rights to banks that manage the stock accounts. On the other hand, in France, many firms are owned by families or the state.

In the UK, even though share repurchases have been legal since 1981, they have become popular in recent years due to the ambiguity of tax treatment. They may also be signaling a shortage of profitable investments. In France, under the July 2, 1998 law, open market share repurchases can be authorized by the firm's shareholders for up to the limit of 10% of a firm's capital and can extend for a maximum period of 18 months.

For each 24-month period, shares representing 10% of a firm's capital can be cancelled or be kept as treasury stock, which is subject to shareholder authorization. In Germany, prior to the legislation passed on May 1, 1998, share repurchases were illegal since they were perceived as being a prohibited repayment of capital and it was only for extraordinary and individual cases that share repurchases were permitted. But the amendment of the legislation, which is based on the European Second Law Directive, paved the way for repurchasing activities by companies in Germany. Likewise, in France, in 1998, companies were granted permission to repurchase their stock and cancel them or keep them as Treasury stock. However, in the United Kingdom, it was only after December of 2003 that repurchased shares could be treated as Treasury stock.

In U.S markets, share repurchases are regulated by the SEC safe harbor Rule 10b-18, which was adopted under Sections 9(a) (2) and 10(b) of the Securities Exchange Act of 1934 and Rule 10b-5 under the Exchange Act. When an issuer or its affiliated purchaser bids for or purchases shares of the issuer's common stock in accordance with Rule 10b-18, the manner, timing, price, and volume conditions are as follows:

- One Broker-dealer per Day: The company repurchasing shares may not use more than one broker or dealer to acquire the shares per each day.
- Timing of Purchase: A repurchase may not be the first trade of the day. Repurchases cannot be made in the last 10 minutes of the trading day, or 30 minutes if the company's ADTV is less than $1 million and has a public float of less than $150 million. These rules do not apply to over-the-counter securities, which are not traded on the NYSE or NASDAQ.
- Purchase Price: A repurchase may not be bid at a price higher than the highest independent bid or last price of the last trade.
- Volume: Repurchases per day may not exceed 25% of the average daily volume of the previous 4 calendar weeks. Block purchases not executed by a broker-dealer are excluded from this restriction.

On November 10, 2003, the Commission amended Rule 10b-18 in order to simplify and update the safe harbor provisions in light of market developments since the adoption of Rule 10b-18. Among other things, the amendments allow issuers of actively traded securities to stay in the market longer at the end of the trading day, extend the safe harbor to certain after-hours repurchases, apply a uniform pricing condition for all

issuers, increase the volume limit following a market-wide trading suspension, modify the block exception, and clarify the scope of the safe harbor with regard to mergers, acquisitions, and similar transactions.

In short, share repurchases have been regulated for a long time in U.S markets and many firms employ share repurchase programs. Another important observation is that the utilization of open market repurchases has also risen dramatically in recent years. (Ikenberry, Lakonishok and Vermaelen (1995), Allen and Michaely (2003))

2.2.3. Rights Offerings

As mentioned above, in Turkish markets, the capital structure changes occur mostly via rights offerings because of regulatory difficulties. This section examines rights issues in Turkey in more detail: A rights issue is an issue of additional shares by a company to raise capital. It is a special form of shelf offering or shelf registration. With the issued rights, existing shareholders have the privilege of buying a specified number of new shares from the firm at a specified price within a specific period time. In rights issue, in contrast to stock split, new cash enters the firm. For example, assume that company X has paid in capital of 100 million TL, book value of 250 million TL, and market capitalization of 500 million TL. In this case, company X's share price is 500/100 = 5 TL. Now assume that there is a 50% rights issue with a price of 3 TL per share. In this case, the new paid in capital is 150 million TL and the book value becomes 250 + (3x50) = 400 million TL.

If he uses his pre-emptive right, an investor who has 100 shares of company X can buy 50 additional shares by paying 150 TL and own 150 shares. The new price per share is (5.00 x 100 + 3.00 x 50)/150 = 4.33 TL. The value of the pre-emptive rights should be 4.33 – 3.00 = 1.33 TL in the absence of arbitrage.

The new market capitalization of company X is 4.33 x 150 = 650 million TL.

2.2.4. Rights Issue price

New shares can be issued at any price; however, if the firm intends to issue at a price different from the market price or nominal price, the CMB should be consulted:

> *"**ARTICLE 27** - (1) In case the sale price is set at a margin from the stock exchange price or the nominal value, the valuation report on the sale price in question as well as the methods utilized to calculate that price shall be published at latest by 2 business days prior to the commencement of the sale, and under the same terms as those with the circulars. The abovementioned valuation report shall be prepared by the financial intermediary in case of initial public offerings."*

Generally, the new shares are issued from a nominal price of 1 TL with very few exceptions.

2.2.5. Rights issues versus seasoned equity offerings in Borsa Istanbul

In rights offerings, the pre-emptive rights of the current shareholders can be restricted so the new shares are only issued to new investors. However, rights offerings are still different from seasoned equity offerings because the money raised has to be added to the capital whereas in seasoned equity offerings they can be added or taken by the shareholders that offer the equity. Moreover, the free float of the company changes in seasoned equity offerings while in rights offerings it stays the same, provided that pre-emptive rights are not restricted.

For the Turkish markets, seasoned equity offerings are very rare; they are only used by state-owned enterprises because in right offerings these public companies also must allocate new capital. The regulations are slightly different for rights issues and seasoned equity offerings. Communiqué number 40, dated 04/03/2010, states:

> ***"Public offerings through capital contributions at publicly held corporations***
> ***ARTICLE 7** - (1) The following procedures shall be carried out prior to the application to the Board for the capital contributions regarding publicly held corporations.*
> *a) In the authorized capital system, the board of directors shall pass a resolution establishing the amount of and the principles governing the capital contribution.*

b) In the declared capital system, an amendment draft shall be prepared for the amendment of the articles of incorporation regulating the capital, and following the approval of the amendment by the Board, the general assembly shall pass a resolution to carry out the capital contribution. In case the general assembly meeting has on agenda the issue of partial or complete restriction of the entitlements to new shares, the board of directors shall be under obligation to notify the shareholders about the grounds of such restrictions.
c) In case of opting to restrict the entitlement to new shares partly or completely, this issue should be stated clearly in the capital contribution resolution by the authorized board of directors in the authorized capital system and in the capital contribution resolution by the general assembly in the declared capital system. In the authorized capital system, the resolution of the board of directors restricting the entitlement to new shares shall be registered in the Trade Registry, and announced in the TTSG within 5 days of the date of resolution, in accordance with the regulations by the Board concerning the authorized capital system.
(2) After the completion of these proceedings, the application to the Board shall be made for the registration of the shares with a petition and documents listed in annex 3 of the Communiqué.
(3) In case of companies listed in the ECM, the application to the Board shall be made for the registration of the shares to be issued, with a petition and documents listed in annex 4 of the present Communiqué.

Proceedings to be carried out to enable the shares to be sold in the stock exchange as trading shares[9]

ARTICLE 8 *- (1)* ***(Amended first paragraph: As amended in Communiqué Series: I, Nr.: 43)*** *For corporations of which shares are traded in the stock exchange, those shares registered with the Board, but not traded in the stock exchange become trading shares and can be sold in the stock exchange through an application by CRI member financial intermediaries on the basis of the principles established by CRI and after the Board registration fee is deposited in the account determined by the Board.*
(2) Board registration fee shall be calculated on the basis of the difference between the nominal value of the shares and the price to occur in the stock exchange in the end of the second session on the date of the approval by the financial intermediary.
(3) CRI shall announce the amount of shares specified for sale, as well as the names and titles of the applicants as a whole, on a daily basis, making use of the KAP. Furthermore, it notifies the Board in writing within the 5 business days following each month.

[9] The title of Article 8 has been amended in Communiqué Series: I, Nr.: 43.

(4) ***(Amended fourth paragraph: As amended in Communiqué Series: I, Nr: 43)***
Unless stated otherwise by the Board, the sale of the shares shall be allowed 3 days after the announcement regarding the sale. This period shall not be applied to the share sales carried out by the Privatization Administration.
(5) Without prejudice to the provisions regarding official auctions, in case the nonpublicly traded shares of the publicly traded companies are intended to be offered to the public through any public offering, it is required to apply to the Board with the documents listed in annex 2 of the present Communiqué.
(6) ***(Added: As added in Communiqué Series: I, Nr.: 43)*** *For corporations listed in ECM, those shares which are not traded in ECM, shall not be qualified as trading shares in the stock exchange.*
(7) ***(Added: As added in Communiqué Series: I, Nr: 43)*** *this article shall not be applied for wholesales carried out at the relevant market of the stock exchange. However, in case of opting to qualify non-trading shares subject to wholesale as trading shares in the stock exchange, only the fourth paragraph of this Article shall not apply. In this case, shares shall be qualified as trading shares in the stock exchange at the time the wholesale carried out."*

2.2.6. Rights Issue versus Bonus Issues in Turkish Market

Bonus issues are the type of issues where companies use to raise equity capital without requiring any payment to be made by existing shareholders. Shares issues for this transaction are free shares. In Turkey, bonus issues are typically financed by using internal resources and stock dividends. The method of internal resources refers to the capital gain from selling firm's assets, buildings, equipment, or other real estates. On the other hand, a stock dividend, perceived by investors as "splits," is an offer of additional shares of stocks to shareholders in proportion to their current stocks rather than cash.

2.3. Data & Methodology

For the present study monthly stock returns, book-to-market, market equity, and shares outstanding data for stocks quoted on the BIST were obtained from STOCKGROUND[10] and Matriks[11] databases for the period 10/1991 -07/2011. The share issuance measure is estimated as in Pontiff and Woodgate (2008); the number of shares outstanding is obtained from the STOCKGROUND database, and the number of real shares outstanding is computed. This adjusts for distribution events such as splits and right offerings as follows. First, the adjustment factor for each stock and time period is computed as follows:

$$f_i = \frac{(1 + \frac{SI_i^{RO}}{SO_i} + \frac{SI_i^{SP}}{SO_i})}{(1 + \frac{P_i^{RO}}{P_i} x \frac{SI_i^{RO}}{SO_i})} \quad (1)$$

Where f_i is the adjustment factor in period i, SI_i^{RO} is the number of shares issued via right offering, SO_i is the number of shares outstanding, SI_i^{SP} is the number of shares issued via splits, P_i^{RO} is the price of the shares issued via right offering and $P_i$is the prices of the old shares.

Then, a total factor at time t is calculated; this represents the cumulative product of the adjustment factors computed as above up to period t inclusive:

[10] STOCKGROUND is financial analysis software with advanced fundamental and technical analysis capabilities designed by Rasyonet Inc. Rasyonet is a software solution provider to brokerage houses, commercial banks and portfolio management firms operating in capital markets. Since 2005, Rasyonet has been operating at Teknopark premises of Istanbul Technical University and its projects are supported by TUBITAK.

[11] Matriks Bilgi Dağitim Hizmetleri A.Ş. (“Matriks”) was established in August 2003. It has been serving as a “Licensed Data Dissemination Company” since January 2004, upon receiving a Buyer’s License from Borsa Istanbul. Matriks extracts information from data on Turkish and global capital markets and provides such information to individual and institutional clients, using every possible medium. Matriks develops individualized software solutions to meet the varying needs of professional and amateur clients for data dissemination, data feeds and analysis tools.

$$TotalFactor_t = \prod_{i=1}^{t}(1 + f_i) \quad (2)$$

The number of shares outstanding adjusted for splits and offerings are computed as:

$$AdjustedSharesOut_t = SharesOutstanding_t / TotalFactor_t \quad (3)$$

This measure of adjusted shares outstanding is then utilized to compute the share issuance at time *t* as:

$$ISSUE_{t-6,t-18} = Ln(AdjustedSharesOut_{t-6}) - Ln(AdjustedSharesOut_{t-18}) \quad (4)$$

This measure is the same variable used by Pontiff and Woodgate.[12] Moreover, annual horizon has been chosen because this frequency is consistent with the market capitalization and book value measures used in the study. The book-to-market, along with market equity, is readily available in STOCKGROUND. The natural logarithm of these values is used; if the book value of equity is unavailable or negative, it is assigned a value of zero. The momentum proxy is the six-month holding period return of the stock between month 1 and month 6. The momentum variable is lagged by one month to avoid losing predictive ability due to positive autocorrelation attributable to the bid-ask bounce.

In the same vein as Fama and MacBeth (1973), separate univariate regressions are estimated for the data of each month using returns as the dependent variable.

$$R_{i,t+n} = \alpha_{i,t} + \beta_i^{ME} ME + \varepsilon_{i,t+n}$$
$$R_{i,t+n} = \alpha_{i,t} + \beta_i^{BM} BM + \varepsilon_{i,t+n}$$
$$R_{i,t+n} = \alpha_{i,t} + \beta_i^{MOM} MOM + \varepsilon_{i,t+n}$$
$$R_{i,t+n} = \alpha_{i,t} + \beta_i^{ISSUE} ISSUE_{t-6,\,t-18} + \varepsilon_{i,t+n}$$

For *n*= 1 month, 3 months and 6 months, first and second year. (5)

Then we estimate multivariate regressions using all the factors to test the statistical power of share issuance controlling for value, size and momentum factors.

[12] $ISSUE_{t-6,\ t-18}$ used in order to be consistent with Pontiff and Woodgate's (2008) timeframe for share issuance. $ISSUE_{t,\ t-12}$ is also used as a robustness check. The results, which are available upon request, are similar.

$$R_{i,t+n} = \alpha_{i,t} + \beta_i^{ME}\,\mathrm{ME} + \beta_i^{BM}\,BM + \beta_i^{MOM}\,\mathrm{MOM} + \beta_i^{ISSUE}\,\mathrm{ISSUE}_{t\text{-}6,\,t\text{-}18} + \varepsilon_{i,t+n}$$

For n= 1 month, 3 months and 6 months, first and second year. (6)

Where $R_{i,t+n}$ is the return on stock i for holding periods of *n* months after year *t*, *ME* is the natural logarithm of market equity one year ago; *BM* is the natural logarithm of the ratio of book value of equity to the market equity one year ago; *MOM* is the natural logarithm of the returns of the past six months returns, lagged one month; $ISSUE_{t\text{-}6,t\text{-}18}$ is estimated from Eq. (4). Since the initial results are contradictory to previous work on developed markets, as a robustness check, ordinal ranking for momentum factor is utilized.

The average slope coefficients, intercepts, and adjusted-R^2s are reported. The dependent variable in the regressions is the stock returns for holding periods of one, three and six months, as well as the stock returns in the first and second year. The regressions estimate linear relations between returns and the independent variables. Using the same procedure as in Pontiff (1996), t-statistics for the slope coefficients are calculated with autocorrelation-consistent standard errors that consider the holding period overlap. This procedure estimates a regression using each month's slope estimate where the residuals of the process follow n^{th} order autoregressive process with n equal to one minus the length of the holding period (in months). This technique is general in that it does not rely on the assumption of no monthly return autocorrelation.

We analyze the time-series of the slope coefficients to see the effects of the crisis periods and business cycles on the predictive power of the share issuance. These results also provide valuable insight into the motives behind the capital structure decisions of the firms in Turkish stock market.

Panel A&B of Table I presents univariate statistics for the variables used in the study. In Panel A, first panel data statistics are computed and then in Panel B, these statistics are calculated on a monthly basis and then averaged over the entire period. Of particular interest in the study is share issuance. Despite the fact that log changes are being examined, this variable exhibits slight right skewness; for Panel A the mean value of 0.14 is greater than the median value of 0.11. For Panel B skewness is more pronounced, with the mean value of 0.19 greater than the median value of 0.11.

Panel C of Table I describes the correlation structure of the sample (1992 to 2011) data. The negative correlation between share issuance and stock returns (for all holding periods) is a precursor to the conclusions: share issuance predicts returns. While the correlations for most of the variables are very small, there is an exceptionally large correlation of 0.70 between *BM* and *ISSUE* variables, which is not seen in US markets. The reason behind this is that contrary to US markets, seasoned equity offerings are very rare on the BIST and the share issuance measure is driven mainly by rights offerings. As mentioned before, rights offerings are different from seasoned equity offerings because the money raised has to be added to the capital whereas in seasoned equity offerings they can be added or taken by the shareholders that offers the equity. Hence, the book value increases mechanically in case of rights offerings and since the issuance measure in this study is dominated by rights issues, there is a strong positive correlation between *BM* and *ISSUE*, which is taken into account in Fama-MacBeth regressions.

Table I
Descriptive Statistics, 1992 – 2011

Panel A&B: Simple Statistics: The variables used are: the natural logarithm of the ratio of the book value of equity to the market value of equity measured at the end of December *t−1*, *BM*; the natural logarithm of market equity measured at the end of the previous June, *ME*; the past 6 months stock return as a proxy for momentum, *MOM*; the change in the logarithm of the number of shares outstanding adjusted for splits to capture the effect of share repurchases and SEOs or rights offerings; $ISSUE_{-18,-6}$ = [Log(shares outstanding, *t-6*) – Log(shares outstanding, *t*−18)]; and stock returns for holding periods of 1 month, 3 months and 6 months, as well as the stock returns in the first and second year. Panel C: Correlations: Correlations between the variables defines in Panel A&B, that is $ISSUE_{-18,-6}$, *BM, ME, MOM* and return variables.

PANEL A: Panel data statistics

Variable	Minimum	25th Percentile	Median	75th Percentile	Maximum	Mean	Standard dev.	Skewness	Kurtosis
R_1	-0.75	-0.07	0.01	0.12	8.87	0.04	0.23	3.87	71.64
R_3	-0.87	-0.11	0.05	0.28	24.99	0.15	0.50	5.99	149.59
R_6	-0.91	-0.13	0.12	0.49	41.61	0.31	0.89	8.15	212.53
R_{12}	-0.94	-0.12	0.28	0.96	80.99	0.72	1.79	9.81	256.35
R_{24}	-0.94	-0.12	0.27	0.94	80.99	0.70	1.76	10.25	275.57
BM	-13.71	-0.92	-0.31	0.19	3.38	-0.44	1.22	-4.43	38.96
ME	8.49	15.66	17.15	18.77	24.15	17.16	2.48	-0.18	3.26
MOM	-0.91	-0.13	0.12	0.49	41.61	0.31	0.89	8.15	212.53
ISSUE	-10.56	0.02	0.11	0.32	2.64	0.14	0.61	-6.48	71.98

PANEL B: The average of cross-sectional statistics

Variable	Minimum	25th Percentile	Median	75th Percentile	Maximum	Mean	Standard dev.	Skewness	Kurtosis
R_1	-0.12	0.06	0.25	0.55	1.81	0.36	0.38	1.32	4.62
R_3	-0.38	0.15	0.41	0.93	4.33	0.65	0.80	2.12	8.58
R_6	-0.57	-0.15	0.09	0.45	7.03	0.25	0.82	5.77	47.33
R_{12}	-0.35	0.85	1.60	3.42	12.89	2.45	2.51	2.13	8.31
R_{24}	-0.45	0.39	1.18	2.12	11.57	1.62	1.91	2.48	11.25
BM	-12.90	-1.25	-0.49	-0.09	1.18	-0.79	1.73	-4.93	32.78
ME	8.57	10.92	12.30	13.22	16.13	12.13	1.67	0.03	2.45
MOM	-0.57	-0.15	0.09	0.45	7.03	0.25	0.82	5.77	47.33
ISSUE	0.01	0.03	0.11	0.31	0.81	0.19	0.20	1.53	4.85

PANEL C: Correlation matrix									
Variable	R_1	R_3	R_6	R_{12}	R_{24}	*BM*	*ME*	*MOM*	*ISSUE*
R_1	1.00								
R_3	0.54	1.00							
R_6	0.34	0.64	1.00						
R_{12}	0.22	0.40	0.58	1.00					
R_{24}	-0.03	-0.03	-0.03	-0.07	1.00				
BM	0.01	0.02	0.03	0.00	-0.03	1.00			
ME	-0.10	-0.17	-0.19	-0.24	-0.22	-0.03	1.00		
MOM	-0.02	-0.03	-0.01	-0.07	0.05	0.06	-0.16	1.00	
ISSUE	0.00	-0.01	-0.02	-0.04	0.01	0.70	-0.04	-0.01	1.00

2.4. Estimation Results

2.4.1. Fama-MacBeth Cross-Sectional Regressions

The test of return predictability in the 1992 to 2011 period is presented in Table II. Five return holding periods are considered: one, three and six-month, annual and second-year annual returns. Panel A presents the one-month estimation results. The first four rows present a "horse race" by considering separate estimation for *BM ME*, and *MOM*; then the fourth row is for the multivariate regression for BM, ME and MOM. For momentum, first, the returns of the last six months lagged one month are utilized. However, while the signs of the slope coefficients on BM and *ME* are consistent with prior literature, the slope coefficient on *MOM* is negative, which contradicts prior studies conducted on US markets. To test the robustness of these results, and to account for possible nonlinearities in the relation, ordinal ranking is utilized for the momentum factor:[13] For each month, stocks are divided into 5 groups according to their momentum. For stocks in the lowest 20% percentile, the momentum is set to equal to 1; for stocks in the 20-40% percentile interval, the momentum is set to equal to 2, and so on.

Panel A of Table II reports the average intercepts and slope coefficients from the Fama-MacBeth cross-sectional regressions of one-month holding period returns. The slope coefficient on *BM* is 0.02 with a Newey-West t-statistic of 1.90; however, it is not as strong as the size effect and has a slope coefficient of -0.00 with a Newey-West t-statistic of -2.86. Contrary to studies on developed markets, the slope coefficient on MOM is negative and statistically significant with a Newey-West t-statistic of -3.01. One important point is that several prior studies on Turkish markets also find that momentum effect does not hold for the BIST.[14]

Looking into Table II in more detail, one interesting observation is the insignificance of *ISSUE* in univariate settings; the slope coefficient on ISSUE is 0.00 with a Newey-West t-statistic of 0.28. This is caused by the mechanical relation

[13] Results with original momentum factor which are consistent with Table II are reported in Appendix A.

[14] Please see literature review, Bildik and Gulay (2007), Kandir and Inan (2011) and Unlu (2011) for further information.

between right offerings and book value that is mentioned above, i.e., the negative relationship between share issuance and stock returns is offset by the positive relationship between rising book-to-market and stock returns. *BM*, *ME* and *MOM* are all statistically significant in univariate settings; however, the predictive power of *BM* diminishes when these variables are utilized together in a multivariate setting. The negative *MOM* is strongest in univariate settings for short-term return periods. While *BM* is weaker than expected in short term, its predictive power peaks at the six-month holding period. The last row considers the multivariate setting with all the variables. For one-month returns, *BM* and *MOM* are statistically significant with the latter being the stronger of the two. *ISSUE* is stronger than *ME* but has no predictive power for one-month returns.

For three-month holding period regressions, the slope coefficient on *BM* is 0.01 with a Newey-West t-statistic of 2.02; the slope coefficient on *ME* is -0.02 with a Newey-West t-statistic of -3.31. The slope coefficient on *MOM* remains negative and statistically significant with a Newey-West t-statistic of -3.27. While the results of three-month holding period regressions are consistent with Panel A of Table II, it is important to note that the predictive power of the issuance increase significantly in the multivariate setting with a slope coefficient of -0.04 and a t-statistic of -2.01. *BM* also exhibits significance at the 90% level of significance.

Panel C of Table II reports the average intercepts and slope coefficients from the Fama-MacBeth cross-sectional regressions of holding period returns for the past six months. In the univariate setting, the slope coefficient on *BM* is 0.02 with a Newey-West t-statistic of 2.31; the slope coefficient on *ME* is -0.03 with a Newey-West t-statistic of -3.47; and the slope coefficient on *MOM* is -0.03 with a Newey-West t-statistic of -2.69. In the multivariate setting, all variables exhibit significance at the 95% level: the slope coefficient on *BM* is 0.04 with a Newey-West t-statistic of 2.01; the slope coefficient on *ME* is -0.02 with a Newey-West t-statistic of -2.00; the slope coefficient on *MOM* is -0.03 with a Newey-West t-statistic of -2.79; and the slope coefficient on *ISSUE* is -0.12 with a Newey-West t-statistic of -2.55. Another notable point is that the addition of *ISSUE* to the multivariate setting of *BM*, *ME* and *MOM* significantly enhances the average adjusted R^2 from 4.30% to 7.77%.

It important to note that in longer horizons, the predictive power of *BM* and *ISSUE* increases, and the statistical significance of *ME* and *MOM* diminishes. For annual regressions, in multivariate setting, *ME* and *MOM* are no longer significant while *BM* and *ISSUE* exhibit significance at the 95% level: the slope coefficient on *BM* is 0.08 with a Newey-West t-statistic of 2.21; the slope coefficient on *ME* is -0.04 with a Newey-West t-statistic of -1.50; the slope coefficient on MOM is -0.04 with a Newey-West t-statistic of -1.51; and the slope coefficient on *ISSUE* is -0.20 with a Newey-West t-statistic of -2.16. For second-year annual returns, the slope coefficient on *BM* is 0.10 with a Newey-West t-statistic of 2.00 and the slope coefficient on *ISSUE* is -0.34 with a Newey-West t-statistic of -4.01. While *BM* and *ISSUE* exhibit significance, *ME* and *MOM* show no significance. It is important to note that *ISSUE* has a t-statistic of -4.01, which is stronger than *BM*, *ME* and *MOM*.

Overall, we interpret these results as evidence that share issuance predicts cross-sectional returns, especially for longer return horizons. When considered jointly with widely acknowledged *BM*, *ME* and *MOM* factors, after three-month return regressions, *ISSUE* has larger t-statistic than *ME* and *MOM*, and is similar to *BM* in terms of predictive power. For second-year annual returns, *ISSUE* is the strongest variable in the analysis in terms of statistical significance. The *MOM* effect is negative; however, this finding is consistent with prior literature on Turkish markets. As mentioned above, *ISSUE* is not significant in the univariate setting because of its high correlation to *BM*, i.e., the negative relationship between *ISSUE* and stock returns is offset by the positive relationship between rising *BM* and stock returns. This result occurs because, unlike the process in U.S. markets, share issuance in Turkish markets is driven by rights offerings rather than seasoned equity offerings.

The contradictory results for issuance in univariate and multivariate settings can be explained from a risk perspective as well: It is known that stocks with high book-to-market ratios have high expected returns because they are considered high-risk and vice versa. At the same time, when a company issues new shares, it is considered as low risk because of the mechanical decrease of its debt ratio. In the present study, when new issuance occurs in the form of rights offerings, the share issuance measure increases along with the book-to-market ratio because the money raised has to be added to the capital. Therefore, while the increase in share issuance predicts a low return, the mechanical increase in the book-to-market neutralizes the issuance effect by implying

higher future returns. Hence, while in the univariate setting, the slope coefficient of issuance is not significant, it exhibits high significance in the multivariate setting when *BM* is held constant.

Table II
Fama-MacBeth Cross-Sectional Regressions with Ordinal Ranking for *MOM*, 1992 - 2011

Fama–MacBeth cross-sectional regressions results are computed for stock returns of various holding periods (each panel gives the appropriate holding period) on the following variables: the natural logarithm of the ratio of the book value of equity to the market value of equity measured at the end of December *t-1*, *BM*; the natural logarithm of market equity measured at the end of June, *ME*; ordinal ranking method is used for momentum, *MOM*; and the change in the logarithm of the number of shares outstanding adjusted for splits to capture the effect of share repurchases and SEOs. *ISSUE*= [Log(shares outstanding, *t*−6)–Log(shares outstanding, *t*−18)]. The number of holding periods in months minus one is used as the lag in Newey-West t-statistics as specified in Pontiff (1996).Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level.

PANEL A: Dependent variable is the 1 month stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.05	0.02				
(5.45)**	(1.90)*				0.84
0.11		0.00			
(4.68)**		(-2.86)**			2.10
0.06			0.00		
(5.74)**			(-3.01)**		1.01
0.12	0.00	0.00	0.00		
(5.03)**	(1.20)	(-2.85)**	(-2.72)**		3.71
0.05				0.00	
(4.90)**				(0.28)	1.23
0.08	0.01	0.00	-0.01	-0.01	
(2.76)**	(1.80)*	(-0.67)	(-2.91)**	(-1.20)	6.57
PANEL B: Dependent variable is the 3 month stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.18	0.01				
(5.29)**	(2.02)**				1.45
0.41		-0.02			
(4.54)**		(-3.31)**			2.09
0.22			-0.01		
(5.42)**			(-3.27)**		1.14
0.44	0.01	-0.02	-0.01		
(4.95)**	(1.49)	(-3.52)**	(-2.83)**		4.30
0.16				0.01	
(4.78)**				(0.47)	1.86
0.36	0.01	-0.01	-0.01	-0.04	
(3.60)**	(1.93)*	(-2.17)**	(-2.78)**	(-2.01)**	7.77

PANEL C: Dependent variable is the 6 month stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.40	0.02				
(5.49)**	(2.31)**				1.65
0.89		-0.03			
(4.66)**		(-3.47)**			1.95
0.47			-0.03		
(4.82)**			(-2.69)**		1.24
0.93	0.02	-0.03	-0.02		
(4.37)**	(1.82)*	(-3.18)**	(-2.57)**		4.44
0.32				0.01	
(4.64)**				(0.44)	1.20
0.77	0.04	-0.02	-0.03	-0.12	
(3.33)**	(2.01)**	(-2.00)**	(-2.79)**	(-2.55)**	7.51
PANEL D: Dependent variable is the one-year stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.93	0.05				
(4.83)**	(1.66)*				2.06
2.05		-0.08			
(4.27)**		(-3.14)**			1.81
1.15			-0.07		
(4.08)**			(-2.66)**		0.99
2.08	0.03	-0.07	-0.06		
(3.62)**	(1.14)	(-2.60)**	(-2.71)**		4.24
0.68				0.08	
(4.39)**				(0.82)	0.55
1.44	0.08	-0.04	-0.04	-0.20	
(2.70)**	(2.21)**	(-1.50)	(-1.51)	(-2.16)**	6.02
PANEL E: Dependent variable is the second-year stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.81	0.03				
(4.97)**	(1.02)				1.78
1.66		-0.05			
(3.91)**		(-2.44)**			1.24
0.87			-0.02		
(4.35)**			(-2.07)**		0.27
1.46	0.01	-0.04	-0.02		
(3.18)**	(0.39)	(-1.69)*	(-1.75)*		3.05
0.72				-0.03	
(4.16)**				(-0.20)	0.56
1.05	0.10	-0.01	-0.03	-0.34	
(1.88)*	(2.00)**	(-0.49)	(-1.51)	(-4.01)**	4.46

2.4.2. Fama-MacBeth Cross-Sectional Regressions with SEOs and Share Repurchases Removed

It is important to note that share issuance in Turkish markets is driven by rights offerings rather than seasoned equity offerings. For this reason, in this section, seasoned equity offerings and share repurchases are removed; only rights offerings are considered as the issuance events. In addition, the Fama-MacBeth regression over the 1992 to 2011 sample is reestimated. The results from this estimation are presented in Table III.

Panel A of Table III reports the average intercepts and slope coefficients derived by the Fama-MacBeth cross-sectional regressions of one-month holding period returns. In the multivariate setting, the slope coefficient on *BM* is 0.00 with a Newey-West t-statistic of 1.29; the slope coefficient on *ME* is -0.00 with a Newey-West t-statistic of -0.87; and the slope coefficient on *MOM* is -0.00 with a Newey-West t-statistic of -2.56. For one-month returns, only *MOM* exhibits statistical significance at the 95% level; the slope coefficient on *ISSUE* is -0.01 with a Newey-West t-statistic of -0.70.

Analyzing Fama-MacBeth regressions with SEOs and share repurchases removed in more detail, the results are consistent with Table II; For three-month returns, the slope coefficient on *BM* is 0.01 with a Newey-West t-statistic of 1.87; the slope coefficient on *ME* is -0.01 with a Newey-West t-statistic of -1.96; the slope coefficient on *MOM* is -0.01 with a Newey-West t-statistic of -1.99; and the slope coefficient on *ISSUE* is -0.04 with a Newey-West t-statistic of -1.59. For six-month returns, the slope coefficient on *BM* is 0.01 with a Newey-West t-statistic of 1.87; the slope coefficient on *ME* is -0.01 with a Newey-West t-statistic of -1.96; the slope coefficient on *MOM* is -0.01 with a Newey-West t-statistic of -1.99; and the slope coefficient on *ISSUE* is -0.04 with a Newey-West t-statistic of -1.59.

Panel D of Table III presents the average intercepts and slope coefficients from the Fama-MacBeth cross-sectional regressions of annual returns. Confirming the study's previous results, in the multivariate setting, *ME* and *MOM* are no longer significant while *BM* and share issuance (*ISSUE*) are significant at the 95% level: the slope coefficient on *BM* is 0.08 with a Newey-West t-statistic of 2.33; the slope coefficient on *ME* is -0.04 with a Newey-West t-statistic of -1.33; the slope coefficient

on *MOM* is -0.04 with a Newey-West t-statistic of -1.09; and the slope coefficient on *ISSUE* is -0.17 with a Newey-West t-statistic of -2.82.

For second-year annual returns, the slope coefficient on *BM* is 0.10 with a Newey-West t-statistic of 2.16 and the slope coefficient on *ISSUE* is -0.31 with a Newey-West t-statistic of -3.08. While *BM* and *ISSUE* exhibit significance, *ME* and *MOM* show no significance. It is important to note that, as shown in Table II *ISSUE* has a t-statistic of -3.08, which is stronger than *BM*, *ME* and *MOM*.

Overall, Table III shows that, as expected, removal of seasoned equity offerings and repurchases has a minor impact on the ability of *ISSUE* to predict returns. The major difference is that in the multivariate analysis, the slope coefficients and the t-statistics on annual *ISSUE* shrink slightly towards zero. The slope on *ISSUE* continues to lead to the rejection of the null hypothesis in the multivariate analysis for annual and second year annual returns and it is even more significant than the slope coefficient of *BM*. However, it is no longer significant for the three-month returns holding period and only significant at the 90% level for six months. Moreover, the predictive power of *ME* and *MOM* decline, but they remain significant for short term, and *BM* remains significant especially for longer return horizons. The adjusted-R^2s are slightly higher when only rights offerings are considered. In short, it is safe to say that there exists a negative relationship between *ISSUE*, especially rights offerings, and expected stock returns, which is more pronounced in longer return horizons (after six-months).

Table III

Fama-MacBeth Cross-Sectional Regressions with only Rights Offerings considered, 1992 - 2011

Fama–MacBeth cross-sectional regressions results are computed for stock returns of various holding periods (each panel gives the appropriate holding period) on the following variables: the natural logarithm of the ratio of the book value of equity to the market value of equity measured at the end of December *t-1*, *BM*; the natural logarithm of market equity measured at the end of June, *ME*; ordinal ranking method is used for momentum, *MOM*; and the change in the logarithm of the number of shares outstanding adjusted for splits with only rights offerings considered. *ISSUE*= [Log(shares outstanding, *t*−6)–Log(shares outstanding, *t*−18)]. The number of holding periods in months minus one is used as the lag in Newey-West t-statistics as specified in Pontiff (1996). Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level.

PANEL A: Dependent variable is the 1 month stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.05	0.02				
(5.45)**	(1.90)*				0.84
0.11		0.00			
(4.68)**		(-2.86)**			2.10
0.06			0.00		
(5.74)**			(-3.01)**		1.01
0.12	0.00	0.00	0.00		
(5.03)**	(1.20)	(-2.85)**	(-2.72)**		3.71
0.05				0.01	
(4.72)**				(0.76)	1.80
0.08	0.00	0.00	0.00	-0.01	
(2.68)**	(1.29)	(-0.87)	(-2.56)**	(-0.70)	7.52
PANEL B: Dependent variable is the 3 month stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.18	0.01				
(5.29)**	(2.02)**				1.45
0.41		-0.02			
(4.54)**		(-3.31)**			2.09
0.22			-0.01		
(5.42)**			(-3.27)**		1.14
0.44	0.01	-0.02	-0.01		
(4.95)**	(1.49)	(-3.52)**	(-2.83)**		4.30
0.15				0.02	
(4.58)**				(0.83)	2.16
0.33	0.01	-0.01	-0.01	-0.04	
(3.36)**	(1.87)*	(-1.96)**	(-1.99)**	(-1.59)	9.09

PANEL C: Dependent variable is the 6 month stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.40	0.02				
(5.49)**	(2.31)**				1.65
0.89		-0.03			
(4.66)**		(-3.47)**			1.95
0.47			-0.03		
(4.82)**			(-2.69)**		1.24
0.93	0.02	-0.03	-0.02		
(4.37)**	(1.82)*	(-3.18)**	(-2.57)**		4.44
0.31				0.04	
(4.48)**				(0.73)	1.59
0.68	0.04	-0.02	-0.02	-0.11	
(3.09)**	(2.14)**	(-1.70)*	(-2.05)**	(-1.88)*	8.59
PANEL D: Dependent variable is the one - year stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.93	0.05				
(4.83)**	(1.66)*				2.06
2.05		-0.08			
(4.27)**		(-3.14)**			1.81
1.15			-0.07		
(4.08)**			(-2.66)**		0.99
2.08	0.03	-0.07	-0.06		
(3.62)**	(1.14)	(-2.60)**	(-2.71)**		4.24
0.66				0.14	
(4.28)**				(0.99)	0.36
1.31	0.08	-0.03	-0.03	-0.17	
(2.51)**	(2.33)**	(-1.33)	(-1.09)	(-2.82)**	6.19
PANEL E: Dependent variable is the second - year stock return					
Intercept	*BM*	*ME*	*MOM*	*ISSUE*	*Avg. R^2*
0.81	0.03				
(4.97)**	(1.02)				1.78
1.66		-0.05			
(3.91)**		(-2.44)**			1.24
0.87			-0.02		
(4.35)**			(-2.07)**		0.27
1.46	0.01	-0.04	-0.02		
(3.18)**	(0.39)	(-1.69)*	(-1.75)*		3.05
0.70				-0.03	
(4.09)**				(-0.23)	0.70
0.95	0.10	-0.01	-0.03	-0.31	
(1.75)*	(2.16)**	(-0.35)	(-1.43)	(-3.08)**	4.51

Figure 1 illustrates the time-series of slope coefficients on *ISSUE*. Using the slope coefficients from a multivariate regression of annual returns on issuance, the average slope over the past 12 months and the appropriate standard error from these 12 observations are calculated. These statistics are computed every month, providing a rolling estimate of the share issuance's slope and its standard error.

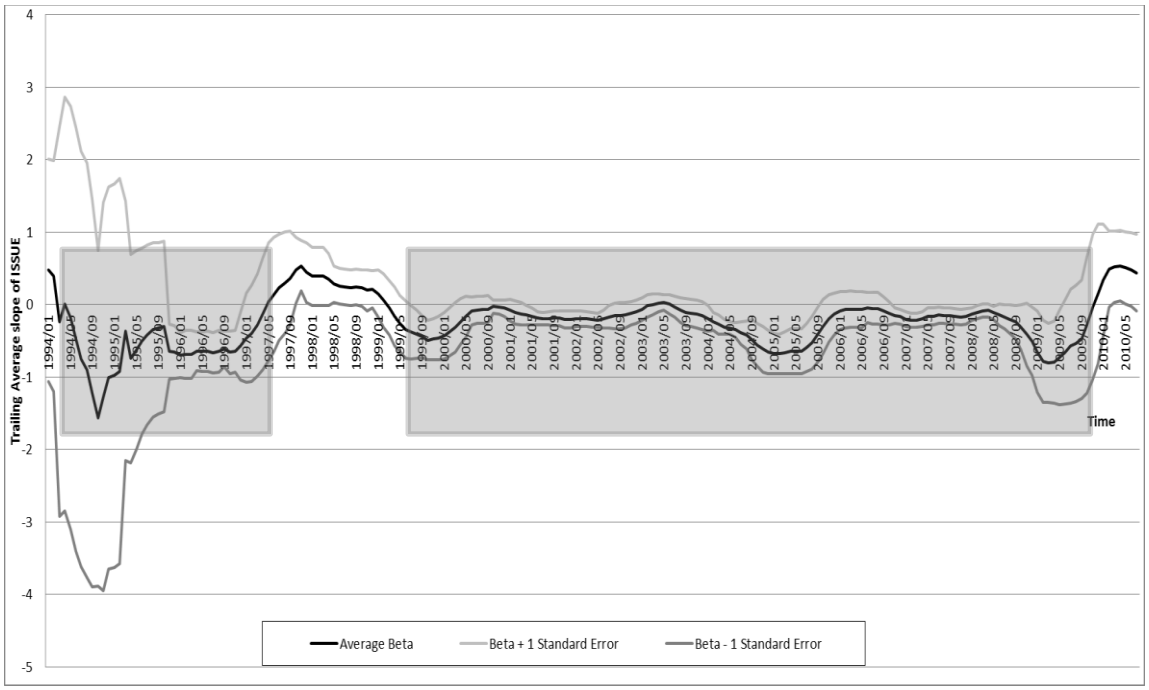

Figure 1. Trailing average slope coefficient from the regression of the annual return on *ISSUE*

The period where the trailing average slope coefficient for issuance is negative is shaded above. As Figure 1 shows, especially after the year 2000, aside from the strong recovery period of 2010, the average slope exhibits a remarkable tendency to be negative. In the early years of the BIST, the pre-1994 data in particular, tend to produce positive slope coefficients, but more importantly, the variability of these slope coefficients is large.

The shaded area, which spans most of the study's period of analysis, marks the dates where the average slope coefficient is negative. As the shaded area shows, the slope coefficient on share issuance is usually negative. When the coefficient is positive, it tends to be of smaller magnitude than that of negative realizations. There does not seem to be a time trend or structural breakpoint during this sub-period. The only significant positive realizations occur after the severe crisis period of 2008, during which the valuations on the BIST were severely depressed. In the post-2008 period,

which produces positive slope coefficients, the variability of these coefficients is also large.

Next, the robustness of the results are checked by utilizing the non-parametric portfolio approach employed by Fama-French (2008); for this, sorted portfolios are estimated according to the difference in the previous year's share issuance. Next, the return differences between extreme portfolios for one, three and six months, and stock returns for the first and second year after portfolio formation are computed and then analyzed for their statistical significance.

2.4.3. Univariate portfolio analysis of Share Issuance (*ISSUE*)

This section employs the non-parametric portfolio approach as in Fama-French (2008) to test the robustness of the predictive power of share issuance; for this, it estimates quintile portfolios according to the study's share issuance measure (*ISSUE*). The breakpoints are 20^{th}, 40^{th}, 60^{th} and 80^{th} percentiles for issuance. Next, it computes the return difference between extreme portfolios one, three and six months, and stock returns in the first and second year after portfolio formation and analyzes their statistical significance.

Panel A of Table IV presents the average stock returns for each of these *ISSUE*-sorted portfolios. Portfolio 1 contains stocks with the lowest 20% *ISSUE* and Portfolio 5 contains stocks with the highest 20% ISSUE. The last column shows the differences in average stock returns between portfolios 5 and 1. For one-month returns, the difference of portfolio 5 (highest issuance) minus portfolio 1 (lowest issuance) is 0.04 with a Newey-West t-statistic of 0.31. For three-month holding period returns, the difference portfolio 5-1 is 0.02 with a Newey-West t-statistic of 0.94. For six-month holding period returns, the difference portfolio 5-1 is 0.02 with a Newey-West t-statistic of 0.57.

Table IV

Univariate Portfolios, 1992 - 2011

In this table, portfolios are formed every month from 1994 to 2011 by sorting individual stocks on their annual share issuance (*ISSUE*). Portfolio 1 contains stocks with the lowest 20 percent share issuance (*ISSUE)* and Portfolio 5 contains stocks with the highest 20 percent share issuance (*ISSUE)*. Panel A of this table reports the average stock returns for one-month, three-months, six-months, annual and second-year annual return for each portfolio. The last column shows the differences in average stock returns between portfolios 5 and 1. Panel B of this table reports the average book-to-market (*BM*), market equity (*ME*) and momentum (*MOM*) for each portfolio. Six months' lag is used in Newey-West t-statistics. Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level.

Panel A: Average Stock Returns						Difference
	1	2	3	4	5	5-1
R_1	0.04	0.04	0.04	0.05	0.04	0.04
	(4.36)**	(4.32)**	(3.89)**	(3.95)**	(3.62)**	(0.31)
R_3	0.14	0.15	0.14	0.14	0.16	0.02
	(4.20)**	(4.69)**	(3.97)**	(3.89)**	(3.73)**	(0.94)
R_6	0.29	0.31	0.30	0.30	0.31	0.02
	(4.17)**	(4.73)**	(4.08)**	(3.90)**	(3.81)**	(0.57)
R_{12}	0.65	0.70	0.63	0.61	0.71	0.05
	(3.75)**	(4.81)**	(4.14)**	(3.52)**	(3.34)**	(0.57)
R_{24}	0.71	0.68	0.62	0.66	0.61	-0.10
	(3.34)**	(3.89)**	(4.19)**	(3.26)**	(3.06)**	(-0.77)

Panel B: Average Stock Characteristics					
	1	2	3	4	5
BM	-1.92	-0.72	-0.53	-0.36	-0.22
	(-11.43)**	(-8.15)**	(-7.02)**	(-5.95)**	(-3.25)**
ME	17.38	17.37	17.01	16.44	16.22
	(62.20)**	(56.77)**	(57.41)**	(60.20)**	(56.78)**
MOM	0.31	0.30	0.30	0.31	0.35
	(4.68)**	(4.26)**	(4.50)**	(3.52)**	(3.58)**
ISSUE	-0.39	0.10	0.19	0.33	0.67
	(-5.78)**	(7.87)**	(10.33)**	(14.94)**	(29.54)**

For one-year annual returns, the difference portfolio 5-1 is 0.05 with a Newey-West t-statistic of 0.57 and for second-year annual returns the difference portfolio 5-1 is 0.-10 with a Newey-West t-statistic of -0.77. In short, there exist no significant return difference of portfolio 5 (highest issuance) minus portfolio 1 (lowest issuance) in any holding period, confirming the results of univariate Fama-MacBeth regressions.

Looking at Panel B in more detail, one important observation is the high correlation between *BM* and *ISSUE* in quintile portfolios; the average *BM* ratios increase in tandem with share issuance: The average *BM* monotonically rises from -1.92 for portfolio 1 to -0.22 for portfolio 5. As previously mentioned, this is caused by the mechanical relation of rights offerings and book value.

To separate out the correlation of *BM* and share issuance, stocks are sorted in the study into portfolios according to the residual component of the share issuance versus *BM* regression. Through this technique, the component of *ISSUE* that is orthogonal to the explanatory variable was obtained.

Table V

Residual Univariate Portfolios, 1992 - 2011

In this table, portfolios are formed every month from 1994 to 2011 by sorting individual stocks on their annual share issuance (*ISSUE*). Portfolio 1 contains stocks with the lowest 20 percent *ISSUE* and Portfolio 5 contains stocks with the highest 20 percent $ISSUE$. Panel A of this table reports the average stock returns for one month, three-months, six-months, annual and second-year annual return for each portfolio. The last column shows the differences in average stock returns between portfolios 5 and 1. Panel B of this table reports the average book-to-market (*BM*), market equity (*ME*) and momentum (*MOM*) for each portfolio. Six months' lag is used in Newey-West t-statistics. Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level.

	Panel A: Average Stock Returns					Difference
	1	2	3	4	5	5-1
R_1	0.05	0.04	0.04	0.04	0.04	-0.01
	(4.44)**	(3.97)**	(4.15)**	(3.69)**	(3.84)**	(-1.03)
R_3	0.16	0.13	0.14	0.14	0.14	-0.03
	(4.37)**	(4.14)**	(4.22)**	(3.84)**	(3.86)**	(-1.58)
R_6	0.34	0.29	0.30	0.32	0.26	-0.08
	(4.29)**	(4.13)**	(4.18)**	(4.17)**	(3.79)**	(-2.03)**
R_{12}	0.76	0.66	0.65	0.69	0.52	-0.25
	(4.18)**	(4.06)**	(3.81)**	(3.75)**	(3.56)**	(-3.26)**
R_{24}	0.81	0.65	0.63	0.67	0.50	-0.31
	(4.06)**	(3.83)**	(3.67)**	(3.05)**	(3.04)**	(-3.71)**

	Panel B: Average Stock Characteristics				
	1	2	3	4	5
BM	-0.56	-0.36	-0.58	-0.86	-1.56
	(-4.63)**	(-4.46)**	(-8.08)**	(-9.48)**	(-14.82)**
ME	16.54	16.82	17.09	17.22	16.82
	(51.80)**	(56.63)**	(56.83)**	(59.55)**	(67.50)**
MOM	0.40	0.34	0.27	0.28	0.28
	(4.84)**	(4.07)**	(3.76)**	(3.77)**	(3.64)**
ISSUE	-0.46	-0.16	-0.02	0.14	0.50
	(-11.88)**	(-9.50)**	(-1.23)	(7.49)**	(17.72)**

As can be seen in Table V, the Newey-West t-statistics of 5-1 difference-sorted residual portfolios exhibit a significant negative relation between share issuance and subsequent stock returns at the 95% level, which becomes stronger especially after six-month return horizons: For the 6-month holding period returns, the difference portfolio 5-1 is 0.08 with a Newey-West t-statistic of -2.03. For one-year holding period returns, the difference portfolio 5-1 is -0.25 with a Newey-West t-statistic of -3.26, i.e., on

average there exists 25% return difference in a year between firms within the lowest issuance quintile and highest issuance quintile, controlling for *BM* ratio. For second-year annual returns the difference portfolio 5-1 is -0.31 with a Newey-West t-statistic of -3.71, i.e., on average there is 31% return difference in second-year annual returns between firms within the lowest issuance quintile and highest issuance quintile, controlling for *BM* ratio. The results from non-parametric portfolio analysis, confirm the results of multivariate Fama-MacBeth regression, and suggest that share issuance exhibits a strong cross-sectional ability to predict stock returns on the BIST between 1992- 2011.

2.5. Conclusion

This study examines the predictive power of share issuance on stock returns on the BIST. Share issuance occurs as a firm purchases or sells its own stock. Particularly in the post-2000 period, there have been numerous studies on developed and emerging markets arguing that post-issuance long-run returns are abnormally low, and that the post-share repurchase long-run returns are abnormally high. This debate has raised the question of whether share issuance can be used to forecast stock returns in the cross-section on the in BIST, hence this study.

The share issuance measure used in the study was constructed on the basis of the methodology employed by Pontiff and Woodgate (2008), by adjusting shares outstanding for distribution events such as stock splits and rights offerings. Then, univariate regressions were estimated to test the stand-alone predictive power of independent variables book-to-market, size, momentum and share issuance. The dependent variable in the regressions is the stock return for holding periods of one, three and six months, as well as the annual stock return in the first and second year. The results of the univariate regressions show that the sign of the slope coefficients on *BM* and *ME* is consistent with prior literature; the slope coefficient on *MOM* is negative, which contradicts prior studies on developed markets. To test the robustness of these results, and to account for possible nonlinearities in the relation, ordinal ranking is utilized for the *MOM* factor.

ISSUE is not statistically significant in univariate regression. This is because unlike in US markets, share issuance on the BIST is driven by right offerings rather than seasoned equity offerings and stock mergers. As mentioned before, rights issues are different from seasoned equity offerings because the money raised has to be added to the capital whereas in seasoned equity offerings they can be added or taken by the shareholders that offers the equity. Hence, the book value increases mechanically in case of rights offerings. Moreover, since the issuance measure in this study is dominated by rights issues, there is a strong positive correlation between *BM* and *ISSUE*, which are taken into account in Fama-MacBeth regressions. Therefore, in univariate analysis the negative relationship between share issuance and stock returns is offset by the positive relationship between rising book-to-market and stock returns.

However, when multivariate Fama-MacBeth regressions are estimated to test the significance of *ISSUE* along with other well–known factors of *BM*, *ME* and *MOM*, the results suggest that the statistical significance of *ISSUE* is greater than *ME* and *MOM*, and its predictive power is equivalent to *BM* in long horizons: For annual regressions, in the multivariate setting, *ME* and *MOM* are no longer significant while *BM* and *ISSUE* exhibit significance at the 95% level: the slope coefficient on *BM* is 0.08 with a Newey-West t-statistic of 2.21; the slope coefficient on *ME* is -0.04 with a Newey-West t-statistic of -1.50; the slope coefficient on *MOM* is -0.04 with a Newey-West t-statistic of -1.51; and the slope coefficient on *ISSUE* is -0.20 with a Newey-West t-statistic of -2.16. For second-year annual returns, the slope coefficient on *BM* is 0.10 with a Newey-West t-statistic of 2.00 and the slope coefficient on *ISSUE* is -0.34 with a Newey-West t-statistic of -4.01. While *BM* and *ISSUE* exhibit significance, *ME* and *MOM* show no significance.

The contradictory results for issuance in univariate and multivariate settings may be explained from a risk perspective as well: It is known that stocks with high book-to-market ratios have high expected returns because they are considered high-risk and vice versa. At the same time, when a company issues new shares, it is considered as low risk because of the mechanical decrease of its debt ratio. In this study, when new issuance occurs in the form of rights offerings, the *ISSUE* measure increases along with the *BM* ratio because the money raised has to be added to the capital. Therefore, while the increase in share issuance predicts a low return, the mechanical increase in book-to-market neutralizes the issuance effect by implying higher future returns. Hence, while in

the univariate setting, the slope coefficient of issuance is not significant; controlling for *BM*, it exhibits high significance in the multivariate setting.

It is important to note that stock repurchases were introduced to the Turkish market very recently by the CMB. Therefore, the occurrence of issue-reducing events is limited in the study sample. The effect of increasing share repurchases with regulation changes is left for future research.

Moreover, the share issuance in Turkish markets is driven by rights offerings rather than seasoned equity offerings. For this reason, in the next section, seasoned equity offerings and share repurchases are removed. Only rights offerings as the issuance events are considered and the Fama-MacBeth regression is reestimated over the 1992 to 2011 sample. As expected, removal of seasoned equity offerings and repurchases has only a minor impact on the ability of share issuance to predict returns. The major difference is in the multivariate analysis, where the slope coefficients and the t-statistics on annual *ISSUE* shrink slightly towards zero. The slope on *ISSUE* continues to reject the null hypothesis in the multivariate analysis for annual and second year return holding periods and it is even more significant than the slope coefficient of *BM*. However, it is no longer significant for the three-month returns holding period and only significant at the 90% level for six months. Moreover, the predictive power of *ME* and *MOM* decline. However, they remain significant for short term and *BM* remains significant, especially for longer return horizons. The adjusted-R^2s are slightly higher when only rights offerings are considered. In short, it is safe to say there exists a negative relationship between *ISSUE*, especially rights offerings and expected stock returns, which is more pronounced in longer return horizons (after six-months).

When the time-series of slope coefficients on share issuance is investigated, the average slope exhibits a remarkable tendency to be negative except for the very early years of the BIST. This result is similar to Pontiff and Woodgate's (2008) finding of large variation in the slope on share issuance during the 1940s. It may be argued that this phenomenon is caused by higher costs associated with capital structure decisions in the early years when these markets are set up. If that is the case, future examination of the influence of decreasing costs of capital structure decisions on the predictive power of share issuance may prove interesting.

Next, the robustness of the predictive power of share issuance is tested by employing the non-parametric portfolio approach used in Fama-French (2008); for this, quintile portfolios are estimated according to the study's measure (*ISSUE*). The breakpoints are 20^{th}, 40^{th}, 60^{th} and 80^{th} percentiles for issuance. One, three and six-month and annual stock returns in the first and second year after portfolio formation and their statistical significance is analyzed. There is no significant return difference of portfolio 5 (highest issuance) minus portfolio 1 (lowest issuance) in any holding period, thus confirming the results of univariate Fama-MacBeth regressions. Finally, to separate out the correlation of *BM* and *ISSUE*, stocks are sorted into portfolios according to the residual component of the share issuance versus book-to-market regression which facilitate obtaining the component of *ISSUE* that is orthogonal to the explanatory variable. When stocks are sorted into portfolios according to the residual component of the *ISSUE* versus *BM* regression, the Newey-West t-statistics of 5-1 difference-sorted residual portfolios have a significant negative correlation to *ISSUE* and subsequent stock returns at the 95% level, which strengthens especially after six-month return horizons: For six-month holding period returns, the difference portfolio 5-1 is 0.08 with a Newey-West t-statistic of -2.03. For one-year returns, the difference portfolio 5-1 is -0.25 with a Newey-West t-statistic of -3.26, i.e., on average there exists 25% percent return difference in a year between firms within the lowest issuance quintile and highest issuance quintile, controlling for book-to-market ratio. For second-year annual returns the difference portfolio 5-1 is -0.31 with a Newey-West t-statistic of -3.71, i.e., on average there is a 31% percent return difference in second-year annual returns between firms within the lowest issuance quintile and highest issuance quintile, controlling for book-to-market ratio. The results from non-parametric portfolio analysis, confirm those of multivariate Fama-MacBeth regression, suggesting that *ISSUE* exhibits a strong cross-sectional ability to predict stock returns on the BIST in the period from 1992 to 2011.

Overall, these results may be interpreted as evidence that share issuance predicts cross-sectional returns, especially for longer return horizons. When considered jointly with widely acknowledged *BM*, *ME* and *MOM* factors, after three-month return regressions, *ISSUE* has larger t-statistic than *ME* and *MOM*, and is similar to *BM* in terms of predictive power. For second-year annual returns, *ISSUE* is the strongest

variable in the current analysis in terms of statistical significance. The *MOM* effect is negative; however, this finding is consistent with prior literature on Turkish markets.

CHAPTER 3

MACROECOMIC VARIABLES AND INDIVIDUAL STOCK RETURNS IN ISTANBUL STOCK EXCHANGE

3.1. Introduction

Security pricing has been one of the most fundamental topics in finance literature since the introduction of the capital asset pricing model (CAPM, Sharpe 1964, Lintner 1965). While still widely used by practitioners, it has some restrictive assumptions; several shortcomings of these assumptions have been documented in the literature (Roll 1977, Shanken 1987 among others).

At about the same time, arbitrage pricing theory was introduced by Ross (1976), who demonstrates that securities affected by systemic risk factors should earn risk premiums in risk-averse economy. Arbitrage pricing theory (APT) allows for the use of several risk factors that explain security returns; however, it also has an important caveat: it cannot specify the factors ex ante. Macroeconomic variables are excellent candidates for these systematic risk factors because they are correlated with expected return and cash flow components of stock returns. Hence, serious research has been dedicated to investigating the relationship between macroeconomic factors and stock returns in both developed and emerging markets. Bodie (1976) attempts to determine the extent to which common stocks are an inflation hedge and concludes that the real return on equity is negatively related to both anticipated and unanticipated inflation. Chen, Roll and Ross (1986), using Fama-MacBeth (1973) regressions, find that the spread between long- and short-term interest rates, expected and unexpected inflation, industrial production, and the spread between high- and low-grade bond risks are significantly priced in stock returns while oil price has no significance. Burnmeister and McElroy (1988) show that the capital asset pricing model restrictions on arbitrage pricing theory are rejected, while the arbitrage pricing theory restrictions on the linear factor model are not rejected. Campbell and Shiller (1988), and

Fama and French (1988,1989) find that expected inflation, dividend yield, short-term interest rates, term spread, default spread and lagged stock returns can predict the expected returns of bonds and stocks. Chen (1991) finds that variables such as the lagged production growth rate, the default premium, the term premium, the short-term interest rate and the market dividend-price ratio are indicators of recent and future economic growth.

There exist various possibilities by which macroeconomic fundamentals such as unemployment, industrial production, interest rates, economic growth or inflation may have an impact on the security prices quoted on the Turkish stock market. For example, a number of studies have found that higher expected inflation depresses stock prices. The explanation behind this is that higher expected inflation leads to higher nominal interest rates: The anticipation of higher rates in the future causes investors to sell Treasury securities immediately, forcing interest rates upward. Higher interest rates then lead to lower stock prices, assuming investors view stocks and bonds as substitutes. For the Turkish case, however, Kandir (2008) shows that exchange rate, interest rate and world market return affect all of the portfolio returns, while inflation rate is significant for only three of the twelve portfolios. On the other hand, unexpected increases in real economic activity may raise investors' expectations of future growth. Forecasts of higher real gross domestic product (GDP), higher growth rate of industrial production and lower unemployment rate could make stocks more attractive. In this context, Vassalou (2003) argues that when news related to future GDP growth is present in the asset-pricing model, book-to-market and size factors lose much of their ability to explain the cross-section of equity returns. Capital inflows and outflows are especially important for Turkey because of its negative current account balance. This has an impact on movements in exchange rates, which in turn increase or decrease the competitiveness of the many sectors such as tourism and automotive industries, and also influence the purchasing power of individuals. For example Ozcan (2012) investigates the univariate relationship between the BIST-Industrials Index and macroeconomic variables and concludes that exchange rate, oil price, interest rates, money supply, current account deficit and export volume all exhibit a long-run univariate relationship with the BIST-Industrials Index. All of these potential links suggest that prices of financial securities such as common stocks, bonds and their derivatives are related to the movements in macroeconomic fundamentals.

That is why serious research has been dedicated to the relationship between macroeconomic factors and stock returns at developed and emerging markets; however, most of these studies focus directly on stock return predictability. They look at the relationship between macroeconomic or financial factors and index returns. For Turkish markets, a thorough literature review shows that there is no consensus among scholars on the candidate macroeconomic or financial risk factors; moreover, several different methodologies are employed for the analysis, ranging from Granger causality to econometric methods.[15]

This paper analyzes the exposure of stocks to various financial and macroeconomic risk factors through univariate and multivariate estimates of factor betas and investigates the performance of these factor betas in predicting the cross-sectional variation in individual stock returns that are quoted on Turkish stock market over the sample period 1992-2011. Hence, this study contributes to Turkish asset pricing literature: By utilizing a two-step procedure, first the factor betas are found, using stock returns and selected macroeconomic factors, and then the sensitivities of these factor betas, are estimated following Bali, Brown and Caglayan (2011).[16] In other words, the "sensitivity of the sensitivities" is estimated by examining the relationship between several macroeconomic variables and individual stock returns in Turkish market. Moreover, although there are several studies on the relationship between stock prices and macroeconomic variables for the Turkish market, most of them focus on the direct relationship between index returns (BIST-100 mostly) and selected macroeconomic and financial factors. This paper is the first study that utilizes the cross-section of all the individual stocks that are quoted on the BIST, which significantly increases the statistical power of its results. In short, the basic premise of arbitrage pricing theory (APT) is tested: if macroeconomic variables truly proxy

[15] Please see Part I: Literature Survey of this dissertation for further information about the asset pricing literature in Turkish markets.

[16] Bali, Brown and Caglayan (2011) utilize this methodology to examine hedge funds' exposures to various macroeconomic and financial risk factors. They find a significantly positive (negative) link between default premium beta (inflation beta) and future hedge fund returns.

these risk factors, securities that are more sensitive to these factors should then earn risk premium in a risk-averse economy.

The three most important findings of this study are: (i) there exists a negative and significant relation between benchmark bonds' interest rate beta (β^{BOND}) and future individual stock returns; (ii) well-known market, book-to-market, size and momentum factors does not alter the statistical significance between benchmark bonds' interest rate beta (β^{BOND}) and stock returns; (iii) univariate portfolio analysis shows that these results are driven by Debt/Equity (Leverage) ratio: Firms with high leverage ratios which are more sensitive to changes in the bond market have higher future returns and firms with low leverage ratios are associated with lower future returns. In short, the study concludes that the sensitivity to benchmark bonds' interest rate or leverage is a risk factor for the Turkish stock market.

The paper is organized as follows: Section 2 describes the data and variables used in the empirical analysis. Section 3 provides the empirical results for univariate and multivariate settings along with a univariate portfolio analysis. Section 4 concludes the paper.

3.2. Data & Methodology

Monthly stock returns, book value of equity, market equity and shares outstanding data are obtained from STOCKGROUND[17] and Matriks[18]. The data used in this chapter

[17] STOCKGROUND is financial analysis software with advanced fundamental and technical analysis capabilities designed by Rasyonet Inc. Rasyonet is a software solution provider to brokerage houses, commercial banks and portfolio management firms operating in capital markets. Since 2005, Rasyonet has operated at Technopark premises of Istanbul Technical University and its projects are supported by TUBITAK.

[18] Matriks Bilgi Dağitim Hizmetleri A.Ş. ("Matriks") was established in August 2003. It has been serving as a "Licensed Data Dissemination Company" since January 2004, upon

belong to the time period of 1992 to 2011. The macroeconomic data is collected from TurkStat,[19] CBRT[20] and Bloomberg[21] databases. One of the challenges in this study is to correctly identify the macroeconomic variables. It is difficult to choose the macroeconomic factors ex ante; hence, a "kitchen sink" approach is utilized.[22] Macroeconomic variables such as inflation, industrial production, money supply and gross domestic product are used. In addition, financial variables, including interest rates and oil prices, are employed in the analysis.

The monthly inflation rate based on the Turkish CPI (*CPI*), the monthly growth rate of industrial production (*IP*), the monthly change in the exchange rate of US Dollars in Turkish Lira (*USDTRY*), the monthly growth rate of gross domestic product (*GDP*), the monthly return of the BIST-100 Index (*MKT*), the monthly growth rate of money supply M1 (*M1*), the monthly growth rate of Turkish foreign trade balance (*FTB*), the monthly growth rate of Turkish unemployment (*UNEMP*), the monthly growth rate of Turkish public sector debt (*DEBT*), the benchmark treasury bills' interest rate (*BOND*) and the monthly growth rate of Brent oil prices (*BRENT*) are included in the analysis. Moreover, Fama and French (1993) book-to-market factor (*HML*), Fama and French (1993) size factor (*SMB*) and Carhart (1997) momentum factor (*UMD*) are estimated in the sample period and

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receiving a Buyer's License from Borsa Istanbul. Matriks extracts information from data on Turkish and global capital markets and provides them to individual and institutional clients, using every possible medium. Matriks develops individualized software solutions to meet the varying needs of professional and amateur clients for data dissemination, data feeds and analysis tools.

[19] Turkish Statistical Institute (commonly known as TurkStat: Turkiye Istatistik Kurumu or TUIK) is the Turkish government agency commissioned with producing official statistics on Turkey, its population, resources, economy, society, and culture. It was founded in 1926 and has its headquarters in Ankara.

[20] Central Bank of the Republic of Turkey

[21] Bloomberg L.P. provides financial software tools such as analytics and equity trading platform, data services and news to financial companies and organizations around the world through the Bloomberg Terminal.

[22] Please see Table I in Part I: Literature Survey of this dissertation for some of the macroeconomic variables that are used in previous studies.

utilized as the financial risk factors. Book-to-market (*HML*) and size factor (*SMB*) are estimated by forming quintile portfolios every month using sorts of stocks on book-to-market and market equity. Then the average monthly return difference between the highest quintile portfolio and lowest quintile portfolio is calculated. The momentum factor (*UMD*) is constructed as in Carhart (1997) as the average return of firms with the highest 30 percent six-month cumulative returns (lagged one month) minus the average return of firms with the lowest 30 percent six-month cumulative returns (lagged one month).

It is important to note that to increase the robustness of the results and to avoid giving any observations undue weight in the estimators, all stock returns are winsorized by setting the smallest and largest 1% of the observations equal to the value of the observation at the respective 1% tail. The monthly growth rate of Turkish foreign trade balance (*FTB*) is also winsorized, as it has very large variance compared to other macroeconomic or financial factors.[23] Other macroeconomic or financial risk factors that are used as independent variables are not transformed. A methodology similar to that of Bali, Brown and Caglayan (2011) is utilized: parametric tests are conducted to assess the predictive power of factor betas over future stock returns.

In the first stage, for each individual stock, univariate and multivariate monthly time-series beta estimates of 14 macroeconomic and financial risk factors (factor betas) are calculated over a rolling-window period; and in the second stage, monthly Fama and MacBeth (1973) cross-sectional regressions of one, three and six-months-ahead individual stock returns on the factor betas are conducted. If, for certain macroeconomic and financial risk factors, the slope coefficients from these Fama-MacBeth regressions indicate statistical significance, then it is concluded that those factor betas have a significant predictive power over future stock returns.

Table I provides summary statistics of individual stock returns and macroeconomic and financial risk factors that are used in the study. Panel A of Table I reports the number of firm-month observations, mean, median, standard deviation, minimum, maximum, 25th

[23] The entire analysis is also performed with both original return and Turkish foreign trade balance (*FTB*) data, the results, which are consistent with winsorized returns and *FTB*, is available upon request.

and 75th percentile, skewness and kurtosis of individual stock returns quoted on BIST for holding periods of one, three and six months. One important item worth noting is the high nominal values of maximum returns. The returns exhibit positive skewness.

Panel B of Table I reports mean, median, standard deviation, minimum, maximum, 25th and 75th percentile, skewness and kurtosis of the 14 financial and macroeconomic risk factors used in this study. The 14 macroeconomic and financial risk factors included in this analysis are as follows: (1) *HML*: Fama and French (1993) book-to-market factor; (2) *SMB*: Fama and French (1993) size factor; (3) *UMD*: Carhart (1997) momentum factor; (4) *CPI*: Monthly inflation rate based on Turkish CPI; (5) *IP*: Monthly growth rate of industrial production; (6) *USDTRY*: Exchange rate of US Dollars in Turkish Lira; (7) *GDP*: Monthly growth rate of gross domestic product;[24] (8) *MKT*: Monthly growth rate of BIST-100 index; (9) *M1*: Monthly growth rate of money supply; (10) *FTB*: Monthly growth rate of Turkish foreign trade balance; (11) *UNEMP*: Monthly growth rate of Turkish unemployment; (12) *DEBT*: Monthly growth rate of Turkish public debt; (13) *BOND*: Benchmark bonds' interest rate; (14) *BRENT*: Monthly growth rate of Brent oil prices. It is important to note that although the averages of Fama and French (1993) book-to-market factor *HML* and size factor *SMB* are positive, contrary to US asset pricing literature, the average value of the momentum factor *UMD* is negative. In addition, while mean monthly return from the BIST-100 Index is around 3.99% and the mean monthly growth rate of GDP in the sample period is around 1.41%. The average CPI is considerably high at 2.86%. Meanwhile, monthly growth rate of foreign trade exhibits great variation in the sample period with a standard deviation of 87 percent. Fama and French (1993) book-to-market factor *HML* exhibits slight positive skewness, while the momentum factor *UMD* exhibit negative skewness. However, the size factor *SMB* is almost symmetrical. All of the macroeconomic/financial risk factors except *GDP* (monthly growth rate of gross domestic product) and *BOND* (benchmark bonds' interest rate) show positive skewness.

Panel C of Table I reports the correlation matrix of the macroeconomic variables and financial risk factors included in the analysis. Most of the correlation coefficients are small,

[24] GDP data is announced on quarterly basis in Turkey. Linear interpolation is utilized to calculate the monthly growth rate.

which prevents multicollinearity in multifactor analysis. Moreover, their sign is consistent with the prior literature. *BOND* and *CPI* have a correlation coefficient of 0.67, which is intuitive considering the importance of inflation in both current and expected interest rates in bond markets. On the other hand, *GDP* and *UNEMP* have a correlation of -0.13, which also makes sense considering the link between the economic growth and creation of new jobs in the economy. One important observation is the positive correlation of 0.40 between *USDTRY* and *CPI*, which is known in Turkish financial circles as the "pass-through effect." It is expected because of the import-driven nature of the Turkish economy - as the US dollar appreciates the prices of most of the goods sold also increase. *IP* and *FTB* have a positive correlation coefficient of 0.30, which confirms that when the Turkish economy accelerates, the foreign trade deficit widens (*FTB* is negative for the whole sample period 1992-2011). However, counterintuitively, *GDP* and *FTB* have a small negative correlation of -0.08; to explain this result, different components of GDP that contribute to the headline figure and their relationship with foreign trade balance must be investigated and it is left for future research. As expected, *IP* and *UNEMP* have a negative correlation coefficient of -0.22, as the industrial production increases unemployment declines. *BOND* and *USDTRY* have a correlation coefficient of 0.36, i.e., as the US dollar appreciates, interest rates in the bond market rise, which is expected due to the positive relation between the currency and inflation rate. Moreover, since Turkish economy mostly relies on foreign inflows, as the US dollar appreciates, interest rates adjust quickly to attract foreign capital to finance its large trade deficit. On the other hand, *BOND* and *DEBT* have a positive correlation of 0.48, which is intuitive because the fixed income market is dominated by the government, and the bond yields rise if the public debt increases. *MKT* and *UMD* have a correlation coefficient of -0.37 - as the stock market rises, the momentum factor diminishes. The reason for this may be the fact that in a strongly trending market, the correlation across individual stock returns also increases. Finally, *BOND* and *GDP* have a correlation coefficient of -0.36 as economy expands Turkish fixed income markets perform well as the interest rates decline. Panel D of Table I reports the Spearman's rank correlation coefficient, which is a nonparametric measure of statistical dependence between two variables. It assesses how well the relationship between two variables can be described using a monotonic function. For most of the macroeconomic and financial risk factors in

the study, Spearman's correlation coefficients are lower but consistent with previous results: *BOND* and *CPI* still have a significant correlation coefficient of 0.54 and *USDTRY* and *MKT* have a negative correlation of -0.49, while the correlation between *BOND* and *USDTRY* weakens to 0.12. *BOND* and *GDP* still have an important negative correlation of -0.32.

Table I

Descriptive Statistics

Panel A reports the number of observation, mean, median, standard deviation, minimum, maximum, 25th and 75th percentile, skewness and kurtosis of individual stock returns quoted on Borsa Istanbul for holding periods of 1 month, 3 and 6 months for the sample period 1992-2011. Panel B reports the time-series mean, median, standard deviation, minimum, maximum, 25th and 75th percentile, skewness and kurtosis of the 14 financial and macroeconomic risk factors used in this study. Panel C reports pairwise correlation between our macroeconomic and financial risk factors. Panel D reports Spearman's rank correlation coefficient between our macroeconomic and financial risk factors.

Panel A: Summary statistics on individual stock returns.

	N	Mean	Median	Std.Dev	Minimum	Maximum	25th percentile	75th percentile	Skewness	Kurtosis
1 month returns	57689	0.0392	0.0105	0.2071	-0.4591	1.0339	-0.0769	0.1200	1.3754	7.2800
3 months returns	56955	0.1315	0.0435	0.4365	-0.6200	2.5516	-0.1182	0.2666	2.1640	10.5347
6 months returns	55857	0.2895	0.1070	0.7524	-0.6933	4.8443	-0.1382	0.4772	2.6998	13.5688

Panel B: Time-series statistics of financial and macroeconomic risk factors (Overall sample period: 1992-2011)

	N	Mean	Median	Std.Dev	Minimum	Maximum	25th percentile	75th percentile	Skewness	Kurtosis
HML: Fama and French (1993) book-to-market factor	234	0.0151	0.0125	0.0708	-0.2056	0.3954	-0.0142	0.0450	0.7504	4.8168
SMB: Fama and French (1993) size factor	239	0.0046	0.0030	0.0532	-0.2656	0.2305	-0.0223	0.0337	-0.0991	7.1643
UMD: Carhart (1997) momentum factor	233	-0.0140	-0.0002	0.0680	-0.3077	0.1747	-0.0392	0.0258	-1.1069	2.3184
CPI: Monthly inflation rate based on Turkish CPI	240	0.0286	0.0209	0.0285	-0.0143	0.2471	0.0075	0.0461	2.3299	13.1605
IP: Monthly growth rate of industrial production	239	0.0070	0.0000	0.0787	-0.2504	0.2508	-0.0377	0.0553	0.2706	0.5545
USDTRY: Exchange rate of US Dollars in Turkish Lira	240	0.0265	0.0256	0.0578	-0.0921	0.4322	-0.0056	0.0513	2.5932	14.6304
GDP: Monthly growth rate of gross domestic product	240	0.0141	0.0205	0.0193	-0.0518	0.0432	0.0065	0.0272	-1.2837	4.1880
MKT: Monthly growth rate of ISE-100 index	240	0.0399	0.0301	0.1483	-0.3903	0.7979	-0.0554	0.1062	1.0597	3.9501
M1: Monthly growth rate of money supply	240	0.0364	0.0352	0.0752	-0.1323	0.6806	0.0048	0.0520	3.5134	24.6087
FTB: Monthly growth rate of Turkish foreign trade balance	240	0.0719	0.0410	0.4031	-0.7896	2.7004	-0.1123	0.2238	2.6798	17.9100
UNEMP: Monthly growth rate of Turkish unemployment	240	0.0016	0.0000	0.0460	-0.1241	0.1800	-0.0129	0.0291	0.0673	1.2072
DEBT: Monthly growth rate of Turkish public debt	240	0.0360	0.0227	0.0509	-0.0788	0.4279	0.0067	0.0557	3.6832	21.0812
BOND: Benchmark bonds' interest rate	150	0.2977	0.1901	0.2430	0.0679	1.2673	0.1337	0.4436	1.4137	4.3931
BRENT: Monthly growth rate of brent oil prices	240	0.0114	0.0107	0.0880	-0.3346	0.4007	-0.0446	0.0717	0.0389	2.0421

Panel C: Correlation matrix of macroeconomic and financial risk factors

	HML	*SMB*	*UMD*	*CPI*	*IP*	*USDTRY*	*GDP*	*MKT*	*M1*	*FTB*	*UNEMP*	*DEBT*	*BOND*	*BRENT*
HML	1													
SMB	0.1683	1												
UMD	-0.1942	-0.1311	1											
CPI	-0.0252	0.0434	-0.1361	1										
IP	0.0507	-0.0356	-0.0245	-0.0483	1									
USDTRY	-0.0628	0.0266	0.0735	0.3983	-0.0171	1								
GDP	-0.0098	0.0372	0.1615	-0.171	0.0573	-0.0662	1							
MKT	0.2076	-0.0865	-0.3752	0.128	-0.0378	-0.1526	-0.0216	1						
M1	0.0687	0.1501	-0.0907	0.0609	-0.018	0.1779	0.0121	0.0749	1					
FTB	0.0977	-0.0806	-0.1549	-0.0953	0.2962	-0.0701	-0.0831	0.1973	0.0535	1				
UNEMP	0.001	0.0191	-0.0097	0.0119	-0.2246	0.0192	-0.1324	0.0471	-0.0901	-0.1305	1			
DEBT	0.0432	0.106	-0.2246	0.3737	-0.086	0.1594	-0.206	0.1212	0.0263	0.0303	0.005	1		
BOND	0.0886	-0.0015	-0.1891	0.667	-0.054	0.3602	-0.3085	0.0129	0.1271	-0.0793	0.1372	0.4828	1	
BRENT	0.0222	-0.0049	0.0735	-0.0116	0.122	-0.1479	-0.0454	0.0686	0.0717	0.0504	-0.1737	-0.0353	-0.0353	1

Panel D: Spearman's rank correlation matrix of macroeconomic and financial risk factors

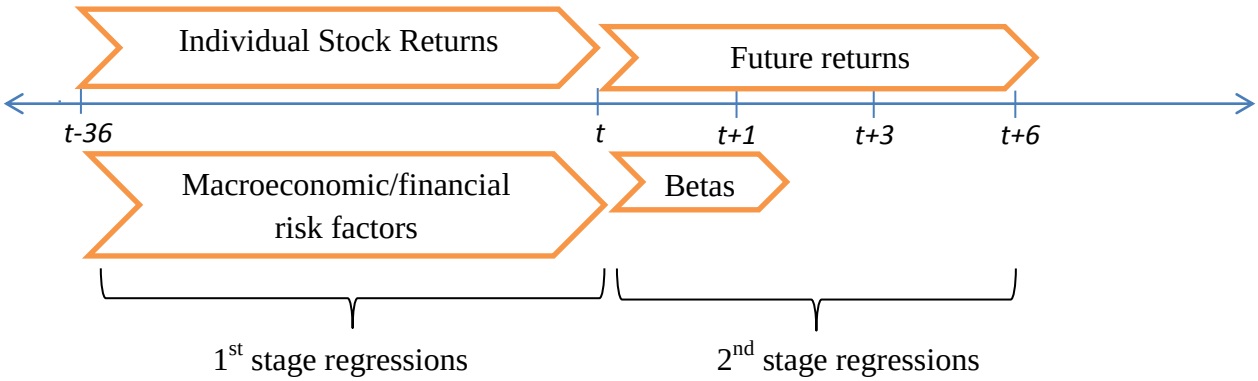
	HML	*SMB*	*UMD*	*CPI*	*IP*	*USDTRY*	*GDP*	*MKT*	*M1*	*FTB*	*UNEMP*	*DEBT*	*BOND*	*BRENT*
HML	1													
SMB	0.0855	1												
UMD	-0.0603	-0.1944	1											
CPI	0.066	0.049	-0.1709	1										
IP	-0.063	0.03	0.0228	0.0233	1									
USDTRY	-0.053	0.1992	0.1444	0.1241	0.009	1								
GDP	-0.0467	0.0854	0.1565	-0.0931	0.0585	0.0722	1							
MKT	0.1769	-0.0989	-0.3289	0.0036	0.0197	-0.4883	-0.0628	1						
M1	0.0578	0.0875	0.0414	0.0177	0.0295	0.1122	0.0506	-0.1025	1					
FTB	0.0068	0.1036	-0.1437	-0.1118	0.2852	-0.2096	0.0093	0.2104	0.1501	1				
UNEMP	0.0488	0.019	0.0846	0.0871	-0.3612	0.0311	-0.2338	0.0366	-0.3177	-0.2003	1			
DEBT	0.1304	0.0501	-0.1147	0.4354	-0.1004	0.2173	-0.1804	0.0223	-0.0245	-0.0799	0.1973	1		
BOND	0.0762	0.0095	-0.0825	0.5406	-0.0411	0.1222	-0.3168	-0.0525	0.1164	-0.0573	0.1471	0.4668	1	
BRENT	0.0776	-0.0417	0.1398	-0.0203	0.1057	-0.197	0.0545	0.0988	0.0047	0.1386	-0.2292	0.0106	-0.0444	1

3.3. Estimation Results

3.3.1. Univariate factor betas in cross-sectional regressions

In the first stage, univariate monthly factor betas are obtained for each stock using the univariate time-series regressions of individual stock returns on the factor over a 36-month rolling-window period. In the second stage, the cross-section of one, three and six-months-ahead individual stock returns are regressed on the stocks' univariate factor betas (derived from the first stage).

Figure I: Timeline of the research design



Initially, the first three years of monthly returns from January 1992 to December 1994 are used to estimate the factor betas for each stock in our sample; this is followed by a monthly rolling regression approach with a fixed estimation window of 36 months to generate the time-series monthly factor betas based on the following regression equation:

$$R_{i,t} = \propto_{i,t} + \beta_{i,t}^{F} F_t + \varepsilon_{i,t+n} \quad (1)$$

Where $R_{i,t}$ is the return on stock i in month t, F_t is the macroeconomic variable or the financial risk factor on month t, $\propto_{i,t}$ and $\beta_{i,t}^{F}$ are respectively alpha and the beta of stock i for risk factor F in month t. F represents one of the 14 variables tested in this study *HML*,

SMB, UMD, CPI, IP, USDTRY, GDP, MKT, M1, FTB, UNEMP, DEBT, BOND, BRENT.[25] In other words, Eq. (1) is a set of 14 regression equations where each regression equation is run for each macroeconomic and financial risk factor separately.

Then, in the second stage, starting from January 1995 we use Fama–MacBeth cross sectional regressions of one-month, three and six-months-ahead stock returns on the factor betas:

$$R_{i,t+n} = w_t + \vartheta_t^F \beta_{i,t}^F + \varepsilon_{i,t+n} \quad (2)$$

For n=1, 3 and 6 months

Where $R_{i,t+n}$ is the cumulative return on stock i in from month t to $t+n$, $\beta_{i,t}^F$ is the risk factor F's beta for stock in month t estimated using Eq. (1). w_t and ϑ_t^F are respectively the monthly intercepts and slope coefficients from the Fama-MacBeth regressions. As in Eq. (1), Eq. (2) is a set of 14 regression equations where each regression equation is run for each macroeconomic/financial risk factor beta separately. The statistical significance of risk exposures are computed using Newey-West standard errors that take into account heteroskedasticity and autocorrelation in the time-series of slope coefficients.

Table II provides summary statistics of the factor betas obtained from the univariate time-series regressions of individual stock returns on the factor over a 36-month rolling-window period. Panel A of this table reports the number of observations, mean, median, standard deviation, minimum, maximum, 25th and 75th percentile, skewness and kurtosis.

Analyzing Panel A of Table II in more detail, for the univariate setting, the average value of β^{HML} is 0.69, its 25th percentile is 0.12 which means that most of its values are in positive territory. β^{MKT} has an average value 0.85; Moreover both β^{HML} and β^{MKT} are also almost symmetrical as the mean and median values are close. Consistent with prior literature, β^{SMB} has an average value of 0.29 and slightly skewed to the right, while β^{UMD} has an average value of -0.92. The average value of β^{BOND} is -0.46, its 25th percentile is -0.93 and 75th percentile is -0.04 which means that most of the values are in negative

[25] The definitions of these macroeconomic and financial risk factors can be found in Section 3.2 "Data and Methodology" as well as Panel B of Table I.

territory. β^{USD}has an average value of -0.44 and also skewed to the right and most of the other univariate betas do not exhibit extreme statistical properties except β^{M1} and β^{UNEMP}, which are highly asymmetrical and leptokurtic.

Panel B of Table II reports the correlation matrix for the univariate factor betas estimated using Eq. (1). Here, the positive correlation between *BOND* and *CPI* is translated to univariate factor betas; β^{BOND} and β^{CPI} have a correlation coefficient of 0.35. It is interesting to note that no such relationship exists between β^{FTB} and β^{GDP} or between β^{GDP} and β^{IP}. As shown in Panel C of Table I, β^{USD} exhibits a positive correlation with β^{CPI} as well as with β^{BOND}. β^{BOND} and β^{MKT} show a negative relationship with a correlation coefficient of -0.21. Consistent with prior literature, β^{MKT} is positively correlated with β^{HML} but negatively correlated with β^{SMB} and especially β^{UMD}.

Panel C of Table II reports Spearman's rank correlations, although the results are consistent with Panel B, most of the univariate factor betas exhibit higher Spearman's rank correlation coefficients: As in Panel B, β^{MKT} is negatively correlated with β^{UMD} and positively correlated with β^{HML}; Moreover, β^{MKT} and β^{USD} exhibit strong negative relationship with a correlation coefficient of -0.58. The positive correlation between univariate factor betas β^{BOND} and β^{CPI} persists, but there also are surprising observations, such as the negative relationship between β^{BRENT} and β^{UNEMP}. The relationship between β^{FTB} and β^{IP} remains significant with a positive Spearman's rank correlation of 0.38. β^{IP} and β^{UNEMP} exhibit strong negative relationship with a spearman correlation coefficient of -0.43. Another interesting observation from this panel is the strong negative relation between β^{BOND} and β^{MKT} with a Spearman's rank correlation of -0.23.

Table II

Descriptive Statistics of Univariate Factor Betas

Panel A reports the number of observation, mean, median, standard deviation, minimum, maximum, 25th and 75th percentile, skewness and kurtosis of univariate monthly factor betas that are estimated for each stock traded in Borsa Istanbul from the univariate time-series regressions of individual stock returns on the factor over a 36-month rolling-window period for the sample period 1992-2011. Panel B reports pairwise correlation between univariate factor betas. Panel C reports Spearman's rank correlation coefficient between univariate factor betas.

Panel A: Time-series descriptive statistics of univariate factor betas (Overall sample period: 1992-2011)

	N	Mean	Median	Std.Dev	Minimum	Maximum	25th percentile	75th percentile	Skewness	Kurtosis
β^{HML}	41017	0.6889	0.6593	0.8912	-5.7606	5.3249	0.1207	1.2165	0.1041	4.4237
β^{SMB}	36491	0.2888	0.2197	0.8302	-3.0402	4.6047	-0.2365	0.7336	0.5954	4.5140
β^{UMD}	43949	-0.9221	-0.9568	0.8776	-4.0834	2.6844	-1.5005	-0.3557	0.1753	3.1587
β^{CPI}	45869	0.1133	0.0715	3.4335	-16.0166	16.0210	-2.0738	2.4536	-0.1508	3.4581
β^{IP}	45869	-0.0098	-0.0215	0.4295	-2.0872	3.1143	-0.2592	0.2324	0.2664	5.1336
β^{USD}	45869	-0.4372	-0.8501	1.6510	-5.7787	11.8153	-1.3050	-0.2838	2.3016	9.2451
β^{GDP}	45869	-0.1878	-0.2102	2.8656	-19.8535	17.2756	-1.4439	1.3244	-0.4897	6.5935
β^{MKT}	45869	0.8478	0.8511	0.3248	-0.7173	2.2049	0.6501	1.0559	-0.0973	3.5216
β^{M1}	45869	-0.0339	0.0483	1.3681	-21.4016	4.9907	-0.3409	0.4798	-5.1972	50.0172
β^{FTB}	45869	0.0498	0.0508	0.1185	-0.7139	0.6914	-0.0108	0.1103	-0.0966	4.9714
β^{UNE}	45869	0.6723	0.2114	2.3973	-21.9273	40.8262	-0.3344	0.7805	4.4308	38.3346
β^{DEBT}	45869	0.4900	0.3671	1.7925	-11.8051	13.6170	-0.2967	1.3821	0.1081	7.4793
β^{BOND}	32061	-0.4642	-0.2563	0.7634	-6.8987	5.9201	-0.9335	-0.0414	-0.3343	6.3839
β^{BRENT}	45869	0.1402	0.1509	0.3903	-2.1172	2.0465	-0.1003	0.3782	-0.1808	4.6648

Panel B: Correlation matrix of univariate factor betas

	β^{HML}	β^{SMB}	β^{UMD}	β^{CPI}	β^{IP}	β^{USD}	β^{GDP}	β^{MKT}	β^{M1}	β^{FTB}	β^{UNE}	β^{DEBT}	β^{BOND}	β^{BRENT}
β^{HML}	1													
β^{SMB}	0.2619	1												
β^{UMD}	-0.1726	-0.2033	1											
β^{CPI}	0.2138	0.1244	-0.1753	1										
β^{IP}	-0.1858	-0.0297	-0.0236	-0.1839	1									
β^{USD}	-0.0436	-0.0224	-0.2269	0.1679	-0.0979	1								
β^{GDP}	0.1110	0.1650	-0.2193	0.2698	-0.0797	0.1437	1							
β^{MKT}	0.2998	-0.1004	-0.2700	-0.0805	0.0452	-0.1788	-0.0806	1						
β^{M1}	-0.1436	0.0592	-0.1937	-0.0023	-0.0894	0.0692	-0.0175	-0.1056	1					
β^{FTB}	0.0055	0.1244	-0.1719	-0.1574	0.4359	-0.0562	-0.0411	0.1650	0.0555	1				
β^{UNE}	0.0816	-0.0350	0.0541	-0.0201	0.0233	0.2183	-0.0567	0.1904	-0.2319	-0.0061	1			
β^{DEBT}	-0.0032	0.0396	0.0912	0.1127	-0.0750	0.0290	0.0335	0.0014	-0.0159	-0.1182	0.0131	1		
β^{BOND}	0.1136	0.0452	0.2228	0.3477	-0.1864	0.2434	0.0225	-0.2145	-0.2927	-0.2120	0.3506	0.1067	1	
β^{BRENT}	-0.2487	-0.0090	-0.0557	-0.1966	0.2364	-0.0704	-0.0341	0.0506	0.2978	0.1296	-0.1847	-0.0431	-0.3511	1

Panel C: Spearman's rank correlation matrix of univariate factor betas

	β^{HML}	β^{SMB}	β^{UMD}	β^{CPI}	β^{IP}	β^{USD}	β^{GDP}	β^{MKT}	β^{M1}	β^{FTB}	β^{UNE}	β^{DEBT}	β^{BOND}	β^{BRENT}
β^{HML}	1													
β^{SMB}	0.1718	1												
β^{UMD}	-0.0474	-0.1815	1											
β^{CPI}	0.2448	0.0690	0.0303	1										
β^{IP}	-0.3325	0.0294	-0.0966	-0.2386	1									
β^{USD}	0.0350	0.1724	0.3114	0.2959	-0.2215	1								
β^{GDP}	0.0988	0.1234	-0.1447	0.2761	-0.1125	0.1778	1							
β^{MKT}	0.2941	-0.0755	-0.4039	-0.0916	-0.0158	-0.5782	-0.0884	1						
β^{M1}	-0.2059	0.0444	-0.1812	-0.2872	0.2892	-0.1056	-0.1731	0.0362	1					
β^{FTB}	-0.0314	0.2025	-0.2122	-0.2656	0.3811	-0.2384	-0.1020	0.2108	0.3719	1				
β^{UNE}	0.3502	0.0987	0.4455	0.2640	-0.4269	0.1871	-0.0345	0.0179	-0.4164	-0.2407	1			
β^{DEBT}	0.0259	0.0045	0.0578	0.1828	-0.0316	0.0146	0.0072	0.0109	-0.1123	-0.1071	0.2136	1		
β^{BOND}	0.1861	0.0341	0.2652	0.4088	-0.2314	0.3311	0.0274	-0.2278	-0.3318	-0.2598	0.4020	0.1199	1	
β^{BRENT}	-0.3381	-0.0332	-0.1679	-0.4108	0.4053	-0.3309	-0.0968	0.1369	0.3645	0.2799	-0.5046	-0.0530	-0.4400	1

Table III

Univariate Fama-MacBeth cross-sectional regressions of future stock returns on the univariate factor betas

Panel A of this table reports, for the sample period 1995-2011, the average intercept and slope coefficients from the Fama and MacBeth (1973) cross-sectional regressions of one-month ahead individual stock return on the univariate factor betas. In the first stage, monthly factor betas are estimated for each stock from the univariate time-series regressions of stock returns on the factor over a 36-month rolling-window period. In the second stage, the cross-section of one-month-ahead stock returns are regressed on the stocks' factor betas for each month for the period 1995-2011. Newey-West (1987) t-statistics are reported in parentheses to determine the statistical significance of the average intercept and slope coefficients. Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level. Panel B of this table reports the same analysis for three-months-ahead individual stock returns. Panel C of this table reports the same analysis for six-months-ahead individual stock returns.

Panel A: Univariate Fama-MacBeth cross-sectional regressions of one-month ahead stock returns on the univariate factor betas.

Intercept	β^{HML}	β^{SMB}	β^{UMD}	β^{CPI}	β^{IP}	β^{USD}	β^{GDP}	β^{MKT}	β^{M1}	β^{FTB}	β^{UNE}	β^{DEBT}	β^{BOND}	β^{BRENT}
0.0362038	0.00112													
(4.09)**	(0.51)													
0.043097		0.0010												
(4.57)**		(0.38)												
0.0366139			-0.0001											
(4.3)**			-(0.04)											
0.0425786				- 0.0000										
(4.66)				-(0.04)										
0.0443282					-0.0001									
(4.71)**					-(0.04)									
0.0383216						-0.0034								
(4.37)**						-(1.43)								
0.0427221							0.0017							
(4.57)**							(2.40)**							
0.0412365								0.00283						
(5.08)**								(0.43)						
0.0429485									-0.0023					
(4.59)**									-(0.81)					
0.0447048										0.00372				
(4.91)**										(0.27)				
0.0428337											-0.0008			
(4.61)**											-(0.40)			
0.042938												0.00094		
(4.57)**												(0.60)		
0.0252981													-0.0106	
(3.06)**													-(1.70)*	
0.0435812														-0.00472
(4.62)**														-(1.58)

Panel B: Univariate Fama-MacBeth cross-sectional regressions of three-months ahead stock returns on the univariate factor betas.

Intercept	β^{HML}	β^{SMB}	β^{UMD}	β^{CPI}	β^{IP}	β^{USD}	β^{GDP}	β^{MKT}	β^{M1}	β^{FTB}	β^{UNE}	β^{DEBT}	β^{BOND}	β^{BRENT}
0.1212342	0.0028													
(4.22)**	(0.40)													
0.1392531		0.00641												
(4.56)**		(0.82)												
0.1288984			-0.0002											
(4.63)**			-(0.03)											
0.1357726				-0.00033										
(4.42)**				-(0.17)										
0.1433792					0.00064									
(4.58)**					(0.09)									
0.1236488						-0.0135								
(4.51)**						-(1.85)*								
0.1368874							0.0055							
(4.44)**							(2.51)**							
0.143963								-0.0024						
(5.15)**								-(0.13)						
0.1396595									-0.0070					
(4.46)**									-(0.94)					
0.1460151										-0.0297				
(4.74)**										-(0.98)				
0.1378159											-0.0033			
(4.54)**											-(0.58)			
0.1375212												0.00393		
(4.51)**												(1.12)		
0.0809321													-0.0293	
(3.54)**													-(2.07)**	
0.141961														-0.0140
(4.54)**														-(1.29)

Panel C: Univariate Fama-MacBeth cross-sectional regressions of six-months ahead stock returns on the univariate factor betas.

Intercept	β^{HML}	β^{SMB}	β^{UMD}	β^{CPI}	β^{IP}	β^{USD}	β^{GDP}	β^{MKT}	β^{M1}	β^{FTB}	β^{UNE}	β^{DEBT}	β^{BOND}	β^{BRENT}
0.2753734	0.00507													
(4.12)**	(0.34)													
0.2944		0.01706												
(4.27)**		(1.08)												
0.2920857			0.00384											
(4.74)**			(0.22)											
0.2822131				-0.00073										
(4.15)**				-(0.18)										
0.299482					0.00073									
(4.33)**					(0.04)									
0.2538191						-0.0264								
(4.63)**						-(1.64)								
0.2884671							0.01317							
(4.20)**							(2.36)**							
0.2967059								0.00046						
(4.93)**								(0.01)						
0.2893886									-0.0202					
(4.19)**									-(1.29)					
0.3057989										-0.0781				
(4.46)**										-(1.14)				
0.2875946											-0.0054			
(4.31)**											-(0.47)			
0.287076												0.01407		
(4.35)**												(1.70)		
0.1717288													-0.0600	
(3.35)**													-(1.96)**	
0.2954938														-0.02282
(4.29)**														-(0.89)

Table III presents the time-series average intercept and slope coefficients from Eq. (2), the independent variable are the univariate factor betas that are estimated using a fixed 36-month rolling-window period. The corresponding Newey and West (1987) t-statistics are reported in parentheses. Observe that for one-month-ahead stock returns, there is a positive and significant relation between the monthly growth rate of GDP beta (β^{GDP}) and the expected stock returns. The average slope coefficient from the monthly regressions of one-month-ahead individual stock returns on the previous months' GDP beta (β^{GDP}) is 0.0017 with Newey-West t-statistic is 2.40. Moreover, there is a negative and significant relation between the benchmark bonds' beta (β^{BOND}) and the expected stock returns are at the 90% level. The average slope coefficient from the monthly regressions of one-month-ahead individual stock returns on the previous months' benchmark bonds' beta (β^{BOND}) is -0.0106 with a Newey-West t-statistic is -1.70. This finding is suggestive of a negative and significant link between benchmark bonds' interest rate beta (β^{BOND}) and future individual stock returns.

In Panel B of Table III, we use three-months-ahead stock returns as the dependent variable. The significant relation between the monthly growth rate of GDP beta (β^{GDP}) and the expected stock returns persists. The average slope coefficient from the monthly regressions of three-months-ahead individual stock returns on the previous months' GDP beta (β^{GDP}) is 0.0055 with a Newey-West t-statistic of 2.51. Moreover, there is a stronger negative relation between the benchmark bonds' beta (β^{BOND}) and the expected stock returns: The average slope coefficient from the monthly regressions of three-months-ahead individual stock returns on the previous months' benchmark bonds' beta (β^{BOND}) is -0.0293 with a Newey-West t-statistic of -2.07. This shows a negative and significant link between benchmark bonds' interest rate beta (β^{BOND}) and future individual stock returns. Panel C of Table III reports the time-series average intercept and slope coefficients from Eq. (2) using six-months-ahead returns; the results are consistent with shorter return horizons. The average slope coefficient of monthly growth rate of GDP beta (β^{GDP}) is 0.0132 with a Newey-West t-statistic of 2.36, and the average slope coefficient of previous months' benchmark bonds' beta (β^{BOND}) is -0.0600 with a Newey-West t-statistic of -1.96.

In short, the results of univariate analysis show that there exists a positive and significant relation between the monthly growth rate of GDP beta (β^{GDP}) and the expected stock returns at the 95% level. Moreover, there is a negative and significant link between benchmark bonds' interest rate beta (β^{BOND}) and future individual stock returns, and these relationships remain significant for one, three and six-month return horizons.

In addition, the betas of book-to-market, size and momentum do not have any predictive power: The average slope coefficient from the monthly regressions of one-month-ahead individual stock returns on the previous months' book-to-market beta (β^{HML}) is 0.0011 with a Newey-West t-statistic of 0.51. The slope coefficient from the monthly regressions of one-month-ahead individual stock returns on the previous months' size beta (β^{SMB}) is 0.001 with a Newey-West t-statistic of 0.38 and the slope coefficient from the monthly regressions of one-month-ahead individual stock returns on the previous months' momentum beta (β^{UMD}) is -0.0001 with a Newey-West t-statistic of -0.04.

Other than β^{GDP} and β^{BOND}, the remaining 12 macroeconomic and financial risk factor betas, including the market beta, do not have any predictive power over expected future stock returns in univariate analysis. (See Table III).

3.3.2. Four factor model plus β^{GDP} in cross-sectional regressions

In the previous section, we present the predictive power of *GDP* betas (*GDP*) over future stock returns. In this section, other macroeconomic/financial risk factors are dropped from the analysis. Of interest here is whether the earlier results of the analysis hold after controlling for the widely accepted risk factors of book-to-market, size, and momentum along with market factor.

Table IV reports the time-series average intercept and slope coefficients from the Fama-MacBeth cross-sectional regressions of one, three and six-months-ahead individual stock returns on the four-factor model and the monthly growth rate of GDP beta. As previously mentioned, book-to-market (*HML*) and size factor (*SMB*) are estimated by forming quintile portfolios every month using stocks sorted on the basis of book-to-market

and market equity. Then, the average monthly return difference between the highest quintile portfolio and lowest quintile portfolio is calculated. In the first stage, the following regression with a fixed rolling estimation window of 36 months is run:

$$R_{i,t} = \propto_{i,t} + \beta_{i,t}^{MKT} MKT_t + \beta_{i,t}^{HML} HML_t + \beta_{i,t}^{SMB} SMB_t + \beta_{i,t}^{UMD} UMD_t + \beta_{i,t}^{GDP} GDP_t + \varepsilon_{i,t} \quad (3)$$

Where $R_{i,t}$ is the return on stock *i* in month *t*; MKT_t , HML_t ,SMB_t ,UMD_t and GDP_t are, respectively, the market factor, the book-to-market factor, the size factor, the momentum factor and monthly growth rate of GDP in month t. The coefficients $\propto_{i,t}$ and $\beta_{i,t}^{MKT}$, $\beta_{i,t}^{HML}$, $\beta_{i,t}^{SMB}$, $\beta_{i,t}^{UMD}$, $\beta_{i,t}^{GDP}$, are, respectively alpha, the market beta (*MKT*), book-to-market beta (*HML*), size beta (*SMB*), momentum beta (*UMD*) and GDP beta (*GDP*) for stock *i* in month *t*.

In the second stage, monthly cross-sectional regressions are run for the following multivariate specification:

$$R_{i,t+n} = w_t + \vartheta_t^{MKT} \beta_{i,t}^{MKT} + \vartheta_t^{HML} \beta_{i,t}^{HML} + \vartheta_t^{SMB} \beta_{i,t}^{SMB} + \vartheta_t^{UMD} \beta_{i,t}^{UMD} + \vartheta_t^{GDP} \beta_{i,t}^{GDP} + \varepsilon_{i,t+n}$$

For *n*=1, 3 and 6 months (4)

Where $R_{i,t+n}$ is the cumulative return on stock *i* in from month *t* to *t+n*. w_t, ϑ_t^{MKT}, ϑ_t^{HML}, ϑ_t^{SMB}, ϑ_t^{UMD} and ϑ_t^{GDP} are the monthly intercepts and slope coefficients from the Fama-MacBeth regressions.

Table IV

Fama-MacBeth cross-sectional regressions of future stock returns when *GDP* is added on the Fama-French-Carhart four factor model

Panel A of this table reports, for the sample period 1995-2011, the average intercept and slope coefficients from the Fama and MacBeth (1973) cross-sectional regressions of one-month ahead individual stock return on the multivariate (four factor model and monthly growth rate of GDP) factor betas. In the first stage, monthly factor betas are estimated for each stock from the multivariate time-series regressions of stock returns on the factor over a 36-month rolling-window period. In the second stage, the cross-section of one-month-ahead stock returns are regressed on the stocks' factor betas for each month for the period 1995-2011. Newey-West (1987) t-statistics are reported in parentheses to determine the statistical significance of the average intercept and slope coefficients. Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level. Panel B of this table reports the same analysis for three-months-ahead individual stock returns. Panel C of this table reports the same analysis for six-months-ahead individual stock returns.

Panel A: 1 month returns					
Intercept	β^{MKT}	β^{HML}	β^{SMB}	β^{UMD}	β^{GDP}
0.0393	0.0014	0.0020	0.0025	-0.0027	0.0030
(4.65)**	(0.17)	(0.74)	(0.88)	-(0.83)	(2.58)**
Panel B: 3 months returns					
Intercept	β^{MKT}	β^{HML}	β^{SMB}	β^{UMD}	β^{GDP}
0.1348	-0.0014	0.0040	0.0126	-0.0098	0.0095
(4.68)**	-(0.06)	(0.47)	(1.60)	-(1.02)	(3.04)**
Panel C: 6 months returns					
Intercept	β^{MKT}	β^{HML}	β^{SMB}	β^{UMD}	β^{GDP}
0.2773	0.0166	0.0040	0.0349	-0.0147	0.0205
(4.23)**	(0.37)	(0.19)	(2.30)**	-(0.67)	(2.96)**

As shown in Table IV, after controlling for market beta (*MKT*), book-to-market beta (*HML*), size beta (*SMB*) and momentum beta (*UMD*), significance of GDP beta increases; there is a positive and significant relation between β^{GDP} and expected stock returns, in all return horizons up to six-months. The average slope coefficient on *GDP* beta is estimated to be between 0.0030 and 0.0205, with Newey-West t-statistics ranging from 2.58 to 3.04, which indicates that the predictive power of *GDP* beta is considerably stronger than all the other risk factors. The sign of average slope coefficients of *HML* beta and *SMB* beta are consistent with the prior literature; the sign of average slope coefficients *UMD* beta is

negative. Aside from *GDP* beta, only *SMB* beta exhibits some statistical power in six-months-ahead return horizon with an average slope coefficient of 0.0349 and with Newey-West t-statistic of 2.30. All in all, the clear conclusion is that the Fama-MacBeth cross-sectional regressions controlling for well-known risk factors of market, book-to-market, size and momentum provide strong evidence for an economically and statistically significant positive link between monthly growth rate of GDP beta and future individual stock returns.

3.3.3. Four factor model plus β^{BOND} in cross-sectional regressions

Benchmark bonds' interest rate beta (β^{BOND}) was another significant variable in univariate regressions. In this section, we now drop the other macroeconomic/financial risk factors, including monthly growth rate of GDP beta, from our analyses. We investigate the predictive power of benchmark bonds' interest rate beta (β^{BOND}) controlling for widely accepted risk factors of book-to-market, size, and momentum along with market factor.

Table V reports the time-series average intercept and slope coefficients from the Fama-MacBeth cross-sectional regressions of one-month, three-months and six-months-ahead individual stock returns on the four factor model and benchmark bonds' interest rate. In the first stage we run the following regression with a fixed rolling estimation window of 36 months to generate the time-series monthly factor betas:

$$R_{i,t} = \propto_{i,t} + \beta_{i,t}^{MKT} MKT_t + \beta_{i,t}^{HML} HML_t + \beta_{i,t}^{SMB} SMB_t + \beta_{i,t}^{UMD} UMD_t + \beta_{i,t}^{BOND} BOND_t + \varepsilon_{i,t} \quad (5)$$

Where $R_{i,t}$ is the return on stock *i* in month *t*; MKT_t , HML_t ,SMB_t ,UMD_t and $BOND_t$ are, respectively, the market factor, the book-to-market factor, the size factor, the momentum factor and benchmark bonds' interest rate in month t. The coefficients $\propto_{i,t}$ and $\beta_{i,t}^{MKT}$, $\beta_{i,t}^{HML}$, $\beta_{i,t}^{SMB}$, $\beta_{i,t}^{UMD}$, $\beta_{i,t}^{BOND}$, are, respectively alpha, market beta (*MKT*), book-to-market beta (*HML*), size beta (*SMB*), momentum beta (*UMD*) and benchmark bonds' beta (*BOND*) for stock *i* in month *t*.

In the second stage, monthly cross-sectional regressions are run for the following multivariate specification:

$$R_{i,t+n} = w_t + \vartheta_t^{MKT}\beta_{i,t}^{MKT} + \vartheta_t^{HML}\beta_{i,t}^{HML} + \vartheta_t^{SMB}\beta_{i,t}^{SMB} + \vartheta_t^{UMD}\beta_{i,t}^{UMD} + \vartheta_t^{BOND}\beta_{i,t}^{BOND} + \varepsilon_{i,t+n}$$

For n=1, 3 and 6 months (6)

Where $R_{i,t+n}$ is the cumulative return on stock i in from month t to $t+n$, $\beta_{i,t}^{MKT}$, $\beta_{i,t}^{HML}$, $\beta_{i,t}^{SMB}$, $\beta_{i,t}^{UMD}$, $\beta_{i,t}^{BOND}$, are, respectively, market beta (*MKT*), book-to-market beta (*HML*), size beta (*SMB*), momentum beta (*UMD*) and benchmark bonds' beta (*BOND*) for stock i in month t estimated using Eq. (5). w_t, ϑ_t^{MKT}, ϑ_t^{HML}, ϑ_t^{SMB}, ϑ_t^{UMD} and ϑ_t^{BOND} are the monthly intercepts and slope coefficients from the Fama-MacBeth regressions.

Table V

Fama-MacBeth cross-sectional regressions of future stock returns when *BOND* is added on the Fama-French-Carhart four factor model

Panel A of this table reports, for the sample period 1995-2011, the average intercept and slope coefficients from the Fama and MacBeth (1973) cross-sectional regressions of one-month ahead individual stock return on the multivariate (four factor model and benchmark bonds' monthly interest rate (*BOND*) factor betas. In the first stage, monthly factor betas are estimated for each stock from the multivariate time-series regressions of stock returns on the factor over a 36-month rolling-window period. In the second stage, the cross-section of one-month-ahead stock returns are regressed on the stocks' factor betas for each month for the period 1995-2011. Newey-West (1987) t-statistics are reported in parentheses to determine the statistical significance of the average intercept and slope coefficients. Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level. Panel B of this table reports the same analysis for three-months-ahead individual stock returns. Panel C of this table reports the same analysis for six-months-ahead individual stock returns.

Panel A: 1 month returns					
Intercept	β^{MKT}	β^{HML}	β^{SMB}	β^{UMD}	β^{BOND}
0.0215	0.0052	0.0017	0.0005	-0.0013	-0.0109
(3.13)**	(0.81)	(0.93)	(0.32)	-(0.52)	-(1.66)*
Panel B: 3 months returns					
Intercept	β^{MKT}	β^{HML}	β^{SMB}	β^{UMD}	β^{BOND}
0.0712	0.0118	0.0046	0.0003	-0.0005	-0.0315
(3.39)**	(0.61)	(0.92)	(0.07)	-(0.07)	-(1.89)*
Panel C: 6 months returns					
Intercept	β^{MKT}	β^{HML}	β^{SMB}	β^{UMD}	β^{BOND}
0.1546	0.0248	0.0128	-0.0017	0.0079	-0.0830
(3.61)**	(0.63)	(1.30)	-(0.22)	(0.41)	-(2.04)**

Similar to the results in Table IV, after controlling for market beta (*MKT*), book-to-market beta (*HML*), size beta (*SMB*) and momentum beta (*UMD*), benchmark bonds' beta (*BOND*) exhibits statistically significant predictive power; there is a negative and significant relation between β^{BOND} and expected stock returns, especially in longer return horizons. The average slope coefficient on *BOND* beta is estimated to be between -0.0109 and -0.0830, with the Newey-West t-statistics ranging from -1.66 to -2.04 which indicates that the predictive power of *BOND* beta is considerably stronger than all the other factors

included in the analysis. The clear conclusion is that the Fama-MacBeth cross-sectional regressions controlling for well-known risk factors of market, book-to-market, size and momentum provide strong evidence for an economically and statistically significant negative link between benchmark bonds' interest rate beta (*BOND*) and future stock returns.

3.3.4. Four factor model plus β^{GDP} and β^{BOND} in cross-sectional regressions

Controlling for Fama-French-Carhart model, we show that both *GDP* and *BOND* are valid risk factors. To investigate the robustness of both *GDP* and *BOND* beta and their interaction, the statistical significance of the *GDP* and *BOND* variables in the 6-factor model is tested.

Table VI reports the time-series average intercept and slope coefficients from the Fama-MacBeth cross-sectional regressions of one-month, three-months and six-months ahead individual stock returns on the four factor model plus monthly growth rate of GDP and benchmark bonds' interest rate. In the first stage we run the following regression with a fixed rolling estimation window of 36 months to generate the time-series monthly factor betas:

$$R_{i,t} = \propto_{i,t} + \beta_{i,t}^{MKT} MKT_t + \beta_{i,t}^{HML} HML_t + \beta_{i,t}^{SMB} SMB_t + \beta_{i,t}^{UMD} UMD_t + \beta_{i,t}^{GDP} GDP_t \beta_{i,t}^{BOND} BOND_t + \varepsilon_{i,t} \quad (7)$$

In the second stage, monthly cross-sectional regressions are run for the following multivariate specification:

$$R_{i,t+n} = w_t + \vartheta_t^{MKT} \beta_{i,t}^{MKT} + \vartheta_t^{HML} \beta_{i,t}^{HML} + \vartheta_t^{SMB} \beta_{i,t}^{SMB} + \vartheta_t^{UMD} \beta_{i,t}^{UMD} + \vartheta_t^{GDP} \beta_{i,t}^{GDP} + \vartheta_t^{BOND} \beta_{i,t}^{BOND} + \varepsilon_{i,t+n}$$

For n=1, 3 and 6 months (8)

Table VI

Fama-MacBeth cross-sectional regressions of future stock returns when *GDP* and *BOND* are added on the Fama-French-Carhart four factor model

Panel A of this table reports, for the sample period 1995-2011, the average intercept and slope coefficients from the Fama and MacBeth (1973) cross-sectional regressions of one-month ahead individual stock return on the multivariate (four factor model plus monthly growth rate of GDP and benchmark bonds' interest rate) factor betas. In the first stage, monthly factor betas are estimated for each stock from the multivariate time-series regressions of stock returns on the factor over a 36-month rolling-window period. In the second stage, the cross-section of one-month-ahead stock returns are regressed on the stocks' factor betas for each month for the period 1995-2011. Newey-West (1987) t-statistics are reported in parentheses to determine the statistical significance of the average intercept and slope coefficients. Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level. Panel B of this table reports the same analysis for three-months-ahead individual stock returns. Panel C of this table reports the same analysis for six-months-ahead individual stock returns.

Panel A: 1 month returns						
Intercept	β^{MKT}	β^{HML}	β^{SMB}	β^{UMD}	β^{GDP}	β^{BOND}
0.0217	0.0053	0.0016	-0.0006	-0.0018	0.0002	-0.0119
(3.15)**	(0.82)	(0.87)	-(0.34)	-(0.69)	(0.25)	-(1.77)*
Panel B: 3 months returns						
Intercept	β^{MKT}	β^{HML}	β^{SMB}	β^{UMD}	β^{GDP}	β^{BOND}
0.0725	0.0122	0.0040	-0.0004	-0.0024	-0.0002	-0.0372
(3.48)**	(0.62)	(0.82)	-(0.10)	-(0.28)	-(0.09)	-(2.11)**
Panel C: 6 months returns						
Intercept	β^{MKT}	β^{HML}	β^{SMB}	β^{UMD}	β^{GDP}	β^{BOND}
0.1574	0.0274	0.0110	0.0010	0.0027	0.0002	-0.0951
(3.69)**	(0.69)	(1.14)	(0.13)	(0.14)	(0.04)	-(2.12)**

As shown in Table VI, the addition of *BOND* beta ($\beta_{i,t}^{BOND}$) significantly alters the predictive power of *GDP* beta, whereas *BOND* beta remains significant especially for longer horizons. The average slope coefficient on *BOND* beta ($\beta_{i,t}^{BOND}$) is estimated to be between -0.0119 and -0.0951, the Newey-West t-statistics range from -1.77 to -2.12. An important observation in Table VI is that *GDP* beta ($\beta_{i,t}^{GDP}$) does not exhibit predictive power in any return horizon: The average slope coefficient on *GDP* beta ($\beta_{i,t}^{GDP}$) is

estimated to be between -0.0002 and 0.0002, the Newey-West t-statistics range from -0.09 to 0.25. In short, the inclusion of *BOND* beta ($\beta_{i,t}^{BOND}$) mitigate the predictive power of *GDP* beta ($\beta_{i,t}^{GDP}$) which means that *BOND* beta ($\beta_{i,t}^{BOND}$) variable already contains risk-return characteristics that are similar to *GDP* beta ($\beta_{i,t}^{GDP}$); when interest rates in the market are taken into account, the monthly growth rate of GDP is no longer significant. We conclude that the Fama-MacBeth cross-sectional regressions provide strong corroborating evidence for an economically and statistically significant negative link between benchmark bonds' beta ($\beta_{i,t}^{BOND}$) and future stock returns.

As in our previous results, when *GDP* beta ($\beta_{i,t}^{GDP}$) and *BOND* beta ($\beta_{i,t}^{BOND}$) are included to the Fama-French-Carhart 4-factor model, widely accepted risk factors of book-to-market, size, and momentum as well as the market factor do not exhibit predictive power for any return horizon.

3.3.5. Multivariate factor betas in cross-sectional regressions

In this section, we use all risk factors in our analysis and perform the two-step multivariate analysis. Table VII reports the time-series average intercept and slope coefficients from the Fama-MacBeth cross-sectional regressions of one-month, three-months and six-months-ahead individual stock returns on the multivariate factor betas. In the first stage we run the following regression with a fixed rolling estimation window of 36 months to generate the time-series monthly factor betas:

$$R_{i,t} = \propto_{i,t} + \beta_{i,t}^{MKT} MKT_t + \beta_{i,t}^{HML} HML_t + \beta_{i,t}^{SMB} SMB_t + \beta_{i,t}^{UMD} UMD_t + \beta_{i,t}^{CPI} CPI_t + \beta_{i,t}^{IP} IP_t + \beta_{i,t}^{USD} USD_t + \beta_{i,t}^{GDP} GDP_t + \beta_{i,t}^{M1} M1_t + \beta_{i,t}^{FTB} FTB_t + \beta_{i,t}^{UNEMP} UNEMP_t + \beta_{i,t}^{DEBT} DEBT_t + \beta_{i,t}^{BOND} BOND_t + \beta_{i,t}^{BRENT} BRENT_t + \varepsilon_{i,t} \quad (9)$$

In the second stage, monthly cross-sectional regressions are run for the following multivariate specification:

$$R_{i,t+n} = w_t + \vartheta_t^{MKT}\beta_{i,t}^{MKT} + \vartheta_t^{HML}\beta_{i,t}^{HML} + \vartheta_t^{SMB}\beta_{i,t}^{SMB} + \vartheta_t^{UMD}\beta_{i,t}^{UMD} + \vartheta_t^{CPI}\beta_{i,t}^{CPI} + \vartheta_t^{IP}\beta_{i,t}^{IP} + \vartheta_t^{USD}\beta_{i,t}^{USD} + \vartheta_t^{GDP}\beta_{i,t}^{GDP} + \vartheta_t^{M1}\beta_{i,t}^{M1} + \vartheta_t^{FTB}\beta_{i,t}^{FTB} + \vartheta_t^{UNEMP}\beta_{i,t}^{UNEMP} + \vartheta_t^{DEBT}\beta_{i,t}^{DEBT} + \vartheta_t^{BOND}\beta_{i,t}^{BOND} + \vartheta_t^{BRENT}\beta_{i,t}^{BRENT} + \varepsilon_{i,t+n}$$

For *n*=1, 3 and 6 months (10)

Table VII shows that, when all the macroeconomic/financial variables are used in our model, there still is a negative and significant relation between $\beta_{i,t}^{BOND}$ and expected stock returns: For three-months-ahead returns, the average slope coefficient on *BOND* beta ($\beta_{i,t}^{BOND}$) is estimated to be -0.0343 and the Newey-West t-statistics is -1.98. The predictive power of *BOND* beta slightly diminishes for six-month-ahead returns, the average slope coefficient on *BOND* beta ($\beta_{i,t}^{BOND}$) is estimated to be -0.0834 and the Newey-West t-statistics is -1.93. *GDP* beta ($\beta_{i,t}^{GDP}$) does not have any predictive power: The average slope coefficient on *GDP* beta ($\beta_{i,t}^{GDP}$) is estimated to be between -0.0004 and 0.0004, the Newey-West t-statistics range from -0.18 to 0.10. Another notable point in Table VII is that $\beta_{i,t}^{FTB}$ is significant for three and six-months-ahead returns. For three-months-ahead returns, the average slope coefficient on *FTB* beta ($\beta_{i,t}^{FTB}$) is estimated to be 0.0608 and the Newey-West t-statistics is 2.39. For six-months-ahead returns, the average slope coefficient on *FTB* beta ($\beta_{i,t}^{FTB}$) is estimated to be 0.1721 and the Newey-West t-statistics is 3.40. These results can be interpreted using the consumption smoothing model (Hall (1978), Cochrane (1991)): Due to the import driven nature of Turkish economy, when Turkish economy accelerates the foreign trade deficit widens (*FTB* is negative for the whole sample period 1992-2011, i.e. if foreign trade deficit widens, monthly growth rate of *FTB* increases). In addition, if $\beta_{i,t}^{FTB}$ is high, the return of that stock R_i is high during booms (when *FTB* is high, i.e. the foreign trade deficit widens) and the return R_i is low during recessions (when *FTB* is low, i.e. the foreign trade deficit shrinks). Hence we can state that high $\beta_{i,t}^{FTB}$ stocks are procyclical. Procyclical stocks that earn high returns during booms and low returns during recessions are not preferable. Because during recessions, marginal utility of wealth is higher and this is exactly when the procyclical (high $\beta_{i,t}^{FTB}$) stocks perform badly. Thus, at the equilibrium, these stocks need to bring higher returns; our findings support this by the positive ϑ_t^{FTB}. On the other hand, countercyclical (low $\beta_{i,t}^{FTB}$) stocks that earn low returns

during booms and high returns during recessions are preferable because during recessions, marginal utility of wealth is higher, and countercyclical (low $\beta_{i,t}^{FTB}$) stocks perform well. From the investor standpoint, one can argue that countercyclical (low $\beta_{i,t}^{FTB}$) stocks have an embedded put option: hence countercyclical (low $\beta_{i,t}^{FTB}$) stocks earn less.

Table VII further shows that the market beta (*MKT*), book-to-market beta (*HML*), size beta (*SMB*) and momentum beta (*UMD*) do not exhibit predictive power in any return horizon: the Newey-West t-statistics of the average slope coefficient on *HML* beta ($\beta_{i,t}^{HML}$) is estimated to be between 1.06 and 1.38, the Newey-West t-statistics of the average slope coefficient on *SMB* beta ($\beta_{i,t}^{SMB}$) is estimated to be between -0.04 and 0.24, the Newey-West t-statistics of the average slope coefficient on *UMD* beta ($\beta_{i,t}^{UMD}$) is estimated to be between -0.34 and 0.38 and the Newey-West t-statistics of the average slope coefficient on *MKT* beta ($\beta_{i,t}^{MKT}$) is estimated to be between 0.24 and 0.45.

Table VII

Multivariate Fama-MacBeth cross-sectional regressions of future stock returns on the multivariate factor betas

Panel A of this table reports, for the sample period 1995-2011, the average intercept and slope coefficients from the Fama and MacBeth (1973) cross-sectional regressions of one-month ahead individual stock return on the multivariate (all factors) factor betas. In the first stage, monthly factor betas are estimated for each stock from the multivariate time-series regressions of stock returns on the factor over a 36-month rolling-window period. In the second stage, the cross-section of one-month-ahead stock returns are regressed on the stocks' factor betas for each month for the period 1995-2011. Newey-West (1987) t-statistics are reported in parentheses to determine the statistical significance of the average intercept and slope coefficients. Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level. Panel B of this table reports the same analysis for three-months-ahead individual stock returns. Panel C of this table reports the same analysis for six-months-ahead individual stock returns.

Panel A: 1 month returns

Intercept	β^{HML}	β^{SMB}	β^{UMD}	β^{CPI}	β^{IP}	β^{USD}	β^{GDP}	β^{MKT}	β^{M1}	β^{FTB}	β^{UNE}	β^{DEBT}	β^{BOND}	β^{BRENT}
0.024061	0.00202	-6.87E-05	-0.001	-0.0003	0.0021	0.00025	8.5E-05	0.00289	-0.0005	0.01182	-0.0021	-0.0019	-0.0102	-0.0015
(3.64)**	(1.06)	-(0.04)	-(0.34)	-(0.56)	(0.47)	(0.08)	(0.10)	(0.45)	-(0.12)	(0.85)	-(0.72)	-(1.26)	-(1.46)	-(0.34)

Panel B: 3 months returns

Intercept	β^{HML}	β^{SMB}	β^{UMD}	β^{CPI}	β^{IP}	β^{USD}	β^{GDP}	β^{MKT}	β^{M1}	β^{FTB}	β^{UNE}	β^{DEBT}	β^{BOND}	β^{BRENT}
0.078349	0.00538	0.0003938	-8E-05	-0.0008	0.01359	-0.0049	-0.0004	0.00467	-0.0078	0.06078	-0.0059	-0.0056	-0.0343	0.0044
(3.79)**	(1.07)	(0.09)	-(0.01)	-(0.57)	(1.11)	-(0.57)	-(0.18)	(0.24)	-(0.75)	(2.39)**	-(0.65)	-(1.15)	-(1.98)**	(0.28)

Panel C: 6 months returns

Intercept	β^{HML}	β^{SMB}	β^{UMD}	β^{CPI}	β^{IP}	β^{USD}	β^{GDP}	β^{MKT}	β^{M1}	β^{FTB}	β^{UNE}	β^{DEBT}	β^{BOND}	β^{BRENT}
0.171897	0.01377	0.0019903	0.00826	-0.0009	0.03304	-0.0142	0.00037	0.01236	-0.0225	0.17208	-0.0188	-0.014	-0.0834	0.02607
(4.17)**	(1.38)	(0.24)	(0.38)	-(0.31)	(1.28)	-(0.82)	(0.08)	(0.33)	-(0.84)	(3.40)**	-(0.91)	-(1.35)	-(1.93)*	(0.73)

3.3.6. Univariate portfolio analysis of *BOND* beta ($\beta_{i,t}^{BOND}$)

In this section, we dig deeper into the economic reasons behind the negative relation between stocks' *BOND* betas ($\beta_{i,t}^{BOND}$) and future stock returns. To achieve this, non-parametric portfolio analysis is employed where tercile portfolios are formed every month by sorting stocks according to their *BOND* beta ($\beta_{i,t}^{BOND}$). These stocks' debt/equity ratio (leverage) are observed in each tercile to see if there is a significant pattern (difference) in the leverage of high factor beta tercile vs. low factor beta tercile. Portfolios are constructed every month from 1995 to 2011 by sorting individual stocks based on their 36-month *BOND* beta ($\beta_{i,t}^{BOND}$), where portfolio 1 contains stocks with the lowest 30 percent *BOND* beta ($\beta_{i,t}^{BOND}$) and portfolio 3 contains stocks with the highest 30 percent *BOND* beta $\beta_{i,t}^{BOND}$.

Table VIII

Univariate portfolio analysis of stocks sorted by *BOND* beta ($\beta_{i,t}^{BOND}$)

In this table, portfolios are formed every month from 1995 to 2011 by sorting individual stocks on their 36-month *BOND* beta ($\beta_{i,t}^{BOND}$). Portfolio 1 contains stocks with the lowest 30 percent *BOND* beta ($\beta_{i,t}^{BOND}$) and Portfolio 3 contains stocks with the highest 30 percent *BOND* beta ($\beta_{i,t}^{BOND}$). This table reports the average *BOND* beta ($\beta_{i,t}^{BOND}$) and the average debt/equity ratio (leverage) for each portfolio. The third column reports, the average debt/equity ratios that are computed for all the companies in Borsa Istanbul. The last row shows the differences in debt/equity Ratio (leverage) between portfolios 3 and 1. Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level.

Portfolios	Average β^{BOND} in each portfolio	Debt/Equity Ratio (Leverage) For All Companies
Low β^{BOND}	-0.9549	2.2642
		(17.40)
Medium β^{BOND}	-0.4467	2.3005
		(4.57)
High β^{BOND}	0.1078	1.6724
		(15.49)
High β^{BOND} - Low β^{BOND}		-0.5918
Debt/Equity Ratio diff.		-(3.12)**

Table VIII reports the average *BOND* beta ($\beta_{i,t}^{BOND}$) and the average debt/equity ratio (leverage) for each of these *BOND* beta ($\beta_{i,t}^{BOND}$) sorted portfolios. The third column reports, the average debt/equity ratios that are computed for all the companies

in Borsa Istanbul. It is important to note that average *BOND* beta ($\beta_{i,t}^{BOND}$) of low $\beta_{i,t}^{BOND}$ portfolio is actually much higher in magnitude than high $\beta_{i,t}^{BOND}$ portfolio, but it is labelled as such because of its negative sign. We observe that the average $\beta_{i,t}^{BOND}$ is negative for both low and medium $\beta_{i,t}^{BOND}$ portfolios, ranging between -0.9549 and -0.4467, only high $\beta_{i,t}^{BOND}$ portfolio has a positive average $\beta_{i,t}^{BOND}$ of 0.1078. The negative relation between the stock and bond markets is expected because the discounting rate utilized in the valuation of stock prices is closely correlated with market rates. Moreover, higher interest rates may lead to lower stock prices if investors view stocks and bonds as substitutes. The last row of Table VIII shows that when all the firms are considered there is a statistically significant difference in debt/equity ratios (leverage) the extreme portfolios: On average, there is a difference of -0.5918 between the leverage ratios of stocks with high $\beta_{i,t}^{BOND}$ and stocks with low $\beta_{i,t}^{BOND}$ (with a Newey-West t-statistic of -3.12).[26] It is important to note that the relationship between $\beta_{i,t}^{BOND}$ and leverage is not linear. Nevertheless, while the previous analysis have shown that there is a statistically significant negative relationship between $\beta_{i,t}^{BOND}$ and future stock returns, Table VIII shows that these results are mostly driven by Debt/Equity (Leverage) ratio: Firms with high leverage ratios which are more sensitive to changes in the bond market (portfolio 1), have higher future returns and firms with low leverage ratios (portfolio 3) are associated with lower future returns.

We conclude that there exists a negative and significant relation between $\beta_{i,t}^{BOND}$ and individual stock returns, and stocks with high leverage ratio have higher future expected returns, i.e. sensitivity to benchmark bonds' interest rate or leverage is a risk factor for the Turkish stock market.

[26] We also perform the univariate portfolio analysis excluding financial firms; the results are similar.

3.4. Conclusion

We analyze individual stock returns employing various financial and macroeconomic risk factors through univariate and multivariate estimates of factor betas, and we investigate the performance of these factor betas in predicting the cross-sectional variation in individual stock returns in Borsa Istanbul over the sample period 1992-2011. While much research has been devoted on the effects of macroeconomic factors in Turkish markets, this paper is the first sensitivity analysis of expected future stock returns to factor loadings (betas). Moreover, it appears to be the first study that includes all quoted stocks on the BIST instead of a specific index such as BIST-100 or BIST-30, which significantly increases the statistical power of tests performed.

In this paper, we estimate two-step regressions to determine the significance of factor loadings on future stock returns: In the first stage, we compute monthly factor betas for each stock traded in Borsa Istanbul using the univariate and multivariate time-series regressions of individual stock returns on the specific factor over a 36-month rolling-window period. In the second stage, we regress the cross-section of one-month-ahead, three-months-ahead and six-months-ahead cumulative stock returns on the stocks' univariate and multivariate factor betas (derived from the first stage). In other words, we start with the first three years of monthly returns from January 1992 to December 1994 to estimate the factor betas for each stock in our sample; this is followed by a monthly rolling regression approach with a fixed estimation window of 36 months to generate the time-series monthly factor betas. Then, in the second stage, starting from January 1995 we use Fama–MacBeth cross sectional regressions of one-month-ahead, three-months-ahead and six-months-ahead cumulative stock returns on the factor betas. These tests reveal interesting results, showing a negative and significant relation between benchmark bonds' beta and expected future stock returns. Besides benchmark bonds' interest rate, the monthly growth rate of GDP beta also exhibits statistical significance in univariate regressions.

The univariate Fama-MacBeth regressions show that there exist a positive and significant relation between the monthly growth rate of GDP beta ($\beta_{i,t}^{GDP}$) and the expected stock returns at 95% level: Controlling for market beta ($\beta_{i,t}^{MKT}$), book-to-market beta ($\beta_{i,t}^{HML}$), size beta ($\beta_{i,t}^{SMB}$) and momentum beta ($\beta_{i,t}^{UMD}$), does not hinder the

significance of the predictive power of monthly growth rate of GDP beta ($\beta_{i,t}^{GDP}$) beta; there is a positive and significant relation between $\beta_{i,t}^{GDP}$ and expected stock returns, in all return horizons up to six-months. Moreover, the average slope coefficient on *GDP* beta ($\beta_{i,t}^{GDP}$) is estimated to be between 0.0030 and 0.0205, with the Newey-West t-statistics ranging from 2.58 to 3.04 which indicates that the predictive power of *GDP* beta ($\beta_{i,t}^{GDP}$) is stronger than all other risk factors.

The results from univariate two-step regressions also suggest that there exists a negative and significant relation between the benchmark bonds' interest rate beta ($\beta_{i,t}^{BOND}$) and the expected future stock returns at %95 level.

Controlling for Fama-French-Carhart model, we see that *BOND* beta ($\beta_{i,t}^{BOND}$) is a valid risk factor for individual stock returns in Turkish market. The inclusion of *BOND* beta ($\beta_{i,t}^{BOND}$) mitigates the predictive power of *GDP* beta ($\beta_{i,t}^{GDP}$) which means that *BOND* beta ($\beta_{i,t}^{BOND}$) variable already contains risk-return characteristics that are similar to *GDP* beta ($\beta_{i,t}^{GDP}$); when interest rates in the market are taken into account, the monthly growth rate of GDP is no longer significant.

In conclusion, we find that stocks with high *BOND* beta ($\beta_{i,t}^{BOND}$) have a lower debt/equity ratio and stocks with low *BOND* beta ($\beta_{i,t}^{BOND}$) have a higher debt/equity ratio. We conclude that the differences in the leverage ratio cause the differences in the expected returns, i.e. leverage is a valid risk factor for Borsa Istanbul.

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APPENDIX A

Fama-MacBeth Regressions with Original Momentum Factor, 1992-2011

Fama–MacBeth cross-sectional regressions results are computed for stock returns of various holding periods (each panel gives the appropriate holding period) on the following variables: the natural logarithm of the ratio of the book value of equity to the market value of equity measured at the end of December *t-1*, *BM*; the natural logarithm of market equity measured at the end of June, *ME*; the past 6 months stock return as a proxy for momentum, *MOM*; and the change in the logarithm of the number of shares outstanding adjusted for splits to capture the effect of share repurchases and SEOs. *ISSUE*= [Log (shares outstanding, *t*−6) – Log (shares outstanding, *t*−18)]. The number of holding periods in months minus one is used as the lag in Newey-West t-statistics as specified in Pontiff (1996). Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level.

PANEL A: Dependent variable is the 1 month stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.05	0.02				
(5.45)**	(1.90)*				0.84
0.11		0.00			
(4.68)**		(-2.86)**			2.10
0.05			-0.01		
(5.53)**			(-3.12)**		1.46
0.11	0.00	0.00	-0.01		
(4.68)**	(1.11)	(-2.75)**	(-2.82)**		4.20
0.05				0.00	
(4.90)**				(0.28)	1.23
0.08	0.01	0.00	-0.19	-0.01	
(2.66)**	(1.81)*	(-1.01)	(-3.09)**	(-1.24)	7.27
PANEL B: Dependent variable is the 3 month stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.18	0.01				
(5.29)**	(2.02)**				1.45
0.41		-0.02			
(4.54)**		(-3.31)**			2.09
0.18			-0.04		
(5.34)**			(-3.54)**		1.28
0.41	0.01	-0.01	-0.03		
(4.75)**	(1.62)	(-3.46)**	(-3.03)**		4.53
0.16				0.01	
(4.78)**				(0.47)	1.86
0.34	0.01	-0.01	-0.05	-0.04	
(3.32)**	(1.96)*	(-2.17)**	(-3.05)**	(-2.00)**	8.55

PANEL B: Dependent variable is the 6 month stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.40	0.02				
(5.49)**	(2.31)**				1.65
0.89		-0.03			
(4.66)**		(-3.47)**			1.95
0.42			-0.07		
(5.54)**			(-3.85)**		1.06
0.88	0.02	-0.03	-0.07		
(4.76)**	(2.19)**	(-3.42)**	(-3.97)**		4.34
0.32				0.01	
(4.64)**				(0.44)	1.20
0.71	0.04	-0.02	-0.10	-0.12	
(3.13)**	(2.19)**	(-1.89)*	(-2.88)**	(-2.31)**	8.20
PANEL C: Dependent variable is the one - year stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.93	0.05				
(4.83)**	(1.66)*				2.06
2.05		-0.08			
(4.27)**		(-3.14)**			1.81
0.95			-0.21		
(5.09)**			(-3.92)**		0.81
1.93	0.04	-0.07	-0.22		
(4.16)**	(1.34)	(-3.02)**	(-4.13)**		4.19
0.68				0.08	
(4.39)**				(0.82)	0.55
1.35	0.09	-0.04	-0.14	-0.19	
(2.66)**	(2.32)**	(-1.43)	(-2.38)**	(-2.03)**	5.58
PANEL C: Dependent variable is the second - year stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.81	0.03				
(4.97)**	(1.02)				1.78
1.66		-0.05			
(3.91)**		(-2.44)**			1.24
0.81			-0.08		
(5.23)**			(-2.47)**		0.26
1.41	0.01	-0.04	-0.08		
(3.57)**	(0.52)	(-2.02)*	(-2.27)**		3.12
0.72				-0.03	
(4.16)**				(-0.20)	0.56
0.99	0.11	-0.01	-0.08	-0.34	
(1.91)*	(2.00)**	(-0.49)	(-1.42)	(-3.95)**	4.27

APPENDIX B

Fama-MacBeth Cross-Sectional Regressions with winsorized factors, 1992 – 2011

Fama–MacBeth cross-sectional regressions results are computed for stock returns of various holding periods (each panel gives the appropriate holding period) on the following variables: the natural logarithm of the ratio of the book value of equity to the market value of equity measured at the end of December *t-1*, *BM*; the natural logarithm of market equity measured at the end of June, *ME*; the past 6 months stock return as a proxy for momentum, MOM; and the change in the logarithm of the number of shares outstanding adjusted for splits to capture the effect of share repurchases and SEOs. *ISSUE*= [Log (shares outstanding, t−6) – Log (shares outstanding, t−18)]. All right-hand-side variables are winsorized by setting the smallest and largest 0.5% of the observations equal to the value of the observation at the respective 0.5% tail. We do not transform the holding period returns that are used as dependent variables. The number of holding periods in months minus one is used as the lag in Newey-West t-statistics as specified in Pontiff (1996). Coefficients with significant t-statistics at %95 level are marked (**), while (*) are significant at %90 level.

PANEL A: Dependent variable is the 1 month stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.05	0.00				
(5.43)**	(1.92)*				0.82
0.11		0.00			
(4.69)**		(-2.87)**			2.09
0.06			0.00		
(5.74)**			(-3.01)**		1.01
0.12	0.00	0.00	0.00		
(5.02)**	(1.20)	(-2.82)**	(-2.73)**		3.66
0.05				0.00	
(4.94)**				(-0.12)	1.33
0.09	0.01	0.00	-0.01	-0.01	
(2.85)**	(1.82)*	(-0.89)	(-2.91)**	(-1.46)	6.57
PANEL B: Dependent variable is the 3 month stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.18	0.01				
(5.26)**	(2.02)**				1.47
0.41		-0.02			
(4.54)**		(-3.31)**			2.09
0.22			-0.01		
(5.42)**			(-3.27)**		1.14
0.44	0.01	-0.02	-0.01		
(4.96)**	(1.51)	(-3.50)**	(-2.84)**		4.26
0.16				0.00	
(4.78)**				(0.02)	2.00
0.36	0.02	-0.01	-0.01	-0.05	
(3.63)**	(2.21)**	(-2.15)**	(-2.81)**	(-2.21)**	7.84

PANEL C: Dependent variable is the 6 month stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.40	0.02				
(4.85)**	(1.96)**				1.67
0.88		-0.03			
(4.22)**		(-3.17)**			1.93
0.47			-0.03		
(4.82)**			(-2.69)**		1.24
0.93	0.02	-0.03	-0.02		
(4.40)**	(1.76)*	(-3.18)**	(-2.58)**		4.41
0.33				-0.01	
(4.63)**				(-0.24)	1.20
0.76	0.04	-0.02	-0.03	-0.13	
(3.33)**	(2.19)**	(-1.95)*	(-2.78)**	(-2.46)**	7.46
PANEL D: Dependent variable is the one - year stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.93	0.06				
(4.15)**	(1.39)				2.14
2.06		-0.08			
(3.74)**		(-2.74)**			1.79
1.15			-0.07		
(4.08)**			(-2.66)**		0.99
2.06	0.04	-0.07	-0.06		
(3.63)**	(1.08)	(-2.58)**	(-2.70)**		4.27
0.68				0.03	
(4.36)**				(0.43)	0.43
1.44	0.09	-0.04	-0.03	-0.25	
(2.69)**	(2.33)**	(-1.47)	(-1.48)	(-2.34)**	5.73
PANEL E: Dependent variable is the second - year stock return					
Intercept	BM	ME	MOM	ISSUE	Avg. R2
0.82	0.03				
(4.26)**	(0.85)				1.85
1.66		-0.05			
(3.23)**		(-1.98)**			1.20
0.87			-0.02		
(4.35)**			(-2.07)**		0.27
1.44	0.02	-0.04	-0.02		
(3.15)**	(0.44)	(-1.61)	(-1.72)*		3.08
0.72				-0.08	
(4.13)**				(-0.89)	0.47
1.03	0.11	-0.01	-0.03	-0.34	
(1.87)*	(2.02)**	(-0.45)	(-1.51)	(-3.81)**	4.39

APPENDIX C

Turkish Regulations

1. Article 329 of old Turkish Trade Law number 6762 (In Turkish)

"Madde 329 – Şirket, kendi hisse senetlerini temelluk edemiyeceği gibi rehin olarak da kabul edemez. Bu senetlerin temelluku veya rehin alinmasi neticesini doğuran akitler hukumsuzdur. Şu kadar ki; asağida gosterilen akitler bu hukumden mustesnadir:

1. Hisse senetleri sirketin sermayesinin azaltilmasina dair bir karara dayanilarak devralinmissa;

2. Hisse senetleri sirketin kurulmasi veya esas sermayesinin coğaltilmasi dolayisiyle vaki olan istirak taahhudunden baska bir sebepten doğan sirket alacaklarinin odenmesi maksadiyle devralinmissa;

3. Hisse senetleri bir mamelekin veya isletmenin borc ve alacaklariyle beraber temelluk edilmesi neticesinde sirkete gecmisse,

Devralinan hisse senetleri, 1 numarali bentte yazili halde derhal imha edilir ve bu hususta tutulan zabit ticaret siciline verilir. Diğer hallerde bu senetler ilk firsatta tekrar elden cikarilir.

Bu muameleler yillik raporda gosterilir. Şirketce devralinan paylarin umumi heyette temsili caiz değildir."

2. New incentives of the Capital Markets Board Of Turkey (In Turkish)

"SPK, KOSGEB, İMKB ve TSPAKB arasinda 04.02.2011 tarihinde imzalanan isbirliği protokolu kapsaminda, İMKB Gelisen İsletmeler Piyasasi'nda islem gormek uzere, sermaye piyasasi araclarini halka arz edecek KOBİ'lerin halka arza iliskin belirlenecek maliyetlerinin finansmaninin sağlamasi icin KOSGEB tarafindan "Gelisen İsletmeler Piyasasi KOBİ Destek Programi" olusturulmustur.

KOSGEB, “Gelisen İsletmeler Piyasasi KOBİ Destek Programi” ile ust limiti toplam 100.000TL olmak uzere asağidaki tabloda belirtilen sekilde geri odemesiz destek sağlayacaktir.”

3. Article 379 of new Turkish Trade Law number 6102 (In Turkish)

“Bu cercevede, yatirim ortakliklari ve araci kurumlarin kendi hisselerini geri almalarinda uygulanacak esaslara iliskin Kurulumuzun 01.09.2009 tarih ve 27/748 sayili İlke Karari yururlukten kaldirilarak, pay geri alimlari Yeni TTK'da yer alan hukumlere paralel olarak yeni bir İlke Karari ile duzenlenmistir. Yapilan duzenleme ile, paylari İstanbul Menkul Kiymetler Borsasi'nda (İMKB) islem goren tum sirketlerin paylarini İMKB'de geri alabilmelerine iliskin ilke ve esaslar belirlenmis, ayrica İlke Karari'nin Yeni TTK ile uyumu sağlanmistir. Duzenleme kapsaminda, geri alim orani sirketin odenmis/cikarilmis sermayesinin %10'u olarak belirlenmistir.Özellikle son donemde dunya borsalarinda ve İMKB'de gorulen yoğun fiyat hareketlerine karsi, hisse fiyatlarindaki dalgalanmalari azaltici yonde sirketlere imkan taninmasi, ayrica kendi paylari uzerinde islem yapan sirketlerin yaptiklari islemlerin daha seffaf bir ortamda yapilmasinin sağlanmasi ve yatirimcilarin daha doğru bir sekilde bilgilendirilmesi amaclanmistir.”

Şirketin kendi paylarini iktisap veya rehin olarak kabul etmesi

a) Genel olarak

MADDE 379- (1) Bir sirket kendi paylarini, esas veya cikarilmis sermayesinin onda birini asan veya bir islem sonunda asacak olan miktarda, ivazli olarak iktisap ve rehin olarak kabul edemez. Bu hukum, bir ucuncu kisinin kendi adina, ancak sirket hesabina iktisap ya da rehin olarak kabul ettiği paylar icin de gecerlidir.

(2) Paylarin birinci fikra hukmune gore iktisap veya rehin olarak kabul edilebilmesi icin, genel kurulun yonetim kurulunu yetkilendirmesi sarttir. En cok bes yil icin gecerli olacak bu yetkide, iktisap veya rehin olarak kabul edilecek paylarin itibarî değer sayilari belirtilerek toplam itibarî değerleriyle soz konusu edilecek paylara odenebilecek bedelin alt ve ust siniri gosterilir. Her izin talebinde yonetim kurulu kanuni sartlarin gerceklestiğini belirtir.

(3) Birinci ve ikinci fikralardaki sartlara ek olarak, iktisap edilecek paylarin bedelleri dusuldukten sonra, kalan sirket net aktifi, en az esas veya cikarilmis sermaye ile kanun ve esas sozlesme uyarinca dağitilmasina izin verilmeyen yedek akcelerin toplami kadar olmalidir.

(4) Yukaridaki hukumler uyarinca, sadece, bedellerinin tumu odenmis bulunan paylar iktisap edilebilir.

(5) Yukaridaki fikralarda yer alan hukumler, ana sirketin paylarinin yavru sirket tarafindan iktisabi hâlinde de uygulanir. Pay senetleri borsada islem goren sirketler hakkinda, Sermaye Piyasasi Kurulu seffaflik ilkeleri ile fiyata iliskin kurallar yonunden gerekli duzenlemeleri yapar.

4. The communiqué number 40, dated 04/03/2010, Halka acik ortakliklarin sermaye artirimlari yoluyla halka arz

MADDE 7 - (1) Halka acik ortakliklarin sermaye artirimlarinda Kurul'a basvuru oncesinde asağidaki islemler yapilir.

a) Kayitli sermaye sisteminde, yonetim kurulu artirilacak sermaye miktarini ve satis esaslarini belirleyen bir karar alir.

b) Esas sermaye sisteminde; yonetim kurulunca, esas sozlesmenin sermaye maddesinin değisikliğini iceren madde tadil tasarisi hazirlanir ve madde değisikliği icin Kurul'un onayini takiben genel kurulca sermaye artirimi karari alinir. Bu genel kurulda, yeni pay alma haklarinin kismen ya da tamamen kisitlanmasinin toplanti gundemine alinmis olmasi halinde yonetim kurulu tarafindan yeni pay alma haklarinin kisitlanma nedenlerinin ortaklarin bilgisine sunulmasi zorunludur.

c) Yeni pay alma haklarinin tamamen veya kismen kisitlanmak istenmesi durumunda; bu hususun, kayitli sermaye sisteminde esas sozlesme ile yetkili kilinmis yonetim kurulunun alacaği sermaye artirimi kararinda, esas sermaye sisteminde ise genel kurulun alacaği sermaye artirimi kararinda, acikca belirtilmesi gerekir. Kayitli sermaye sisteminde, yonetim kurulunun yeni pay alma haklarini kisitlama karari, Kurulun kayitli sermaye sistemine iliskin duzenlemeleri cercevesinde, alindiği tarihten itibaren 5 is gunu icinde Ticaret Siciline tescil ve TTSG'de ilan edilir.

(2) Bu islemlerden sonra bu Tebliğ'in 3 no'lu ekinde belirtilen belgelerin eklendiği bir dilekce ile paylarin kayda alinmasi icin Kurula basvurulur.

(3) Paylari GİP Listesi'nde bulunan sirketlerin bu kapsamda ihrac edeceği paylarin kayda alinmasi icin bu Tebliğ'in 4 no'lu ekinde belirtilen belgelerin eklendiği bir dilekce ile Kurula basvurulur.

Paylarin Borsada islem goren niteliğe donusturulerek Borsada satisa konu olabilmesi icin yapilacak islemler (*)

MADDE 8 - (1) (Değisik birinci fikra: Seri: I, No: 43 sayili Tebliğ ile) Paylari Borsada islem goren ortakliklarin, Kurul kaydinda olan ancak Borsada islem gormeyen paylari MKK'nin belirlediği esaslar cercevesinde ortak tarafindan MKK uyesi araci kuruluslar vasitasiyla yapilacak talep uzerine Kurul kayit ucretinin Kurul'ca belirlenecek hesaba yatirilmasindan sonra Borsa'da islem goren niteliğe donusur ve Borsa'da satilabilir.

(2) Kurul kayit ucreti, paylarin nominal değeri ile araci kurulus tarafindan islemin onaylandiği tarihte Borsa ikinci seans kapanis fiyati arasindaki fark uzerinden hesaplanir.

(3) MKK, satisi ongorulen pay miktarlarini, muracaati yapan kisilerin isim veya unvanini gunluk olarak toplu halde KAP ile kamuya duyurur. Ayrica, her ayi takip eden 5 is gunu icinde Kurula yazili olarak bildirir.

(4) (Değisik dorduncu fikra: Seri: I, No: 43 sayili Tebliğ ile) Kurul tarafindan aksi bildirilmedikce paylar, satisin duyurulmasindan itibaren 3 is gununden sonra satilabilir. Bu sure Özellestirme İdaresi Baskanliğinin yuruttuğu pay satislari icin uygulanmaz.

(5) Resmi muzayedelere iliskin hukumler sakli kalmak uzere, paylari Borsada islem goren ortakliklarin, Borsada islem gormeyen mevcut paylarinin her turlu yoldan halka cağrida bulunulmasi yoluyla halka arz edilmek istenmesi halinde bu Tebliğ'in 2 no'lu ekinde yer alan belgelerle Kurula basvurulmasi zorunludur.

(6) (Ek fikra: Seri: I, No: 43 sayili Tebliğ ile) Paylari GİP'te islem goren ortakliklarin GİP listesinde bulunmayan paylari Borsada islem goren niteliğe cevrilemez.

(7) (Ek fikra: Seri: I, No: 43 sayili Tebliğ ile) Borsanin ilgili pazarinda gerceklesen toptan satislarda bu madde hukmu uygulanmaz. Ancak, toptan satisa konu Borsada

islem gormeyen nitelikteki mevcut paylarin ayni zamanda Borsada islem goren niteliğe donusturulmek istenmesi durumunda bu maddenin sadece dorduncu fikrasi uygulanmayacaktir. Bu durumda, paylar toptan satisin gerceklestiği tarihte Borsada islem goren niteliğe donusur."

5. Communiqué dated 11.08.2011 number 26/767, Paylari İMKB'de İslem Goren Şirketlerin Kendi Paylarini Satin Almalari Sirasinda Uyacaklari İlke ve Esaslar

Paylari İMKB'de islem goren sirketlerin kendi paylarini satin almalari durumunda uymalari gereken ilke ve esaslar asağidaki sekilde belirlenmistir:

a) Geri alim islemleri, genel kurul tarafindan onaylanmis geri alim programi cercevesinde ve azami 18 aylik bir sure icin verilebilecek yetki dahilinde yonetim kurulu tarafindan yapilir.

b) Geri alimi yapilacak paylar İMKB'de islem goren nitelikte olmali ve alimlar yalnizca İMKB'de gerceklestirilmelidir.

c) Geri alimi yapilacak paylarin, daha once iktisap edilenler dahil, toplam nominal değeri, sirketin odenmis/cikarilmis sermayesinin %10'unu asamaz. Bu oranin asilmasi halinde asima sebep olan paylar, alim tarihini muteakip 6 ay icerisinde elden cikarilir.

d) İktisap edilecek paylarin bedelleri dusuldukten sonra, kalan sirket net aktifi (ozkaynak), en az odenmis/cikarilmis sermaye ile kanun ve esas sozlesme uyarinca dağitilmasina izin verilmeyen yedek akcelerin toplami kadar olmalidir.

e) İMKB'de yapilacak geri alimlara iliskin borsa tarafindan belirlenen islem kurallarina ek olarak asağidaki kurallara uyulmasi zorunludur:

i. Acilis seansi ve 1'inci seansin son 15 dakikasi ile 2'nci seansin ilk ve son 15 dakikasi icinde geri alim emri verilemez.

ii. Geri alim icin verilen fiyat emri, mevcut fiyat tekliflerinden veya en son gerceklesen satis fiyatindan daha yuksek olamaz.

iii. Şirket tarafindan bir gunde geri alimi yapilacak toplam pay miktari, paylarin son uc aydaki gunluk islem miktari ortalamasinin %25'ini gecemez.

f) Şirketin iktisap ettiği kendi paylari ile sirketin tam konsolidasyona tabi tuttuğu finansal duran varliklari tarafindan iktisap edilen ana sirket paylari, ana sirketin genel kurulunun toplanti nisabinin hesaplanmasinda dikkate alinmaz. Bedelsiz paylarin iktisabi haric, sirketin devraldiği kendi paylari hicbir pay sahipliği hakki vermez. Tam konsolidasyona dahil edilen sirketlerin iktisap ettiği ana sirket paylarina ait oy haklari ile buna bağli haklar donar.

g) Geri alinan paylar ile soz konusu paylar cercevesinde edinilmis bedelsiz paylar icin azami elde tutma suresi 3 yili asmamak uzere sirket tarafindan serbestce belirlenebilecek olup, bu sure zarfinda elden cikarilmayan paylar sermaye azaltimi yapilmak suretiyle iptal edilir.

h) Geri alinan paylar, 32 no'lu Turkiye Muhasebe Standardi cercevesinde, bilancoda ozkaynaklar altinda bir indirim kalemi olarak izlenir ve finansal tablo dipnotlarinda gerekli aciklamalar yapilir. Soz konusu paylarin elden cikarilmasindan kaynaklanan kazanc ve kayiplar gelir tablosu ile iliskilendirilemez.

i) Geri alim islemleri ile ilgili olarak;

i.Şirket yonetim kurulu tarafindan, geri alimin amacini, geri alim icin ayrilan fonun toplam tutari ile kaynağini, geri alinabilecek azami pay sayisini, paylarin geri alinmasi icin belirlenen alt ve ust fiyat limitlerini, alimlar icin yetkilendirilen kisileri (tuzel kisi ve yetkilileri dahil), genel kuruldan talep edilecek yetki suresi ile soz konusu programin onaya sunulacaği genel kurul tarihini ve tamamlanmis en son geri alim programinin ozetini iceren bir geri alim programi hazirlanir ve bu program onaya sunulacaği genel kurul tarihinden en az 15 gun once sirket web sitesinde yayimlanarak kamuya duyurulur.

ii. Genel kurul onayina sunulmus geri alim programinda genel kurul tarafindan herhangi bir değisiklik yapilmasi durumunda değistirilmis geri alim programi genel kurul tarihini izleyen is gunu icerisinde yapilacak bir ozel durum aciklamasi ile kamuya duyurulur ve esanli olarak sirketin web sitesinde yayimlanir.

iii. Şirket tarafindan geri alim programi cercevesinde gerceklesen her bir islem icin, islem tarihini izleyen is gunu icerisinde, isleme konu paylarin nominal tutarini, islem fiyatini, sermayeye oranini, varsa bu paylara bağli imtiyazlari ve islem tarihini iceren bir ozel durum aciklamasi yapilir.

iv. Şirket tarafindan, geri alim programinin sona ermesini izleyen 5 is gunu icerisinde, geri alim programi cercevesinde geri alinan paylardan iptal edilenler ve elde tutulanlar icin ayri ayri belirtilmek suretiyle, bir pay icin odenmis olan maksimum ve ortalama geri alim bedelini, geri alimin maliyetini, geri alinan toplam pay sayisini, bu paylarin sermayeye oranini, varsa bu paylara bağli imtiyazlari ve islem tarihlerini iceren ozel durum aciklamasi yapilir. Geri alim programinin ozeti mahiyetindeki bu bilgiler ayrica ilk genel kurulda ortaklarin bilgisine sunulur.

v. Onaylanmis geri alim programinda sonradan genel kurul karari ile değişiklik yapilmasi durumunda soz konusu değişiklikler, sebeplerini de iceren bir ozel durum aciklamasi ile kamuya duyurulur.

j) Geri alimi yapilan paylar sadece borsada satis yoluyla ve ancak aciklanan geri alim programi sona erdikten sonra elden cikarilir. Geri alinan paylar cercevesinde edinilmis bedelsiz paylar icin de ayni esaslar uygulanir.

k) Geri alinan paylarin elden cikarilmasi halinde gerceklesen her bir satis islemi, islem tarihini izleyen is gunu icerisinde sirket tarafindan, isleme konu paylarin nominal tutarini, islem fiyatini, sermayeye oranini, varsa bu paylara bağli imtiyazlari ve islem tarihini iceren bir ozel durum aciklamasi yapilmasi suretiyle kamuya duyurulur.

l) Geri alim islemini muteakip donemlerde, ilgili paylar elden cikarilincaya kadar, yatirim ortakliklari icin hesaplanan birim pay değeri, toplam pay sayisindan geri alinan paylarin cikarilmasi sonucunda bulunacak tedavuldeki pay sayisi esas alinarak hesaplanir.

m) Şirketlerce aciklanmasi ertelenmis icsel bilgiler olmasi durumunda veya pay fiyatini etkilemesi muhtemel ozel durumlarin varliği halinde herhangi bir alim veya satim islemi yapilmaz.

n) Makul gerekcelerin varliği halinde yonetim kurulu tarafindan genel kurulun yetkilendirmeye iliskin karari olmadan da geri alim yapilabilir. Bu kapsamda yapilacak geri alimlara iliskin olarak;

i.Geri alim islemlerine baslanmasindan en az 2 is gunu once sirket tarafindan yapilacak bir ozel durum aciklamasi ile, geri alim yapilacaği hususu, soz konusu geri alimin sebep ve amaci, alinmasi planlanan pay miktari ve odenecek maksimum tutar kamuya duyurulur.

ii. İslem tarihini izleyen is gunu icerisinde, geri alinan paylarin nominal tutarini, islem fiyatini, sermayeye oranini, varsa bu paylara bağli imtiyazlari ve islem tarihini iceren bir ozel durum aciklamasi yapilarak gerceklesen alimlar kamuya duyurulur.

iii. Yonetim kurulu tarafindan ayrica, geri alimin sebep ve amaci, geri alinan paylarin islem tarihi, nominal tutari, islem fiyati, geri alimin maliyeti, sermayeye orani ve varsa bu paylara bağli imtiyazlar hakkinda ilk genel kurulda bilgi verilir.

o) Esas sermaye sisteminde olan sirketler tarafindan sermaye artirimina iliskin genel kurul kararinin alindiği tarihten, kayitli sermaye sisteminde olan sirketler tarafindan ise sermaye artirimina iliskin yonetim kurulu kararinin alindiği tarihten sermaye artirim islemlerinin sona erdiği tarihe kadar geri alim islemi yapilamaz.