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Address of Administration: İMKB, Istanbul Stock Exchange, Reşitpaşa Mah. Tuncay Artun Cd. Emirgan 34467, Istanbul / TURKEY
Contact Address: İMKB (ISE), Strategy Development and Research Department, Reşitpaşa Mah. Tuncay Artun Cd. Emirgan 34467, Istanbul / TURKEY
Phone: (0212) 298 21 00 Fax: (0212) 298 25 00
Internet web site: http://www.ise.org
E-mail: saadet.oztuna@imkb.gov.tr

Objectives and Contents

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For further information, comments and suggestions please contact:
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Reşitpaşa Mah., Tuncay Artun Cad.
Emirgan 34467 Istanbul-TURKEY
Tel:+90 212 298 21 71 Fax: +90 212 298 21 89

The ISE Review

Volume: 11 No: 42

CONTENTS

The ISE Review is included in the "World Banking Abstracts" Index published by the Institute of European Finance (IEF) since 1997, in the Econlit (Jel on CD) Index published by the American Economic Association (AEA) as of July 2000, and in the TÜBİTAK-ULAKBİM Social Science Database since 2005.

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THE EFFECT OF THE CHANGE IN THE EXCHANGE RATE OF US DOLLARS ON THE MARKET INDEX OF DEVELOPING COUNTRIES: JANUARY 2001– NOVEMBER 2006 PERIOD

Semra KARACAER[*]
Yusuf Volkan TOPUZ[**]

Abstract

In this study, we examine the effect of the change in the exchange rate of US Dollars on the market index of 20 developing countries for the period between January 2001 to November 2006 with regression analysis. In adition, this study also compares the effect of the decrease in US Dollars interest rate by the state bank of America in the period from January 2001 to May 2004 and increase in interest rate for the period from June 2004 to November 2006. In other words, we investigate this effect in two different periods separately. As a result, when we look at the change in exchange rate and its effect on each country's market index, we found that change in exchange rate effect significantly the market index of 11 countries. This study also found that the decrease in interest rate by FED effect significantly in 9 countrry's market index and inrease in interest rate effect significantly in 7 countries. According to lag effect of US Dollar change, it is noticed that significant effect was found after 1 and 3 months in four countries.

I. Introduction

After 1971 when the gold standard has been removed (Bretton Woods) the exchange rates are one of the potantial risk resources for firms. Nowadays, exchange rates are fluctuating. As a result, change in the exchange rates effects

[*] Assoc. Prof. Semra Karacaer, Hacettepe Üniversity, Faculty of Economics and Administrative Sciences, Business Department, Beytepe, Ankara.
Tel. 0312- 297 87 01 E-mail: semra@hacettepe.edu.tr

[**] Yusuf Volkan Topuz, Research Assistant, Hacettepe Üniversity, Institute of Social Sciences, Department of Business Administration, Beytepe, Ankara.
Tel. 0312- 297 87 01 E-mail: yvtopuz@hacettepe.edu.tr
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have reached an important level on firms and their international activities (Aldiab, vd., 1994) and so that on the inverstors.

Change in the exchange rates that are difficult the investors to forecast the effect direction and size are one of the basic subjects of the investors that develop potfolios at international levels. The reason is that transaction of exchange rates can directly or indirectly effect the firms which have both local and international activity structures and also their effect direction and size can not be forecasted. Therefore, it is an important fact for investors and finance managers to recognize the movements and see the effects of exchange rates that are important risk sources.

According to Levi (1990), the effect of exchange rate is because of unexcepted changes of exchanges rates and by the simplest exposition, it can be described as the sensitivity of the simple regression coefficient which is associated with the prices and returns of stocks and changes of real exchange rates.

It can be seen that studies about the effects of changes of exchanges rates on firms or industry returns are popular on 1990's. In these studies, effects of exchange rates on stocks are measured both by using the weighted exchange rate index (Jorion, 1990-1991; Choi and Prasad 1995; Chow Lee and Solt, 1997), and by using the changes on the values of the currencies that have an international legalty (Booth and Rotenberg, 1990; Khoo, 1994, Levi 1994; Domingez 1998; Miller and Reuer, 1998 Griffin and Stulz, 2001). On the other hand, in some studies more than one countries are examined (Bodnar and Gentry, 1993; Prasad ve Rajan, 1995, Bartram Karolyi, 2006; Domingez ve Tesar, 2001). On the assumption of the changes of exchange rates may effect firm's stock values or industry returns common point of nearly all these studies is, majoring on the changes of exchange rates and the comparison of firm and industry and not including very strong exchange rate effects.

Normally, in the long run stock returns are considerably effected from exchange rates (Chow, Lee ve Solt, 1997). Especially, it is an unavoidable situation for capital markets which are composed of openness industries and firms to be influenced from the changes of exchange rates. In spite of this situation that has a conflict with efficient markets hypothesis, even in many studies considering developed countries markets (example: Griffen and Stulz,

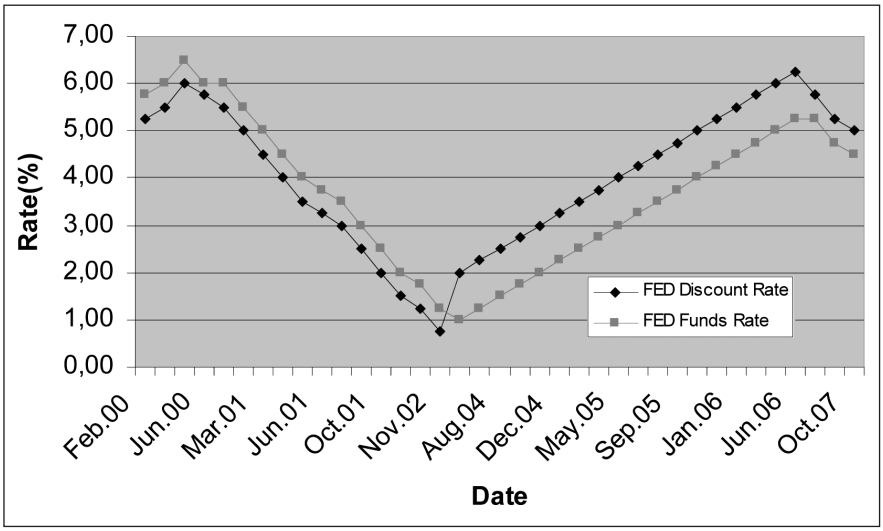
2001; Jorion, 1991; Bodnar and Gentry, 1993; Booth Rotenberg, 1990)–not beeing too strong- statistically significant results are arised. As a result, the effect of the exchange rate is expected to be significant in this study because of considering the developing countires (less efficient).

In the literature it is possible to find studies about the effect of exchange rates in developing countries. Kıymaz (2003) found out that, nearly half of the 109 firms (51 firms) listed on the ISE are significantly effected from the changes of exchange rates. Chue ve Cook (2007) calculated the effect of exchange rates about 900 firms from 15 developing countries. Aybar ve Thirunavukkarasu (2007), calculated the 106 firms of 16 developing countries's effect of exchange rates and they found that more than %60 of the firms have the effect of exchange rates.

However in this study, even the subject enclosures the developing countries, further from the one industy index or firm return, it is tried to calculate the effect of the USA dolar rate nominal changes on the stock market index of 20 developing countries (Argentina, Brazil, Indonesia, Morocco, Philippines, South Africa, South Korea, India, Colombia, Hungary, Malaysia, Mexico, Pakistan, Poland, Rusia, Chile, Thailand, Taiwan, Turkey, Venezuela). This study covers the period between January 2001-November 2006.

Year 2001 is the year that USA stock markets have its final improvements after 7 years and after that again on 2001 starting with the increase on USA's current account deficit, the private investments of USA stock markets have started to decrease (Somçağ, 2005). As is known USA Central Bank (FED), decreased reference interest rate to %1,75 at the end of 2001 and pegged the interest rates during the year. But as there were no inflationist pressures and it is expected that the slowdown on the growt will continue, FED decided to decrease the interest rates to %1,25 at the end of the year (TCMB, 2003). FED's interest rate cut policy which was applied from the beginning of 2001 till the middle of 2004 caused USA dolar lose value against the other currencies. Only in 2002 it was seen that according to the end of 2001, ABD dolar has lost %13 value against euro (TCMB, 2003). As it will be seen on Diagram 1, beginning from January of 2001 till the middle of 2004 FED decreased the interest rates and beginning from June 2004 it orientated to interest accruals.

Figure 1: USA Cenrtal Bank (FED)'s Discount and Fund Rating's Movements Between the Periods of February 2000 and October 2007



Because of the decrease of interest rates at USA and the rapidly loss in value of dollar against international markets caused the movements of funds especially to developing markets and also caused the firms that do their exports and imports dollar based to be effected from this process. However, in reality, was the movement of dollar really effective on the developing countries' stock markets? Was there a dollar risk possibility for these countries? Did the investors reflect such changes to their investments?

Answers to these questions will be found by analysing the market index of 20 developing countries and considering the change of USA dollar against these countries currencies between the periods of 2002:01 and 2006:11. On the other hand, the study will be analysed separately which means in two different subgroups during the periods of 2001:01 and 2004:05 in which FED went to interest rate cut and during the periods of 2004:06 and 2006:11 in which FED went to interest rate hike.

II. Data and Method

In this study that covers the periods from January 2001 to November 2006, the effects of the market index of the chosen 20 developing countries' against the change of USA dollar was analysed. January of 2001 is the period that USA FED had gone to a serious interest rate cut and during the same year FED had gone cut 11 times. After this date to 2004 FED had gone cuts several times. However, after the middle of 2004 we see FED's orientations on interest rate hikes. Consequently, these relations will be examined in two subperiods as (January 2001-May 2004 and June 2004-November).

During the selection of the countries, the 33 country that were placed on the S&P Emerging Market Datebase evaluated and 20 country (Argentina, Brazil, Indonesia, Morocco, Philippines, South Africa, South Korea, India, Colombia, Hungary, Malaysia, Mexico, Pakistan, Poland, Rusia, Chile, Thailand, Taiwan, Turkey, Venezuela) that had confidential datas were included to the study.

In this direction, USA dollar rates against countries's own currencies were gained online from Datastream. Again all countries's market index values were gained online from Global Financial Data. Necessary adjustments and percentage change operations on datas were done covering the studys' period.

Generally in the literature, it can ben seen that the effect of exchange rate is measured by regression model (Example; Soenen ve Hennigar, 1988; Jorion, 1990; Bodnar ve Gentry, 1993; Bartov ve Bodnar, 1994; Domingez ve Tesar, 2001). In this study, we will firstly test the effect of change of dollar rate on the undertaken countries' market indexes by using multiple regression model that includes market indexes which was propounded by Adler and Dumas (1984) and improved by Jorion (1990).

This model:

$$\Delta R_{i,t} = \alpha_i + \beta_1 \Delta R_{m,t} + \beta_2 \Delta S_t + \varepsilon_{i,t} \quad T: 1,...,t$$

$R_{i,t}$: i firms' return at time t
$R_{m,t}$:Index's rate of return at time t (monthly)
S_t : Exchange rate at time t,
$\varepsilon_{i,t}$: Error term

However, as our study was implemented according to the level of countries' market indexes, instead of $\boldsymbol{R_{m,t}}$ a general index that is composed by all the countries' market returns' simple average is used and instead of $\boldsymbol{S_t}$ by using the countries's dollar rates the model will be used. Next, different from this model with the purpose of seeing the effect of the change of the dollar rate on market indexes, the simple regression model that the market index is not included will be used in both general and sub levels.

Thirdly, the following model will be used with a different point of view which means that with the assumption of rates that may be foreseen during the previous periods and accordingly with the assumption of these may be reflected to stock prices before the changes are occured (Çukur ve Topuz, 2006).

This model:

$$\Delta R_{i,t} = \alpha_i + \beta_1 \Delta S_{t+1} + \varepsilon_{i,t} \qquad T: 1,...,t$$

$R_{i,t}$: i'th country's market index at time t,
S_{t+1}: i'th country's dollar rate at time t+1
$\varepsilon_{i,t}$: error term

The information asymmetry between local and foreign investors and the fluctuations on exchange rates can reflect to the firms' values of the developing countires with a lag (Mishra, 2003). In this contex, in our study we finally evaluate the effect of 1, 2 and 3 monthly lag of the dollar rate that is expected to give significant results at the developing countires by the decentralized lag regression model although it has a conflict with efficient markets hypothesis.

III. Findings

When the effect of change of USA dollar rates on the developing countries' market indexes is analysed with a model that includes market factor (all countries' simple avarege of market returns) the results are shown on Table 1. In this model all F-test resulsts are significant and coefficients are joint different than zero. In the calculated regression model the autocorrelation problem was tested with Durbin Watson (DW) and Breusch-Godfrey LM test. New models

were developed including autocorrelation parameters for South Africa and Tayland which have autocorrelation problems according to the LM test and the obtained coefficients in the new situation were shifted to Table 1. When we look at the β_1 coefficients gained from the models there is a significant and positive relationship between all countries' stocks and avarage market potfolios. Contrary to this, according to the β_2 coefficients, the changes on the value of the dollar were statistically significantly effective on the %25 of the stocks that is to say in 5 countries. However, while this effect is negative at Argentina, South Africa and Venezuela, it is positive at Indonesia and Thailand. Yet, with the simplest form, as the results of FED's decisions about the interest rates, the cause on the change of the value of USA dollar and the fund movements to the developing countries are expected to be in negative direction. As a result, it is an unexpected situation that there would be a positive relation between Indonesia and Thailand.

Table 1: The Effect of Changes of Dollar Rate on Market Indexes

$$(\Delta R_{i,t} = \alpha_i + \beta_1 \Delta R_{m,t} + \beta_2 \Delta S_t + \varepsilon_{i,t})$$

Countries	α_i	β_1	β_2	R^2	D.W.	LM	F-Test
Argentina	-0,73 (-0,57)	**1,83** (7,21)***	**-0,48** (-3,06)***	0,49	1,90	0,10 (0,74)	33,6 (0,00)
Brazil	-0,07 (-0,10)	**1,05** (7,24)***	0,13 (0,91)	0,52	2,37	2,54 (0,12)	37,2 (0,00)
Indonesia	1,17 (1,39)	**0,77** (4,57)***	**0,52** (2,68)***	0,34	2,21	0,90 (0,34)	17,4 (0,00)
Morocco	0,57 (0,80)	**0,31** (2,25)**	-0,10 (-0,35)	0,07	2,05	0,16 (0,68)	2,62 (0,00)
Philippines	-0,22 (-0,28)	**0,63** (4,04)***	0,30 (0,64)	0,18	2,44	0,06 (0,05)	8,86 (0,00)
South Africa[a]	-0,32 (-0,63)	**1,01** (9,62)***	**-0,25** (-2,78)***	0,60	2,02	0,41 (0,42)	33,9 (0,00)
South Korea	-0,84 (-1,28)	**1,41** (10,6)***	-0,27 (-0,93)	0,63	1,94	0,00 (0,97)	58,5 (0,00)
India	-0,23 (-0,36)	**1,03** (7,99)***	0,27 (0,52)	0,52	2,05	0,08 (0,77)	36,9 (0,00)
Colombia	**2,17** (2,34)**	**0,95** (4,85)***	-0,02 (-0,04)	0,29	1,92	0,02 (0,86)	14,1 (0,00)
Hungary	-0,26 (-0,43)	**0,92** (7,89)***	-0,07 (-0,45)	0,48	1,75	0,70 (0,40)	31,2 (0,00)
Malaysia	-0,17 (-0,30)	**0,53** (4,66)***	0,93 (0,65)	0,26	1,73	0,96 (0,32)	12,0 (0,00)
Mexico	0,21 (0,56)	**1,00** (13,41)***	0,13 (0,73)	0,74	2,20	1,00 (0,31)	100 (0,00)
Pakistan	1,42 (1,23)	**0,79** (3,52)***	1,73 (1,55)	0,18	2,29	1,90 (0,17)	7,7 (0,00)
Poland	-0,44 (-0,72)	**1,01** (8,00)***	-0,17 (-0,90)	0,49	1,90	0,01 (0,92)	33,3 (0,00)
Russia	0,53 (0,61)	**1,38** (7,95)***	-0,38 (-0,45)	0,48	2,27	1,37 (0,24)	32,5 (0,00)
Chile	0,16 (0,33)	**0,58** (5,01)***	-0,02 -0,14	0,34	1,91	0,07 (0,78)	17,8 (0,00)
Thailand[a]	-0,14 (-0,21)	**0,86** (5,64)***	0,81 (2,00)**	0,51	2,11	2,61 (0,11)	22,9 (0,00)
Taiwan	-1,63 (-2,19)**	**1,24** (8,12)***	0,20 (0,37)	0,52	2,04	0,26 (0,60)	37,4 (0,00)
Turkey	-0,39 (-0,23)	**1,58** (4,22)***	0,12 (0,67)	0,35	2,32	2,32 (0,13)	18,7 (0,00)
Venezuela	1,18 (0,94)	**0,91** (3,78)***	-0,47 (2,89)***	0,22	1,74	0,83 (0,36)	9,7 (0,00)

Note: ***,** and * according to the calculated t value for the regression coefficients denote statistical significance at the 1 %, 5% and 10% levels. [a]During the first solution according to the Breusch-Godfrey LM test autocorrelation problem was seen. For that reason to solve the serial correlations between error terms, the autocorrelation parameters were included into the model and solved again.

With a similar approach, when we look at Table 2 that shows the one to one effect of changes of dollar rate on stocks, the changes of dollar rate have statistically significance on 11 (11/20=%55) countries' market indexes. From these countries only in Argentina and Venezuela the changes of dollar rate effect the market indexes negatively as it is expected. However, it is surprising that in the other 9 countries the significant coefficients are positive.

Table 2: The One to One Effect of Changes of Dollar Rate on Market Indexes

$$(\Delta R_{i,t} = \alpha_i + \beta_1 \Delta S_t + \varepsilon_{i,t})$$

Countries	α_i	β_1	R^2	D.W.	LM	F-Test
Argentina	**3,09** (1,99)**	**-0,61** (-2,96)***	0,11	1,80	0,24 (0,62)	8,8 (0,00)
Brazil	**2,23** (2,83)***	**0,60** (3,54)***	0,15	2,08	0,43 (0,51)	12,5 (0,00)
Indonesia	**2,83** (3,27)***	**0,71** (3,28)***	0,13	1,86	0,21 (0,64)	10,7 (0,00)
Morocco	**1,27** (1,89)***	**-0,12** (-0,38)	0,00	2,03	0,04 (0,82)	0,1 (0,69)
Philippines	**1,15** (1,45)	**0,56** (1,07)	0,00	1,95	0,00 (0,99)	1,14 (0,28)
South Africa	**1,80** (2,49)***	**-0,15** (-1,08)	0,02	2,05	0,09 (0,75)	1,2 (0,28)
South Korea	**1,83** (1,89)*	**0,59** (1,33)	0,03	1,71	0,37 (0,54)	1,8 (0,18)
India	**1,92** (2,45)**	**1,58** (2,30)**	0,06	1,87	0,24 (0,62)	5,3 (0,02)
Colombia	**4,25** (4,49)***	**0,72** (1,90)*	0,05	1,79	0,46 (0,49)	3,6 (0,06)
Hungary	**1,65** (2,22)**	**0,08** (0,35)	0,00	2,01	0,00 (0,94)	0,1 (0,72)
Malaysia	**0,88** (1,48)	**2,16** (1,35)	0,03	1,67	1,35 (0,24)	1,8 (0,18)
Mexico	**2,52** (3,99)***	**0,79** (2,45)**	0,08	1,82	0,04 (0,84)	6,0 (0,01)
Pakistan	**3,17** (2,82)***	**1,94** (1,60)	0,03	2,28	1,46 (0,22)	2,6 (0,11)
Poland	**1,51** (1,92)*	**0,28** (1,16)	0,02	2,12	0,29 (0,59)	1,4 (0,24)
Russia	**3,36** (3,09)***	**1,08** (0,96)	0,01	2,08	0,32 (0,57)	0,9 (0,34)
Chile	**1,35** (2,62)***	**0,50** (2,79)***	0,10	2,05	0,15 (0,69)	7,8 (0,07)
Thailand	**1,54** (1,86)*	**2,15** (4,43)***	0,22	2,13	1,19 (0,27)	19,6 (0,00)
Taiwan	**1,01** (1,08)	**1,53** (2,13)**	0,06	1,70	0,52 (0,47)	4,5 (0,03)
Turkey	**3,80** (2,65)***	**0,95** (3,96)***	0,18	2,33	2,18 (0,14)	15,0 (0,00)
Venezuela	**3,32** (2,72)***	**-0,36** (-2,06)**	0,05	1,55	2,48 (0,12)	4,2 (0,04)

Note: ***,** and * denote statistical significance at the1 %, 5% and 10% levels according to t test

With the assumption of the the values of the changes of exchange rates that can be forseed and consequently the movements of the subsequent period rates that can be reflected to todays' stocks are shown at Table 3. According to this, the one to one effect of the changes of the subsequent period dollar on the market index are seen only in %15 (3/20) of the countries. While this effect is negative for Argentina, it is positive for Indonesia and India.

Table 3: The One to One Effect of the Changes of the Subsequent Period of Dollar Rate on Market Indexes

$$(\Delta R_{i,t} = \alpha_i + \beta_1 \Delta S_{t+1} + \varepsilon_{i,t})$$

Countries	α_i	β_1	R^2	D.W.	LM	F-Test
Argentina	**3,06** (1,91)*	**-0,49** (-2,34)**	0,08	2,05	0,26 (0,60)	5,49 (0,02)
Brazil	**2,14** (2,49)***	0,21 (1,54)	0,01	2,18	1,05 (0,30)	1,31 (0,25)
Indonesia	**2,78** (3,03)***	**0,41** (1,80)*	0,03	2,00	0,01 (0,95)	3,26 (0,07)
Morocco	**1,41** (2,11)**	-0,44 (-0,15)	0,02	2,07	0,15 (0,69)	2,10 (0,15)
Philippines	1,14 (1,42)	0,58 (1,09)	0,02	1,99	0,02 (0,88)	1,18 (0,27)
South Africa	**1,70** (2,31)**	0,10 (0,72)	0,01	2,05	0,10 (0,74)	0,52 (0,47)
South Korea	**2,07** (2,07) **	0,03 (0,06)	0,00	1,76	0,16 (0,68)	0,04 (0,95)
India	**1,92** (2,37)**	**1,22** (1,73)*	0,04	1,82	0,45 (0,50)	3,02 (0,09)
Colombia	**4,35** (4,47)***	0,32 (0,83)	0,01	1,74	0,87 (0,35)	0,69 (0,40)
Hungary	**1,48** (1,99)**	0,35 (1,61)	0,04	2,00	0,00 (0,97)	2,59 (0,11)
Malaysia	0,83 (1,40)	1,11 (0,70)	0,01	1,71	1,15 (0,28)	0,49 (0,48)
Mexico	**2,23** (3,40)***	-0,40 (-1,19)	0,02	1,71	0,62 (0,43)	1,43 (0,23)
Pakistan	**3,17** (2,74)***	0,20 (0,16)	0,00	2,18	0,60 (0,44)	0,02 (0,87)
Poland	**1,51** (1,90)*	0,17 (0,68)	0,01	2,11	0,25 (0,61)	0,47 (0,49)
Russia	**3,31** (3,00)***	0,68 (0,60)	0,01	2,09	0,33 (0,56)	0,36 (0,54)
Chile	**1,33** (2,46)**	0,21 (1,13)	0,02	2,10	0,31 (0,57)	1,28 (0,26)
Thailand	**2,09** (2,21)**	0,22 (0,39)	0,00	2,18	2,13 (0,14)	0,15 (0,69)
Taiwan	1,00 (1,02)	0,35 (0,47)	0,00	1,71	0,26 (0,60)	0,22 (0,63)
Turkey[a]	**3,13** (2,01)**	0,45 (0,14)	0,09	2,09	2,32 (0,13)	3,26 (0,04)
Venezuela	**3,58** (2,83)***	-0,33 (-0,18)	0,00	1,65	1,49 (0,22)	0,33 (0,85)

Note: ***,** and * denote statistical significance at the1 %, 5% and 10% levels according to t test. [a]During the first solution according to the Breusch-Godfrey LM test autocorrelation problem was seen. For that reason to solve the serial correlations between error terms, the autocorrelation parameters were included into the model and solved again.

With the assumption of USA dollar that can be effective on stocks during 1, 2 and 3 monthly lags are shown at Table 4 on which the results of the decentralized lag regression model has applied. In spite of the situation that has a conflict with the effecient markets hypothesis, in this study which considers the developing countries, it was seen that lags can be significant. According to the result of these analysis, 1 month lagged effect of dollar is said to be for 4 (%20) countires' market index. A 1 month lagged effect of dollar has a negative effect for Turkey and Brazil whereas it is positive at Mexico and Venezulea. The 3 months lagged effect of dollar is again significally observed at 4 (%20) countries. While this effect is negative for Russia, it is positive for Hungary, Thailand and Venezuela. On the other hand, in this model all the market indexes (β_1) have significant and positive values. The immediate (current) effect of dollar on stocks (β_2) are significant in 5 (%25) countries.

Table 4: Lagged Effect of Changes of Dollar Rate on Market Indexes

$$(\Delta R_{i,t} = \alpha_i + \beta_1 \Delta R_{m,t} + \beta_2 \Delta S_t + \beta_3 \Delta S_{t-1} + \beta_4 \Delta S_{t-2} + \beta_5 \Delta S_{t-3} + \varepsilon_{i,t})$$

Countries	α_1	β_1	β_2	β_3	β_4	β_5	R^2	DW	LM	F-Test
Argentina	-0,51 (-0,37)	**1,75** (6,23)***	**-0,63** (3,55)***	0,18 (1,02)	0,27 (1,52)	-0,06 (0,35)	0,46	1,85	1,32 (0,27)	12,7 (0,00)
Brazil	-0,24 (-0,35)	**1,12** (6,83)***	0,15 (1,07)	**-0,37** (-2,79)***	-0,04 (-0,31)	0,15 (1,17)	0,53	2,46	1,24 (0,30)	14,4 (0,00)
Indonesia	1,23 (1,34)	**0,79** (3,99)***	**0,46** (2,20)**	-0,02 (-0,08)	-0,04 (0,19)	-0,25 (1,24)	0,33	2,20	1,44 (0,23)	6,26 (0,00)
Morocco	-0,03 (0,03)	**0,49** (3,22)***	-0,01 (-0,03)	0,10 (0,38)	0,28 (0,91)	-0,08 (-0,27)	0,14	1,94	0,07 (0,97)	2,1 (0,07)
Philippines	-0,03 (-0,03)	**0,56** (3,11)***	0,19 (0.38)	0,25 (0.50)	-0,13 (-0.26)	-0,02 (-0.04)	0,14	2,42	1,53 (0,23)	2,1 (0,07)
South Africa[a]	-0,42 (-0,80)	**0,97** (8,98)***	**-0,24** (-2,81)***	0,03 (0,40)	-0,11 (-1,30)	-0,09 (-1,00)	0,64	2,00	0,87 (0,42)	15,01 (0,00)
South Korea	-0,58 (-0,77)	**1,29** (8,59)***	-0,20 (-0,68)	0,29 (-1,05)	-0,19 (-0,67)	0,05 (0,16)	0,59	2,03	0,04 (0,84)	18,2 (0,00)
India	0,006 (0,01)	**1,00** (7,04)***	0,30 (0,57)	0,29 (0,57)	-0,44 (-0,84)	-0,03 (-0,05)	0,49	2,07	0,17 (0,67)	12,1 (0,00)
Colombia	**2,15** (2,13)**	**0,93** (4,08)***	-0,03 (-0,07)	0,13 (0,37)	-0,13 (-0,36)	-0,31 (-0,87)	0,26	1,94	0,25 (0,85)	4,5 (0,02)
Hungary	-0,15 (-0,24)	**0,94** (7,21)***	-0,12 (-0,74)	-0,01 (-0,05)	-0,05 (-0,28)	**0,28** (1,70)*	0,49	1,85	1,30 (0,28)	11,9 (0,00)
Malaysia[a]	0,26 (0,48)	**0,46** (3,78)***	0,50 (0,33)	1,00 (0,59)	-1,72 (-0,96)	0,04 (0,02)	0,35	2,14	2,07 (0,13)	4,62 (0,00)
Mexico	0,35 (0,83)	**0,94** (10,2)***	0,10 (0,52)	**0,37** (2,04)**	-0,02 (-0,09)	-0,02 (-0,12)	0,73	2,23	0,63 (0,59)	33,5 (0,00)
Pakistana[a]	1,53 (1,24)	**0,79** (3,02)***	1,51 (0,97)	1,83 (1,32)	0,20 (0,15)	0,38 (0,30)	0,28	2,06	1,02 (0,36)	3,24 (0,00)
Poland	-0,35 (-0,56)	**1,11** (8,24)***	-0,15 (-0,86)	-0,05 (-0,28)	-0,13 (-0,77)	0,03 (0,13)	0,53	2,07	1,41 (0,24)	14,4 (0,00)
Russia	0,32 (0,35)	**1,45** (7,58)***	-0,24 (-0,25)	0,01 (0,00)	0,66 (0,65)	**-1,66** (-1,74)*	0,49	2,30	1,44 (0,23)	11,9 (0,00)
Chile	-0,06 (-0,10)	**0,71** (5,16)***	-0,06 (-0,31)	-0,15 (-0,99)	-0,26 (-1,56)	-0,06 (-0,41)	0,37	1,97	0,60 (0,61)	7,45 (0,00)
Thailand	-0,29 (-0,39)	**0,87** (5,40)***	**0,98** (2,23)**	-0,27 (-0,69)	-0,53 (-1,34)	**0,72** (1,87)*	0,49	2,55	1,91 (0,13)	12,3 (0,00)
Taiwan	**-2,10** (-2,88)***	**1,28** (8,21)***	-0,05 (-0,10)	0,36 (0,65)	0,11 (0,21)	-0,81 (-1,58)	0,54	1,96	0,22 (0,87)	14,8 (0,00)
Turkey[a]	-1,72 (-1,24)	**1,85** (4,94)***	0,15 (0,48)	**-0,58** (-2,64)***	**-0,31** (-1,47)	0,31 (1,16)	0,51	1,87	0,23 (0,62)	10,3 (0,00)
Venezuela	**3,47** (2,26)**	**0,54** (1,93)**	**-0,36** (-2,06)**	**0,30** (1,68)*	0,26 (1,48)	**0,44** (2,61)***	0,26	1,53	1,05 (0,37)	4,5 (0,00)

Note: ***,** and * denote statistical significance at the1 %, 5% and 10% levels according to t test [a]During the first solution according to the Breusch-Godfrey LM test autocorrelation problem was seen. For that reason to solve the serial correlations between error terms, the autocorrelation parameters were included into the model and solved again.

In Table 5, during the subperiods 2001:01 and 2004:05 when FED had cut interest rate, the results of the analysis of one to one effect of change of dollar rate on market indexes are shown. In this period, it was seen that the effect of change of dollar may statistically significantly be effective in 9 (%45) countries. While this effect is positive for 6 countries, it is negative for the remaining 3. Whereas in this sub period that dollar lost value at international markets and fund movement to developing countries, it is expected that in the majority of the countries the relationships were negative rather than positive.

Table 5: The One to One Effect of Changes of Dollar Rate on Market Indexes (2001:01-2004:05)/($\Delta R_{i,t} = \alpha_i + \beta_1 \Delta S_t + \varepsilon_{i,t}$)

Countries	α_i	β_1	R^2	D.W.	LM	F-Test
Argentina	1,64 (0,71)	**-0,65** (-2,79)***	0,16	1,59	0,98 (0,32)	7,79 (0,00)
Brazil	**2,13** (1,91)*	**0,63** (3,03)***	0,19	2,12	0,54 (0,46)	9,23 (0,00)
Indonesia	**2,26** (1,70)*	**0,66** (2,42)**	0,13	1,81	0,28 (0,59)	5,58 (0,02)
Morocco	0,39 (0,59)	-0,14 (-0,51)	0,007	2,19	0,48 (0,49)	0,27 (0,60)
Philippines	0,31 (0,25)	0,14 (0,18)	0,01	1,81	0,13 (0,71)	0,03 (0,85)
South Africa	1,15 (1,10)	**-0,32** (-1,78)*	0,07	2,06	0,09 (0,75)	3,20 (0,08)
South Korea	2,12 (1,40)	0,65 (0,99)	0,03	1,58	0,51 (0,47)	0,99 (0,32)
India	0,67 (0,58)	1,65 (1,47)	0,05	1,77	0,39 (0,53)	2,18 (0,14)
Colombia	**4,66** (3,89)***	0,71 (1,47)	0,05	1,80	0,03 (0,86)	2,18 (0,14)
Hungary	1,14 (1,14)	-0,08 (-0,28)	0,002	1,99	0,00 (0,98)	0,08 (0,77)
Malaysia	0,90 (0,94)	-20,3 (-0,81)	0,02	1,67	0,72 (0,39)	0,65 (0,42)
Mexico	**2,03** (2,24)**	**0,85** (2,06)**	0,09	1,67	0,27 (0,60)	4,28 (0,04)
Pakistan	**3,23** (1,89)*	2,02 (1,24)	0,38	2,44	2,00 (0,16)	1,55 (0,22)
Poland	0,95 (0,81)	-0,03 (-0,08)	0,00	1,96	0,00 (0,92)	0,01 (0,93)
Russia	**3,48** (2,19)**	1,22 (0,66)	0,01	2,13	0,44 (0,50)	0,44 (0,50)
Chile	1,25 (1,61)	**0,66** (2,70)***	0,15	2,16	0,32 (0,57)	7,29 (0,01)
Thailand	**2,37** (1,82)*	**2,98** (3,69)***	0,26	2,24	1,27 (0,26)	13,6 (0,00)
Taiwan	1,00 (0,64)	1,87 (1,35)	0,04	1,66	0,43 (0,51)	1,83 (0,18)
Turkey	**4,38** (1,82)*	**0,93** (2,83)***	0,17	2,39	1,67 (0,20)	8,01 (0,01)
Venezuela	**4,18** (2,18)**	**-0,38** (-1,78)*	0,07	1,65	0,66 (0,41)	3,17 (0,08)

Note: ***,** and * denote statistical significance at the1 %, 5% and 10% levels according to t test

Finally, in Table 6 in the second subperiod which includes 2004:06 and 2006:11 when FED had realized interest rate hike, the results of one to one effects of the changes of dollar on market indexes are shown. In this table, the effect of change of dollar rate on stocks are significant in 7(%35) countries. However, in this subperiod, the statistically significant β_1 are all positive. Contrary to the expectations, the change of the dollar rate and the market indexes moved in the same direction.

Table 6: The One to One Effect of Changes of Dollar Rate on Market Indexes (2004:06-2006:10)/($\Delta R_{i,t} = \alpha_i + \beta_1 \Delta S_t + \varepsilon_{i,t}$)

Countries	α_i	β_1	R^2	D.W.	LM	F-Test
Argentina	**5,14** (2,67)***	0,98 (0,51)	0,01	2,44	1,65 (0,20)	0,26 (0,60)
Brazil	**2,60** (2,06)**	0,46 (1,26)	0,05	2,04	0,03 (0,85)	1,5 (0,23)
Indonesia	**3,59** (3,66)***	**1,11** (2,49)**	0,18	2,07	0,20 (0,65)	6,23 (0,02)
Morocco	**2,45** (1,88)*	-0,01 (-0,01)	0,00	2,05	0,03 (0,85)	0,00 (0,99)
Philippines	**1,92** (2,05)**	1,15 (1,58)	0,08	2,35	1,06 (0,31)	2,51 (0,12)
South Africa	**2,94** (3,38)***	0,27 (1,40)	0,06	2,37	1,62 (0,21)	1,98 (0,17)
South Korea	1,48 (1,35)	0,54 (0,33)	0,03	2,27	0,65 (0,42)	0,96 (0,33)
India	**3,63** (3,76)***	**1,52** (2,02)**	0,12	2,39	1,10 (0,30)	4,10 (0,05)
Colombia	**3,62** (2,19)**	0,82 (1,26)	0,05	1,78	0,19 (0,66)	1,6 (0,21)
Hungary	**2,47** (2,19)**	0,30 (0,94)	0,03	2,14	0,15 (0,69)	0,89 (0,35)
Malaysia	0,83 (1,59)	**2,23** (2,54)**	0,18	1,94	0,10 (0,74)	6,47 (0,01)
Mexico	**3,27** (3,73)***	0,47 (0,82)	0,02	2,24	0,71 (0,40)	0,68 (0,41)
Pakistan	**3,04** (2,18)**	1,68 (0,89)	0,03	1,78	0,19 (0,66)	0,80 (0,37)
Poland	**2,06** (2,23)**	**0,60** (2,21)**	0,15	2,5	2,21 (0,15)	4,9 (0,03)
Russia	**3,23** (2,16)**	1,00 (0,72)	0,02	1,97	0,00 (0,99)	0,53 (0,47)
Chile	**1,84** (2,96)***	0,07 (0,29)	0,003	1,72	0,27 (0,60)	0,08 (0,77)
Thailand	0,57 (0,84)	**1,33** (3,56)***	0,31	1,87	0,09 (0,75)	12,7 (0,00)
Taiwan	1,06 (1,56)	**1,27** (2,80)***	0,22	2,29	0,71 (0,40)	7,89 (0,01)
Turkey	**2,93** (2,58)***	**1,19** (3,64)***	0,32	1,96	0,01 (0,91)	13,2 (0,00)
Venezuela[a]	**2,86** (2,40)**	0,79 (1,33)	0,20	1,92	0,02 (0,87)	3,31 (0,05)

Note: ***,** and * denote statistical significance at the1 %, 5% and 10% levels according to t test
[a]During the first solution according to the Breusch-Godfrey LM test autocorrelation problem was seen. For that reason to solve the serial correlations between error terms, the autocorrelationparameters were included into the model and solved again

IV. Conclusion

Harvey (1995), examined that in spite of the strong correlation between the movements of exchange rates and the change of stock returns of developing countries, changes of the Exchange rates do not explain the average stock returns. However, it can be seen from the results of our study that in the model which contains change of USA dollar and average market index, in the 5 (%25) countries from the sample, market indexes are statistically significantly effected with the change of dollar. In addition to this when we look at the model that average market index is not considered and the one to one effect of change of dollar on market indexes, it was seen that the change of dollar is effective on the 11 (%55) countries' market indexes. From 9 countries that this effect is observed, while 2 of them have a negative relationship, 7 of them have a positive relationship. However; in the later model that the effect of stock changes of current period on the change of dollar rate of subsequent period it was seen that %15 of the countries have significant results.

Although the results of lag of dollar rate conflict with efficient markets hypothesis, it is desplayed that the effect of 1, 2 and 3 monthly lag of dollar rate is significant but limited. The 1 and 3 monthly lagged effect of dollar is significally observed at 4 countries.

During the 2001:01-2004:05 periods that FED was gone to inrerest rate cut and so it is assumed that dollar lost value, the effect of dolar rate on market index would be statistically effective in 9 countries. In these results 6 of these countries have positive effects. During the 2004:06-2006:11 subperiod that FED was gone to interest rate hike the effect of dolar rate are all positive in 7 countries.

It is confusing that the effect of FED's interest rate cuts or hikes and so the change of the value of dollars' on the developing countires' stock market indexes are statistically significant and it is thoughtful that the majority of significantly coefficients have positive direction. On the other hand, it is known that stock prices can be change relatively to other factors. For example, market indexes can be composed of firms in different sectors. As a result of these firms operate at different industries and have different input-output structures it is posible that they can be influenced from the change of rates differently. For this reason, obtaining positive relations between market index and change in the

USA dollar may be that the firms that are in the market indexes generally have an import based structures. The other point is about investors behavior. Firstly, when the investors tend to developing markets, they may not only invest to stock markets. As a result, the effect of changes of exchange rate on stocks may not be statistically significant. Secondly, the change of exchange rates in this study includes nominal value and rational investors may not consider nominal change of dollar. Nonetheless, as Jorion (1991) also defined, while the investors decide their investments they may not consider the real values of changes of exchange rates.

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INFLATION ACCOUNTING AND STOCK RETURNS: EVIDENCE FROM ISTANBUL STOCK EXCHANGE (ISE)

Berna KIRKULAK[*]
Çağnur KAYTMAZ BALSARI[**]

Abstract

The purpose of this study is to show the importance of inflation accounting application in investment decision making in particular in stock markets. The effect of inflation accounting on stock returns is examined among the Turkish firms listed on the Istanbul Stock Exchange (ISE) in 2003. Descriptive statistics compared the predictability level of inflation-adjusted and inflation non-adjusted fundamental accounting signals on stock returns. Regression analysis tests the explanatory power of these two different accounting applications on stock returns. The results show that investors mainly take earnings and inflation-adjusted fixed asset ratio into consideration when they make their investment decisions. Furthermore, the results show that inflation-adjusted results have slightly more predictive power for stock returns than inflation non-adjusted results suggesting the fact that both inflation-adjusted and inflation non-adjusted financial data complement each other.

I. Introduction

Historical cost based financial reports that are prepared in inflationary environments do not reflect a company's true financial situation. Reports that are prepared according to historical cost principle overstate profitability, weaken equity by causing over taxation, and reduce the accounting reports role in decision making within inflationary environments (Gücenme, 2004).

There are some studies on the use of inflation-adjusted accounting data and information content in the previous literature. There are two types of studies in this field; (1) survey studies that investigate the degree of usage for inflation-

[*] Asst. Prof. Dr. Berna Kırkulak, Department of Business Administration, Faculty of Business, Dokuz Eylül University, 35160, Buca, Izmir, Turkey.
Tel: +90 (0) 232 412 8253 Fax:+90 (0)232 453 5062 E-mail: berna.kirkulak@deu.edu.tr
[**] Asst. Prof. Dr. Çağnur Kaytmaz Balsarı Department of Business Administration, Faculty of Business, Dokuz Eylül University, 35160, Buca, Izmir, Turkey.
Tel: +90 (0) 232 412 8254 Fax:+90 (0)232 453 5062 E-mail: cagnur.kaytmaz@deu.edu.tr
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adjusted accounting data by investors and by groups who support investors in their decision makings and (2) studies that investigate the connection between historical values and inflation-adjusted information and their predictive abilities. In addition to these, there are studies that report strength of inflation-adjusted and historical cost accounting applications on stock returns in terms of information content (Özer, 2000).

The results of survey studies point out that investors and analysts primarily use historical cost accounting information in their investment decisions (Arnold et al., 1984; Berliner, 1983; SRI International, 1987).

Some of the studies on the information content of inflation-adjusted accounting use the information provided in supplementary financial tables that reflect the changes in general and specific prices according to the requirements of SFAS 33 published by Financial Accounting Standards Board from big companies in the U.S. However, different studies produced different results on the issue. For example; McDonald and Morris (1984) did not find a relationship between inflation-adjusted accounting information and stock returns. On the contrary, Sami et al. (1989) found that inflation-adjusted information has more predictive ability on stock returns in comparison with unadjusted information. The results of these studies might be influenced by the data reported by only big firms and by the limited use of supplementary data by investors.

Some other studies compared data that is predicted by the researchers with the reported information. Matolcsy (1984), on American data, and Davidson and Weil (1975), on Australian, data found conflicting results in their empirical studies. The conflicting results might be due to the use of different prediction models.

There have been some interesting studies in the United Kingdom after the release of Inflation Accounting Standard SSAP 16 by the British Accounting Standards Board. While, Board and Walker (1985) found market reaction following the release of inflation-adjusted data, Brayshaw and Miro (1985) found no market reaction. In conclusion, empirical studies concerning this issue show conflicting results. This might be due to differences in the methods or sample used. The reason is that information is only required by big companies.

Other studies in this area focus on the earnings and stock returns. Lev and Thiagaranjan (1993) show that fundamental accounting information has

additional information content on the earnings in relation to stock returns. Akdoğan et al. (2003) investigate the changes in accounting information by the application of inflation accounting after the Banking Regulation and Supervision Agency issued an inflation accounting standard for banking industry. According to the results of their study, there has been a considerable change in the fundamental accounting information provided by the banks. Since fundamental accounting information changes after the inflation accounting adjustment; their information content in predicting stock returns has to be compared.

Turkish Accounting Standard 2 and Communiqué XI; 20 published by Capital Markets Board regulate inflation accounting application in Turkey. These arrangements are similar to International Financial Reporting Standard (IFRS) 29. In accordance with the Communiqué, all firms listed on the ISE prepared their 2004 financial reports in accordance with inflation accounting. In 2003, the financial reports were also prepared and reported according to inflation accounting for comparison purposes with year 2004. With this application, both inflation-adjusted and historical cost accounting information is reported for year 2003 by all firms listed on the ISE. This provides us the unique opportunity to compare the information content of these two sets of reported earnings and other fundamental accounting information. It is important to find the information content of inflation-adjusted accounting information when inflationary pressure is present in the economy.

The purpose of this study is to show the importance of inflation accounting application in investment decisions in particular in stock markets. It tests the effects of inflation accounting on stock returns among the Turkish firms listed on ISE in 2003. This study contributes to the existing literature in two folds: Firstly, it shows the effects of inflation accounting application on financial statements in particular on financial ratios. This study compares the basic financial performance of firms using inflation-adjusted and historical cost data. Secondly, this paper tests the relationship of stock returns with inflation-adjusted and non-inflation-adjusted fundamental accounting signals. Further, it examines the effects of inflation-adjusted and inflation non-adjusted financial reports on stock returns. The study compares the explanatory powers of these two sets of accounting applications on stock returns. In this respect, this is the first study that compares the use of inflation-adjusted and historical cost based fundamental accounting ratios of the listed firms on ISE.

The study is organized as follows. Section two continues with Turkish reporting of environment and inflation accounting. Section three presents data and methodology. Section four reports empirical results and section five represents conclusion and implications for future research.

II. Turkish Reporting Environment and Inflation Accounting

Studies based on ISE data show that stock returns are significantly related to accounting earnings level, changes, and macroeconomic variables such as foreign exchange rate, money supply, inflation, gold prices, capacity utilization rate and industrial production index (Atan, Boztosun ve Kayacan, 2005; Özer, 2002).

The Turkish Uniform Accounting System has been applied to all firms except those in the financial sector since January 1, 1994. This system is designed to produce dependable and comparable financial tables that are prepared according to generally accepted accounting principles. As yet, there has not been any research on the ISE that links stock returns to fundamental accounting signals, such as profitability and operating ratios that can be computed from balance sheet and income statement numbers. This can be attributed to the fact that the Turkish economy has been experiencing very high inflation and historical cost based accounting numbers were insignificant for the market participants. In Table 1, the trend of inflation based on WPI and CPI between 1994-2004 is given.

Table 1: WPI and CPI from 1994 through 2004

Year	WPI	CPI	Year	WPI	CPI
1994	100%	99%	2000	51%	54%
1995	86%	89%	2001	61%	54%
1996	75%	80%	2002	50%	44%
1997	81%	85%	2003	25%	25%
1998	71%	84%	2004	11%	10%
1999	53%	64%			

WPI is Wholesale Price Index and CPI is Consumer Price Index.
Source: State Institute of Statistics.

IAS 29, Financial Reporting in Hyperinflationary Economies, presents the principles and procedures to deal with the effects of inflation on financial statements in inflationary economic environments. According to the IAS 29 standard, hyperinflationary economic environment is defined as whether or not:

- The cumulative inflation rate over 3 years approaches or exceeds 100%
- Current inflation rate is equal to or above 10%

To address the inflation issue in Turkey, The Capital Markets Board (CMB), consistent with IAS 29, required financial statements of all listed companies at the ISE to be restated by using general price level indices as effective from 2004. Companies have been required to restate and report their 2003 financial statements for comparison purpose in 2004.

According to the Capital Markets Boards' requirements, monetary assets and liabilities are not to be restated on the balance sheet since their values are already reflected in the balance sheet date's presumed purchasing power. However, the beginning balances of these assets and liabilities are restated to the purchasing power of balance sheet date to calculate the gain or loss from holding these assets or liabilities during the period. The net monetary position (the difference of monetary assets and liabilities) is disclosed in the income statement as a separate line item called net monetary gain/loss.

Non-monetary items of the balance sheet are restated with a restatement factor (calculated by the general price index) from the recognition date to the balance sheet date. Likewise, revenue and expense items at the income statement are restated by applying the change in the index from revenue or expense date incurred to the end of period.

III. Data and Methodology

Data:

The data comprises the excess returns and fundamental accounting data of firms in Turkey. The balance sheet and income statement items provided by the ISE CD Rom includes data on the firms' net income, net sales, cost of sales, accounts receivables, inventory, fixed assets, total assets, total liabilities, and

stockholders' equity. The stock returns are computed from monthly closing prices collected from an ISE CD Rom. The sample period covers 2003 and 2004. Financial institutions are excluded from the sample. Among the 265 firms listed at the ISE during sample period 83 are financial firms, 35 firms reported their results only according to International Accounting Standards, and 7 firms had missing data, finally 140 firms are used in the analysis.

Methodology:

There are some aspects of accounting ratios that perfectly capture the information needed for predicting the future stock prices. Apart from the macro-economic factors (i.e. financial crises), firm level information based on financial statements is widely used to predict returns (Lev and Thiagarajan, 1993). Among the existing literature, Easton and Harris (1991) show that both earnings level and changes in earnings have explanatory power in a regression of annual returns. In their study, Ohlson and Shroff (1992) argue that earnings level variable will help explain returns if it helps forecast earnings.

To examine the effects of inflation-adjusted accounting system on the stock returns, OLS regression is used. The OLS regression model is given below:

$$R_{i,t} = \beta_0 + \beta_1 EPS\ \ 04_{i,t} + \beta_2 EPS\ \ 03_{i,t-1} + \beta_3\ ROE_{i,t-1} + \beta_4\ LTA_{i,t-1} + \beta_5\ INV_{i,t-1} + \beta_6\ \ ART_{i,t-1} + \beta_7\ DEBT_{i,t-1} + e_{i,t} \quad (1)$$

Variables:

R: shows 12-month excess stock returns of firm i for 2004, where the excess return is determined by subtracting the return of firm i ($r_{i,t}$) during the month from the return on the benchmark ($r_{m,t}$).The information appeared in the financial statements is published within three months after fiscal year end. Thus, the return calculation starts with the fourth month after the beginning of the fiscal year (Fama and French, 1992).

EPS: is the earnings per share and it is calculated as the ratio of total earnings divided by the number of shares outstanding. EPS03 and EPS04 indicate the earnings per share in 2003 and in 2004, respectively. Since the financial reports were prepared according to inflation accounting in 2004, there is no historical cost

based EPS04 variable in 2004. Since stock returns are more strongly related to news about contemporaneous earnings than about cash flow, EPS is an effective measurement to predict stock returns. Early empirical works have generally supported the hypothesis that earning per share has significant explanatory power to predict the stock return (Ou and Penman, 1989; Dechow, 1994)[1]

ROE: is the return on equity and indicates profitability[2] . It is measured as the ratio of net income after taxes to total equity, ROE is a measure of net profitability and it is widely used to explain stock market returns (Furtada and Karan, 1994; Campbel et al., 2005)

FTA: is the ratio of fixed assets to total assets. This variable is used as a proxy for measuring the size and investment potential of the firm. Since fixed assets are held for the purpose of production of goods or rendition of services, high fixed assets to total assets ratio shows the investment potential of firms and gives positive signals to the stock holders. We expect an increase in the fixed assets after inflation correction, therefore inflation-adjusted figures indicate more reliable information to the investors.

INV: is the inventory turnover ratio and it is calculated as a company's annual cost of sales to its inventory. In their paper, Lev and Thiagarahan (1993) argue that carrying cost of inventories (i.e. interest) rises with inflation and therefore firms tend to descend lower inventory levels. Thus, large increase during inflation conveys a negative message to investors.

ART: is the ratio of net sales to accounts receivables. Disproportionate increase in accounts receivables also conveys a negative signal to markets as inventory

[1] In addition to earnings levels, changes in earnings were used in the regression analysis as an independent variable in the previous literature. However, this data is not available to calculate earnings changes for inflation-adjusted and inflation non-adjusted data. For this reason earnings level is used as independent variable.

[2] ROA (Return on Assets) and ROS (Return on Sales) ratios are used for robustness to predict the stock returns. Unreported results present insignificant coefficients for these variables. ROE is used in regression analysis due to better coefficients.

increases. Accounts receivables increases suggest difficulties in sales and therefore result in low earnings.

DBT: is the ratio of total liabilities to total assets. This ratio is used as a proxy to indicate the capital structure of firm. Change in capital structure may change a firm's risk profile. Stock returns vary with the changes of capital structure According to trade-off theory, a deviation from the optimal capital structure (either an increase or a decrease) would result in lower stock returns (Titman and Wessel, 1988; Berens and Cuny, 1995). Increase in financial leverage may result in decrease in stock returns since increase in financial leverage reduces firm's debt capacity. Therefore, an inverse relationship is anticipated.

IV. Empirical Results

Table 2: Descriptive Statistics Before and After Inflation Adjustment

Panel A: Financial Ratios

	Before Inflation Adjustment -2003-				After Inflation Adjustment -2003-				
	Mean	Median	Min	Max	Mean	Median	Min	Max	t- statistics
EPS	-1.62	0.17	-272.12	12.55	-1.86	0.12	-309.44	13.66	-0.71
ROE	-0.02	-0.04	-0.20	0.07	0.01	0.03	-5.59	7.60	-0.32
DBT	0.72	0.49	0.02	17.52	0.62	0.39	0.01	18.11	5.07***
INV	9.44	5.04	122.94	-0.09	8.89	4.75	125.55	0.18	0.39
ART	20.31	5.20	0.28	616.20	18.19	5.51	0.00	632.46	0.91
FTA	0.45	0.44	0.00	0.98	0.52	0.52	0.00	0.98	-7.37***

Panel B: Real Balance Sheet and Income Statement Items (million TL)

	Before Inflation Adjustment -2003-				After Inflation Adjustment -2003-				
	Mean	Median	Min	Max	Mean	Median	Min	Max	t-statistics
Net Income	-30.36	6.20	-4857.54	1514.17	-35.40	3.86	-5396.71	1639.32	0.75
Net Sales	671.35	210.03	0.21	31602.79	954.25	246.64	0.00	36761.14	-3.24***
Total Assets	550.19	232.77	0.30	12000.12	994.68	994.68	0.54	17379.61	-3.77***
Total Liabilities	358.41	101.77	0.19	6222.05	526.88	128.54	0.22	7889.47	-2.86***
Owner's Equity	191.77	81.88	-5440.96	7053.16	427.06	144.13	-6206.19	11980.43	-3.71***
Inventory	88.09	28.34	0.00	3000.10	132.26	44.06	0.00	4008.55	-3.19***
Fixed Assets	251.72	83.46	0.06	7642.25	546.25	143.39	0.27	15326.82	-3.66***
Acc.Receivable	103.88	31.86	00.01	2472.48	141.68	44.60	0.01	3150.22	-3.22***

Note: In Panel B, reel values are documented. EPS: is the earnings per share and it is calculated as the ratio of total earnings divided by the number of shares outstanding. ROE: is the return on equity and indicates profitability. DBT: is the ratio of total liabilities to total assets. INV: is the inventory turnover ratio and it is calculated as a company's annual cost of sales to its inventory. ART: is the ratio of net sales to accounts receivable. FTA: is the ratio of fixed assets to total assets.

*** Significant at 1% level

** Significant at 5% level

* Significant at 10% level

Table 2 shows the descriptive statistics for a sample 2003 inflation-adjusted and non-adjusted balance sheet and income statement items. The results provide the evidence on how inflation accounting application affected the financial results in Turkey. Panel A shows basic accounting ratios and Panel B shows the real balance sheet and income statement items which are normalized by GDP deflator.

All balance sheet items with the exemption of net income show significant increase after inflation adjustment. The findings present that there is a decline in the firms' net income after inflation adjustment. However, this decline is not statistically significant. Since both expense and revenue items are reiterated at the income statement, this result suggests that an increase in revenue items and monetary holding gains compensate for the increase at expense items and monetary losses. This result might be due to the fact that Turkish firms were operating in a hyperinflationary environment for a long time before 2004 and they learned how to manage their monetary assets and liabilities in this environment.

Among the accounting ratios, debt ratio and fixed assets to assets ratio show significant change due to inflation adjustment. Debt ratio decreases significantly after inflation adjustment, as expected, because the inflation adjustment on total assets is expected to be higher than the adjustment at total liabilities. The change in the debt ratio shows that the real risk hazarded in Turkish firms is lower on average than it is widely believed. The fixed assets to assets ratio significantly increases after the inflation adjustment. This is an expected result because the magnitude of adjustment on long term assets is expected to be higher than the other assets.

Change in other relevant ratios due to inflation adjustment is not statistically significant. There is no expectation about the sign of the change for return on equity, on inventory turnover and on accounts receivables turnover ratios. The reason is that both the numerator and the denominator of the ratios are influenced by the inflation adjustment and therefore the sign of the change will vary according to the magnitude of adjustment in these items.

Table 3: Correlation Matrix of Variables

Panel A: Correlation Matrix of Inflation non-adjusted Variables							
	ROE	DBT	ART	FTA	INV	EPS04	EPS03
ROE	-	0.136	-0.037	0.121	-0.013	-0.081	0.453**
DBT		-	0.001	0.064	-0.150	0.050	0.091
ART			-	0.066	-0.034	0.018	-0.078
FTA				-	0.118	-0.084	0.027
INV					-	0.028	0.040
EPS04						-	-0.511**
EPS03							-
Panel B: Correlation Matrix of Inflation-adjusted Variables							
	ROE	DBT	ART	FTA	INV	EPS04	EPS03
ROE	-	0.070	0.018	0.159	0.040	0.078	-0.095
DBT		-	0.002	0.009	-0.037	0.064	-0.837**
ART			-	0.038	-0.021	0.026	0.020
FTA				-	0.178*	0.046	0.010
INV					-	-0.007	0.125
EPS04						-	-0.568**
EPS03							-

Note: ROE: is the return on equity and indicates profitability. DBT: is the ratio of total liabilities to total assets. ART: is the ratio of net sales to accounts receivables. FTA: is the ratio of fixed assets to total assets. INV: is the inventory turnover ratio and it is calculated as a company's annual cost of sales to its inventory. EPS: is the earnings per share and it is calculated as the ratio of total earnings divided by the number of shares outstanding. EPS03 and EPS04 indicate the earnings per share in 2003 and in 2004, respectively.

**: Correlation is significant at the 1 %level (2-tailed)

*: Correlation is significant at the 5 % level (2-tailed)

Table 3 shows the correlation matrix of variables. Correlation matrix measures the strength of the linear relationship between the variables used in Table 4 and 5. Panel A indicates that there is a positive significant correlation between INV and FTA after inflation adjustment. However, there is no significant correlation between these variables before inflation adjustment. While Panel A documents a positive significant correlation between EPS03 and ROE, inflation-adjusted results show that the correlation between EPS03 and ROE is negative and insignificant. Further, both Panel A and Panel B indicate that the relationship between EPS03 and EPS04 is negative and significant at the 5 % level. It is noteworthy that the significance levels of inflation-adjusted results are larger than those of non-inflation-adjusted results.

Table 4: Regression Analysis Results for Inflation Non-Adjusted Data

Model Specifications				Coefficient Estimates of Variables							
Adjusted R^2	F Statistics	Durbin-Watson	Number of Firms	Intercept	EPS04	EPS03	ROE	FTA	INV	ART	DBT
0.269	26.149***	2.028	140	-0.434*** (-12.26)	0.663*** (7.22)	0.366*** (4.18)					
0.282	17.528***	2.021	140	-0.449*** (-10.73)	0.623*** (7.01)	0.356*** (4.00)	-0.052 (-0.69)				
0.285	14.648***	2.005	140	-0.616*** (-6.99)	0.628*** (7.15)	0.345*** (3.92)	-0.070 (-0.94)	0.157 (1.14)			
0.292	11.957***	2.005	140	-0.598*** (-6.44)	0.637*** (6.41)	-0.174* (-1.70)	-0.075 (-1.10)	0.131 (1.73)	0.012 (0.16)		
0.293	9.916***	2.005	140	-0.563*** (-5.92)	0.646*** (6.40)	-0.179* (-1.73)	-0.086 (-1.08)	0.093 (1.21)	0.031 (0.41)	0.055 (0.74)	
0.301	8.954***	1.964	140	-0.475*** (-4.32)	0.691*** (6.62)	-0.260** (-2.26)	-0.070 (-0.88)	0.086 (1.12)	0.017 (0.22)	0.056 (0.75)	-0.134 (-1.57)

Note: Table 4 shows historical cost based mixed results. Stock return (R) is dependent variable. R: shows 12 months excess stock returns of firm i for 2004, where the excess return is determined by subtracting the return of firm i during the month from the return on the benchmark. The return calculation starts with the fourth month after the beginning of the fiscal year. With the exception of EPS04, Table 4 shows the historical cost based data in 2003. The independent variables are described as follows. EPS03: indicates the earnings per share in 2003. EPS04: indicates the earnings per share in 2004. This variable is inflation-adjusted. There is no historical cost data for 2004. ROE: is the return on equity and indicates profitability. FTA: is the ratio of fixed assets to total assets. INV: is the inventory turnover ratio and it is calculated as a company's annual cost of sales to its inventory. ART: is the ratio of net sales to accounts receivable. DBT: is the ratio of total liabilities to total assets.
*** Significant at 1 % level
** Significant at 5 % level
* Significant at 10 % level

In Table 4, the dependent variable is stock returns in 2004 and they are calculated starting four months after the fiscal year. Historical cost based financial data in 2003 and inflation-adjusted earnings per share in 2004 are mixedly used to explain the stock returns. Table 4 shows the historical cost based regression results, whereas Table 5 indicates the inflation-adjusted results. In Table 4 and 5, coefficient estimates, adjusted R^2 values, F-values and Durbin-

Watson statistics of the cross-sectional regression results for excess returns are given. All models in the regression analysis are statistically significant and meet the requirements[3] .

In Table 4, historical cost based regression results indicate that only EPS04 and EPS03 variables are statistically significant, whereas the other variables (ROE, INV, ART, FTA and DBT) have no significant explanatory powers. Both EPS04 and EPS03 are positively correlated to excess returns but in the last three regressions EPS03 has negative coefficient. The higher the earning per share is, the higher the stock return[4].

In Table 5, the findings suggest that the effect of EPS04 and EPS03 on stock returns remain significant after inflation adjustment. According to this result, both inflation-adjusted and non-adjusted earnings per share have significant predictive power on excess returns. Interestingly, while historical cost based FTA values are insignificant, inflation-adjusted FTA values are positive and significantly correlated to stock returns. There is no significant relationship between inventory turnover rate and excess return after inflation correction.

It is important to note that both adjusted R^2 values and significance levels are relatively larger for the inflation-adjusted findings. However, the difference is not substantial. It appears that inflation-adjusted data reflect the true value of the firm to the investors much better than non-inflation-adjusted data. However, the adjusted R^2 values reported both in Table 4 and in Table 5 are similar to each other showing the fact that inflation-adjusted financial reports and historical cost based financial reports could be complementary for each other.

V. Conclusion

The debate about inflation accounting has been ongoing for many years. In this study, it is desired to shift attention from methods to applications and test the effect of inflation accounting on stock returns among the Turkish firms listed on the ISE in 2003. The purpose of this study was to (1) show the effect of inflation accounting application on basic financial statements, (2) to test the relationship of stock returns with inflation-adjusted and non-inflation-adjusted

[3] Durbin-Watson statistics show that there is no autocorrelation for residuals.

[4] The explanatory power of EPS04 is higher than that of EPS03. When EPS04 variable is omitted in the regression analysis, the explanatory powers of EPS03 and the other variables decrease substantially.

fundamental accounting signals and (3) to compare the predictive ability of these two sets of signals on stock returns.

The findings reveal the fact that inflation accounting has had a statistically significant effect on basic financial statements. The values of analyzed balance sheet and of sales items increased significantly after the inflation adjustment. However, the decrease in net income, due to inflation adjustment, was not significant. This result may be due to two factors. First, an increase in expense items is compensated by the increase in sales. Second, firms actually reported net monetary gain in their income statements. Within the fundamental accounting signals, debt level increased but debt ratio (financing the total assets through debt) significantly decreased after the inflation adjustment. Fixed assets to total assets ratio increased significantly. Changes in these ratios show that inflation adjustment might considerably change the risk assessment of a firm by market participants. There was no significant change in the other analyzed fundamental accounting signals.

The results show that stock returns are associated mainly with earnings and inflation- adjusted fixed assets to total assets ratio. There is no significant relationship between other fundamental accounting signals and stock returns. This shows that Turkish investors mainly consider earnings when they make their investment decisions.

One of the most striking findings of the study is that inflation-adjusted results have slightly more explanatory power for stock returns than inflation non-adjusted results. However, this finding needs special attention to interpret. In particular, historical cost based earnings have significant explanatory power to predict stock returns and the results of historical cost regression analysis are similar to those of inflation-adjusted regression analysis. This shows that both inflation-adjusted and inflation non-adjusted financial reports complement each other.

The limitation of this study concerns the sample period. Since the inflation-adjusted and inflation non-adjusted data is available only for 2003, the sample period is constrained by only one year. The evidence presented here suggests a direction for future studies on the use and interpretation of fundamental accounting signals by creditors during inflationary periods. It is hoped that the application of this study will help academics and investors alike to interpret the real life problems in inflationary environments.

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AN EMPIRICAL EXAMINATION OF BILATERAL INTERACTION BETWEEN FOREIGN INVESTORS' TRADING AND RETURNS IN TURKEY

Hasan F. BAKLACI*

Abstract

This study attempts to determine the bilateral interaction between foreign investors' trading activity and returns in Turkish stock market.

The results imply a strong bilateral interaction between foreign investors' trading and stock returns. The results from individual stock and market level analyses indicate that foreign investors closely follow stock returns in shaping their trading strategies. Likewise, foreign investor net inflows are also influential in stock returns providing evidence for the existence of "price-pressure" effect.

Furthermore, the findings of this study reveal that foreign investors frequently change their positions on majority of the stocks in Turkish stock market, which might basically stem from the absence of exit barriers in Turkish financial markets.

I. Introduction

There has been a growing interest of international investors, particularly in the last decade, in emerging countries owing mainly to the low correlation of these financial markets with those of developed countries resulting in significant risk diversification opportunities in these markets. Moreover, the higher economic growth of these emerging economies was translated into higher stock returns which in turn led to a further liberalization of financial markets and has also paved the way to growing interest by foreign investors.

Subsequently, the trading behavior and the impact of foreign portfolio investors in this segment of international capital markets has been of perennial interest to professionals, academicians and domestic policymakers.

However, this phenomenon has also led to an ongoing debate on the impact and behavior of foreign investors in emerging markets.

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* Assoc. Prof. Hasan F. Baklacı, İzmir University of Economics, Sakarya Caddesi, No:156, Balçova, İzmir
Tel: (232) 4888250 E-mail: hasan.baklaci@ieu.edu.tr
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Specifically, there are two major empirical facts about the trading behavior of foreign investors in international capital markets:

First, majority of the empirical findings assert that foreign investors are engaged in positive feedback strategy by chasing returns (Albuquerque, Bauer and Schneider, 2007; Bange and Miller, 2003). On one hand, some researchers propose that these strategies create excess volatility and drive the stock prices away from their fundamental values. Furthermore, the same researchers also claim that this irrationality might end up with destabilization of the financial markets (Froot, Connell and Seasholes, 2001; Borenzstein and Gelos, 2001; Pavabutry and Yan, 2003).

Some researchers have tied the excess volatility observed in emerging markets to the advancement in accessibility of these markets by foreign investors (Miles, 2002).

On the other hand, some studies confirmed the existence of feedback effects in emerging markets but did not find evidence of a destabilizing effect (Choe, Kho and Stulz, 2005; Kim and Wei, 2002; Wei, 2003; Park and Park, 2003).

In addition, some researchers have asserted that the existence of feedback trading is more evident during market declines but not during market advances (Griffin, Nardari and Stulz, 2004; Koutmos and Saidi, 2001).

The second set of findings illustrate that the foreign portfolio inflows/outflows have a predictive power and impact on future stock returns and occasionally leads to the destabilization in these markets. The proponents of this argument, named as "price-pressure effect" in literature, support their assertion with the global financial crises experienced particularly in the last decade (DeLong, Shleifer and Summers, 1990; Pavabutry and Yan, 2003).

Few studies have utilized stock portfolios and mutual funds to detect the interaction between the foreign investor trading and returns (Kaminsky, Lyons and Schmukler, 2004; Karolyi and Stulz, 2002).

The fundamental objective of this paper is to explore the bilateral interaction between foreign investors' trading and individual stock returns in Turkish stock market.

Foreign investors' impact on Turkish stock market is noteworthy since the total holdings of foreign investors' in Turkish stock market have reached to

44 billion New Turkish Lira by the end of March 2008 and the foreign investors' share in overall stock holdings surged up to slightly higher than 70%. These figures point out that the total number of stocks traded by foreign investors is approximately 11.1 million shares and represents an approximately 40% increase when compared to March 2007.

The relationship between foreign portfolio flows and returns will be tested by the use of Vector Auto regression (VAR) methodology. The findings from VAR tests will shed a light on the simultaneous interaction and causality effects of returns and net foreign portfolio inflows in Turkish stock market.

The lack of any other comprehensive study on this topic signifies the contribution of this particular study. In addition, the findings from this study may also be utilized by policymakers in setting up future regulations regarding foreign portfolio investment and ownership restrictions in Turkish stock market. This issue will further be addresses in the concluding remarks of this paper.

II. Data and Descriptive Statistics

The analysis in this research consist of two parts: Individual stock analysis and market analysis.

As discussed in previous sections, the main research question in this study is: "Do the returns and foreign investors' trading have a bilateral impact?"

The existence of bilateral relationship between returns and foreign investor trading on individual stock basis will be tested by utilizing the following bivariate unrestricted VAR model:

$$\begin{bmatrix} r_{i,t} \\ f_{i,t} \end{bmatrix} = \begin{bmatrix} \alpha_r \\ \alpha_f \end{bmatrix} + \begin{bmatrix} \beta_{11}(L)\beta_{12}(L) \\ \beta_{21}(L)\beta_{22}(L) \end{bmatrix} \begin{bmatrix} r_{i,t-j} \\ f_{i,t-j} \end{bmatrix} + \begin{bmatrix} \varepsilon_{i,t}^{r} \\ \varepsilon_{i,t}^{f} \end{bmatrix} \quad \text{(Equation 1)}$$

where $r_{i,t}$ is the time t return on stock i and $f_{i,t}$ is the net foreign inflow (purchase) to stock i at time t. The alphas represent intercept terms, which can also be interpreted as the unconditional mean return and foreign net inflows for stock i, respectively. $\beta(L)$ represents the polynomials in the lag operator L and include the autoregressive coefficients. In the above equation, β_{12} coefficient

indicates the impact of foreign investors' trading in previous period over the current period returns, whereas β_{21} coefficient indicates the impact of previous period returns over the current period foreign investors' trading (net purchases).

In this regard, the statistical significance of β_{12} coefficient along with a positive value signal the existence of positive price-pressure effect. In another saying, an increase (decrease) in foreign investors' trading lead to an associated increase (decrease) in stock returns. Accordingly, a negative and statistically significant β_{12} coefficient represent the existence of negative price-pressure effect. In this case, an increase (decrease) in foreign investor trading result in a decrease (increase) in associated stock returns.

The statistical significance of β_{21} coefficient, on the other hand, imply that foreign investors conduct a feedback strategy. More specifically, a positive and statistically significant β_{21} coefficient imply a positive feedback strategy which in turn, can be interpreted as the fact that foreign investors in current period tend to be net buyers (sellers) in the winning (losing) stocks in previous periods.

Similarly, a negative and statistically significant β_{21} coefficient demonstrate that foreign investors ,in current period, tend to be sell (buy) stocks whose returns have increased (decreased) in the previous period, which implies that they pursue a negative feedback strategy in their trading.

In market level analysis, individual returns in Equation 1 are replaced by index returns and net foreign portfolio inflows are replaced by total number of shares and total market value of shares held by foreign investors. Utilizing the same rationale in individual stock analysis, similar VAR analyses will be applied to determine the bilateral interaction between index returns and shares held by foreign investors. The reasoning behind using VAR specification in analyses will be discussed in more detail in the "Methodology and Results" section subsequently.

By using the formulation in Equation 1, the following hypotheses will be used to assess the joint significance of returns and flows for individual stocks:

$$H_0 : \beta_{12} = 0$$

(Equation 2)

$$H_0 : \beta_{21} = 0$$

Particularly, the first null hypothesis in Equation 2 (When j, which shows the number of lags in Equation 1 is greater than 0) indicates that past foreign investor inflows have no significant price-pressure effects on current stock returns. The second null hypothesis in Equation 2 above (again when j >0 in Equation 1) indicates that past stock returns do not have any significant effect on current foreign investor inflows.

Similarly, when j=0 in Equation 1, hypotheses in Equation 2 indicate no contemporaneous interaction between current month's inflows and returns. The rejection of both hypotheses implies a significant bilateral impact between these variables. Put differently, rejection of both hypotheses asserts the existence of price-pressure and feedback effects in Turkish stock market.

On market level analyses, same hypotheses are used to test the existence of bilateral interaction between index returns and stock of shares held by foreign investors.

The dataset for individual stock analysis consist of monthly returns and net foreign portfolio inflows for 20 large size stocks traded in the Istanbul Stock Exchange (ISE) and sample period spans from January 1997 to December 2007 as the dataset for foreign investor trading start in 1997. Thus, there are 132 monthly observations for majority of the stocks in the sample. However, either due to the lack of data availability or late IPO by some firms, some stocks have shorter sample[1].

The foreign investor purchase and sale figures gathered from the ISE website were provided in gross terms. These figures were netted to reach net foreign investor inflows for individual stocks covered in the sample[2].

14 of these 20 stocks in the sample are being traded in the ISE-30 Index which is comprised of 30 largest size firms' stocks. The largest size firm stocks were included simply because the foreign investors have the largest trading volume in the ISE-30 Index stocks and thus these stocks provide the

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[1] The list of stocks included in the sample and the observation period for these stocks are provided in Appendix 1.

[2] Net Foreign Purchase (Inflow)= Gross Foreign Investor Purchase- Gross Foreign Investor Sales. The relevant data is extracted from ISE's main website by following the "Foreign Investors" and subsequently the " The Transactions Executed on behalf of Foreign Bank/Broker or Individual Accounts" links.

highest liquidity in terms of foreign investor trading. This approach is similar to Pavabutr and Yan (2003) and is expected to provide more consistent and robust results.

The monthly return for a single stock was calculated by averaging the sum of daily returns for the associated month :

$$\sum_{i=1}^{N} \frac{r_i}{N}$$

where r_i = daily return for stock i

N = number of trading days in associated month

The primary reason for using average daily returns instead of differencing the end-of-month and start-of-month prices is the fact that interim price effects of the foreign investors' trading during the month are better captured by averaging daily returns. This issue is even particularly important in the analysis to extract the contemporaneous interaction of stock returns and foreign investor's trading for the selected months.

For the market analyses, three variables are used; namely ISE-100 Index values, the number of shares held by foreign investors and the market value of shares held by foreign investors. The frequency of all three variables are daily and range between December 1, 2005 through March 11, 2008 including 593 observations. The data that contain total number of shares held by foreign investors and the market value of these shares are obtained from Central Registry Agency's "Foreign Investor Stock Portfolio Report"[3]

Table 2.1 provides the aggregate foreign investor trading figures in ISE for the sample period.

From the table , it can be clearly observed that the foreign investor trading volume figures in ISE display various patterns for the sample period. More specifically, the figures exhibit an upward trend from 1997 up until 2000 with a more than 300% increase during that period.

However, in 2001, there is a sudden reversal in trading volume figures resulting in a 63% decrease compared to 2000. This remarkable change in foreign

[3] Since the dissemination of this report has commenced in December 1, 2005, the sample period span from December 1, 2005 through March 11, 2008 which is the last observation date for this study.

trading figures can mainly be attributed to the effect of the deep economical and financial crisis experienced in 2001 which led to a massive amount of sell off during that year. The devaluation of the Turkish Lira in February 2001 has amplified this trend and the annual trading volume of foreign investors has declined from $33.3 Billion to $12.1 Billion between 2000 and 2001.

Starting from 2003, another turnaround in foreign investor trading volume pattern can be observed. Specifically, between years 2003 and 2005, the trading volume increases by approximately 350%. This significant upsurge in trading volume can mainly be attributed to the relative stability achieved in the major economic indicators such as inflation, interest and exchange rate owing mainly to the tight economic policies applied following the 2001 crisis period.

Coupled with the commencement of negotiations with EU officially, positive developments in Turkey have led to a relative optimism among foreign investors attracting their interest back in Turkish stock market. In 2007, trading volume figure has even significantly surpassed the sum of annual volume figures including all the pre-crisis periods.

Tables 2.2 and 2.3 provide the mean and standard deviation values of the series for the selected sample period.

As Table 2.2 portrays, for 85% of the individual stocks in the sample, foreign investors appear to be net buyers for the sample period observed. However, the average inflow figures for individual stocks also display a large disparity ranging from – 1,229,814 $ to a maximum of 8,944,515 $ whereas the standard deviation of inflows range from 2,239,731 to 121,025,243. This finding is in fact commensurate with the other studies' findings (Froot, O'Connell and Sholes, 2001; Pavabutr and Yan, 2003) regarding emerging market statistics indicating an excessive level of volatility in foreign investors' trading in this market segment.

Table 2.2 also provides the descriptive statistics for the variables included in the aggregate market analysis, namely; total number and market value of shares held by foreign investors and ISE-100 Index values.

Table 2.3 displays the return statistics for the sample period chosen. The monthly return figures for the stocks in the sample vary within a tighter band ranging from a minimum of % 0.126 to a maximum of % 0.289. Accordingly, the standard deviation of returns ranges from % 0.685 to % 1.467. This result stems from using the method of averaging daily returns instead of taking the difference between end and beginning of the month figures.

These statistics indicate that the return figures display a relative homogeneity among the stocks in the sample. On the contrary, a very high degree of heterogeneity in foreign net inflow figures can be observed among the same stocks in the sample. This finding can be interpreted as the frequent rebalancing and position change of foreign investors' portfolio investments in ISE stocks.

II. Methodology and Results

This section, at the outset includes a concise discussion of methodology used in examining the joint dynamics and interaction between individual stock returns and foreign investor inflows in Turkish stock market. Subsequently, the results from these analyses as well as their interpretations will be discussed.

3.1. VAR Analysis

As previously stated, the existence of bilateral relationship between returns and inflows on individual stock basis will be tested by utilizing the following bivariate unrestricted VAR model:

$$\begin{bmatrix} r_{i,t} \\ f_{i,t} \end{bmatrix} = \begin{bmatrix} \alpha_r \\ \alpha_f \end{bmatrix} + \begin{bmatrix} \beta_{11}(L)\beta_{12}(L) \\ \beta_{21}(L)\beta_{22}(L) \end{bmatrix} \begin{bmatrix} r_{i,t-j} \\ f_{i,t-j} \end{bmatrix} + \begin{bmatrix} \varepsilon_{i,t}^{r} \\ \varepsilon_{i,t}^{f} \end{bmatrix}$$

$\varepsilon_{i,t}^{r}$ and $\varepsilon_{i,t}^{f}$ are error terms that are assumed to have zero mean and are serially and contemporaneously uncorrelated.

VAR framework is considered as the most appropriate framework due to the following reasons:

First, VAR estimation procedure aims to determine the interrelationships among the variables in hand ignoring the parameter estimates.

Secondly, contrary to the standard estimation techniques, VAR estimation in standard form does not require the regressors to be uncorrelated with the error term.

Thirdly, by use of a VAR system, it is also possible to test the imposed restrictions on the variables.

As discussed in "Data and Descriptive Statistics" section, by using the formulation in Equation 1, the following hypotheses will be used to assess the joint significance of returns and foreign investor trading for individual stocks:

$$H_0 : \beta_{12} = 0$$

(Equation 2)

$$H_0 : \beta_{21} = 0$$

Detailed explanation regarding hypothesis tests in Equation 2 was provided in previous sections. In summary, the rejection of joint hypotheses to be used for individual stock as well as market analyses illustrate that there is a contemporaneous or lagged bilateral interaction between stock returns and foreign investor trading.

The existence of any possible significant interaction between net foreign investor inflows and returns contemporaneously could also have some implications for the existence of a herd behavior by individual investors in Turkish stock market. Elaborated further, as previously suggested, individual investors, whether rationally or irrationally have more tendency to herd the trading behavior of institutional investors simply because institutional investors have much more extensive resources to process any information (Kim and Wei, 2003; Iıhara, Kato and Tokunaga, 2001; Kyrolainen and Perttunen, 2003). Thus, due to any possible informational asymmetry, domestic investors might mimic the trading behavior of foreign investors causing prices to deviate from their fundamental values. This issue however, is beyond the scope of this study and the results to be gathered from this study could pave the way for a future research concentrating on determining the existence of herd behavior in Turkish stock market.

3.2. Diagnostic Tests:

Some diagnostic tests were applied on the data and the results from these tests are discussed in the following section.

Firstly, in market analyses, in order to reduce the size effect, the natural logarithm of all three market variables were taken. Thus, by taking the natural logarithm, index values were transformed to return series.

As the first diagnostic test on the data in hand, a unit root test has been applied to ensure the stationarity of the net foreign flow and return data.

The unit root test results, shown in Table 3.1, indicates that for all of the stocks in the sample, both the return and net inflow series were stationary. The stationarity of the net inflow series is commensurate with the former claim that foreigners frequently rebalance their investments in most of the stocks in ISE and hence do not seem to follow a consistent pattern in their trading strategies.

On the other hand, for the market level variables, the existence of unit root could not be rejected. Accordingly, all three variables were first differenced to be transformed into stationary series.

3.3. Results

The test results from VAR analyses are provided in Tables 3.2 and 3.3. Table 3.2 displays the results for individual stock analyses whereas in Table 3.3, results from market analysis are displayed.

3.3.1. Individual Stock Results:

The results in Table 3.2 indicate a significant interaction and causality between foreign portfolio flows and stock returns at 10% significance level for majority of the stocks in the sample. However, again for majority of the stocks, the direction of causality is from returns towards net inflows indicating that previous month's returns have a significant impact on the foreign investors' decision to trade in the current month. Reverse causality, however, is existent for a lesser number of stocks in the sample. These findings confirm that the explanatory power of lagged foreign investor flows in affecting present stock returns is weaker owing mainly to the effect of other possible idiosyncratic risk factors.

The sign of the coefficients in causality analyses for individual stocks appear to be mixed. It can be observed that, for half of the sample stocks where inflow and return causality is significant, past month's returns create a positive feedback effect for current month's inflows whereas for the remaining half, the feedback effect is negative. Likewise, for almost half of the individual stocks, the price pressure effect indicating the impact of inflows on returns is positive and for the remaining sample, it is negative. These results specify that foreign

investors in Turkey follow very dynamic asset allocation strategy and thus frequently reverse their long and short positions on the stocks that they hold. Particularly, an inflow in certain stocks in the present month could be followed by an outflow or vice versa in the following month, which further leads to instability, and unwarranted volatility in major stocks traded in ISE.

The results obtained from testing the contemporaneous interaction between inflows and returns are similar to those obtained in lag-lead analyses although with some minor distinguishing points.

Similar to the results from previous analyses, the contemporaneous impact of returns on net foreign investor portfolio inflows are pronounced stronger than vice versa.

These findings strengthen the existence of feedback strategy on individual stocks in Turkish stock market. The sign of the impact is also mixed pointing out to the fact that feedback strategy is not homogeneous among individual stocks. More specifically, in some stocks, foreign investors take variant positions in return generating stocks based on their expectations and strategies.

On the other hand, the impact of current month's inflows on current returns is positive for the majority of the stocks indicating that there is a stronger price pressure effect contemporaneously.

These results further support the existence of feedback strategy in foreign portfolio investor behavior. These results are consistent with the seminal literature which document the existence of positive feedback strategy in majority of the emerging markets (Park and Park, 1999; Koutmos and Saidi, 2001). Furthermore, these results are in parallel with the findings in lead-lag flow relationship suggesting a high volatility of returns caused by the foreign investors' dynamic asset allocation strategies on monthly basis. This finding is analogous to the perception that foreign investor's massive selling and a sudden capital outflow from emerging markets move stock prices away from their fundamental values.

The positive coefficient between past flows and present stock returns indicate that foreign investors' trading in previous month is influential in determining current month's stock returns in general and has a positive impact.

Specifically, the results show that foreign investors' net inflows in stocks seem to augment the prices of these particular stocks during a particular month. This result is not surprising considering the massive trading power of foreign investors in ISE.

These results might also lead to an inference that foreign investors frequently reverse their positions during the same month and tend to sell some of the return generating stocks, most likely for profit realization purposes, and even could buy some return generating stocks for the expectation of a further price increase as depicted in positive feedback strategy. This result also signifies the existence of return chasing behavior of foreign investors in Turkey. This result is likewise not surprising, since exit barriers like capital gain tax is not existent in Turkish stock market allowing a free reallocation of financial assets in Turkish stock market.

3.3.2. Market Analysis Results:

As previously indicated, market analyses contain tests to extract a possible interaction between the stocks held by foreign investors and index returns. Thus, using VAR methodology, similar tests used in individual stock analyses are applied to determine whether there is a significant lagged and contemporaneous interaction between stock returns and total market value as well as total number of stocks held by foreign investors on an aggregate level.

There are three variables used in VAR analyses:

1) Market Value of Stocks:

This variable represents the total market value of stocks held by foreign investors in their portfolio.

2) Number of Stocks:

This variable represents the total number of stocks held by foreign investors in their portfolio.

3) ISE Index:

This variable represents ISE-100 Index values

The natural logarithm of all three variables was taken to neutralize the size effect, particularly for total market value and number of stock variables. Furthermore, these variables were differenced since, all variables contained unit root. Thus, as a result of these adjustments, the ISE-100 Index values were transformed to return series.

The sample period spanned from December 1,2005 through March 11, 2008 including 593 daily observations.

The descriptive statistics in Table 2.2 show that, during the sample period, the average number of stocks held by foreign investors amounted to 8.5 million whereas the average market value of these stocks amounted to 58.1 Billion New Turkish Lira. In the same period, the average value of ISE-100 Index was 43,723 with a minimum level of 31,915 and a maximum of 58,232.

The results of VAR tests for market level analysis are provided in Table 3.3.

The second column in the table display lagged VAR test results. In these results, the values provided in parentheses next to the test coefficients represent the lag length. Thus, L3 demonstrates that the length of interaction between variables in hand reach over up to three days. Hence, from the table figures, it can be observed that the lagged interaction between some series could span up to a week. This finding is consistent with some of other studies (Griffin, Nardari & Stulz, 2004).

The results from lagged interaction analyses point out a significant relation between index returns and the market value of stocks at 10% significance level. On the other hand, the impact of returns on the market value of stocks held by foreign investors is stronger than vice versa. This result is similar to the results found in individual stock analyses specifying that past returns are particularly important in shaping foreign investors' trading behavior whereas the past trading behavior and positions taken by foreign investors are relatively less influential in current index returns.

The sign of the causality in both cases is negative, illustrating that when the index returns increase (decrease), the market value of stocks held by foreign investors decrease (increase). This result confirms that, on a market level, when the market is on rise, foreign investors seem to change their positions and reduce the stocks in their portfolio.

In contrast, the contemporaneous effect of the market value of stocks on index returns turns out to be positive. This finding reflects the fact that when the market value of stocks held by foreign investors increase in a certain month, this creates an upward pressure on index. This finding also confirms the existence of

price pressure effect in market level and strengthens the findings from individual stock analyses. This result is somewhat expected, since as depicted previously, foreign investors' share in ISE is approximately around 70%.

Interestingly, the contemporaneous impact of index returns on market value is negative which again can be ascribed to the frequent rebalancing and repositioning by foreign investors in particular months.

The contemporaneous interaction between index returns and number of stocks held by foreign investors is less pronounced compared to the interaction between returns and market value of stocks.

Specifically, the causality effect from index returns towards number of stocks in foreign investors' portfolio is not significant. These results pinpoint the fact that the feedback effect of price changes on foreign investors' trading strategies on an aggregate level is significant, however not on the number of shares held but on the market value of shares held.

Although remarkable, the diversity in outcomes of these analyses could partially be attributed to the price and return volatility since the differentiating parameter between the number and market value of the shares is price. Stated differently, the excess price volatility in certain months during the sample period could have created this difference.

The impact of number of stocks to index returns is positive and significant in both lagged and contemporaneous analyses. These results are consistent with those found between returns and market value of stocks and intensify the existence of price pressure effect in Turkish stock market on aggregate level.

In summary, the results obtained from market analyses are analogous to the results from individual stock analyses denoting that there is a significant feedback effect and return chasing behavior inherent in foreign investors' trading strategies on market level.

The resemblance between individual stock and market analyses might also stem from the fact that for the sample period chosen, 60% of the foreign investors' trading had materialized on the sample stocks chosen for individual analysis.

IV. Conclusion

This particular study attempted to investigate the possible bilateral interaction between foreign investors' trading and individual stock returns.

The results obtained from individual stock analyses as well as those obtained in market analyses proved a significant interaction between foreign investors' trading strategies and stock returns. In particular, except one stock, a significant lagged and contemporaneous bilateral impact was determined between foreign investors' portfolio inflows and returns. In individual stock analyses, for majority of the stocks in the sample, returns turned out to be more influential in foreign investors net inflows than vice versa.

The findings provided evidence for the inference that feedback effect was more pronounced than price pressure effect in Turkish stock market on individual stock basis.

On the other hand, price pressure effect seemed to be relatively more influential than feedback effect on market level analyses. This result is not surprising considering the fact that almost 70% of trading in ISE is realized by foreign investors.

The results from both individual stock and market analyses also demonstrated that foreign investors frequently change their positions on individual stocks, which in turn affect ISE-100index returns.

These findings have very important implications for policymakers, too. Since the existing trading behavior of foreign investors might have a serious destabilizing effect on Turkish stock market, particularly in turbulent periods, it is essential for the policymakers to closely monitor foreign investors' trading patterns to prevent a sudden capital flight from Turkish stock market.

These results also support the argument of tight monitoring of foreign investors' trading in Turkish stock market and accordingly take necessary precautionary measures to halt a sudden and massive capital outflow from the country. The policymakers in Turkey has initiated such an action in January 2006 by imposing a withholding tax on capital gains from all marketable securities and other capital market instruments. The main ration for such an act was to discourage foreign investors from changing their positions frequently, albeit at a possible cost of reduced foreign portfolio inflow to Turkish stock exchange. However, notwithstanding the prevailing global market conditions has been

the predominant trigger for an unprecedented massive shock experienced in Turkish markets in May 2006, the policymakers have removed the withholding tax on capital gains for foreign investors to shun a possible further destructive effect of taxes on existing turmoil.

Similarly, during Asian crisis, Malaysia has been less affected from the Asian crisis by imposing modest restrictions on the borrowing and lending by non-residents to prevent a sudden capital outflow.[4]

[4] In Malaysia, borrowing and lending in foreign currency from/to nonresidents was freely allowed subject to a net overnight open position in foreign currencies.

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Appendix and List of Tables

Appendix 1: Sample Stocks and Observation Period

Stock	Observation Period
Akbank	January 1997- December 2007
Aksigorta	January 1997- December 2007
Alarko	January 1997- December 2007
Beko	January 1997- December 2007
Doğan Holding	January 1997- December 2007
Enka	January 1997- December 2007
Ereğli	January 1997- December 2007
Finansbank	January 1997- December 2007
Ford Otosan	January 1997- December 2007
Garantı Bankası	January 1997- December 2007
Hürriyet	January 1997- December 2007
İş Bank (C)	January 1997- December 2007
Koç Holding	January 1997- December 2007
Migros	January 1997- December 2007
Petrolofisi	January 1997- December 2007
Sabancı Holding	July 1997- December 2007
Şişecam	January 1997- December 2007
Tansaş	January 1997- July 2006
Tofaş	January 1997- December 2007
Tüpraş	January 1997- December 2007

Table 2.1: ISE Total Foreign Investor Stock Holding (Million $)

Year	Total Foreign Investor Stock Holding
1997	8,219
1998	11,645
1999	17,837
2000	33,365
2001	12,134
2002	12,781
2003	17,324
2004	37,356
2005	80,997
2006	88,625
2007	143,859
2008 (January-March)	54,211

Source: Table figures are derived from ISE Foreign Investor Data.

Table 2.2: Descriptive Statistics
(Net Foreign Investor Inflow and Market Statistics)

Stock	Mean	Standard Deviation	Maximum	Minimum
Akbank	8,482,283	121,025,243	1,316,012,972	-168,845,908
Aksigorta	700,809	6,059,451	20,471,217	-35,823,774
Alarko	131,086	5,042,441	36,346,979	-17,040,558
Beko	-117,834	2,239,731	10,583,694	-7,236,474
Doğan Holding	-769,671	24,619,544	82,650,292	-97,798,268
Enka	1,392,895	6,860,608	28,094,967	-29,292,672
Ereğli	1,985,058	20,770,802	56,406,146	-79,390,699
Finansbank	2,031,653	11,631,221	66,360,128	-29,322,890
Ford	886,110	6,745,388	28,227,652	-22,867,564
Garanti	5,064,228	42,773,189	246,773,171	-188,907,612
Hürriyet	482,978	7,722,132	31,343,847	-20,273,542
İş C	4,754,168	52,849,766	217,415,395	-271,659,830
Koç Holding	1,266,056	23,658,567	81,733,612	-88,190,439
Migros	166,909	10,878,580	57,595,815	-36,347,078
Petrol Ofisi	182,579	9,202,581	59,076,034	-24,207,061
Sabancı	1,486,167	37,882,582	193,593,117	-191,377,606
Şişecam	327,422	7,377,210	21,318,859	-24,398,152
Tansaş	-1,229,814	9,665,977	24,024,641	-88,677,209
Tofaş	650,555	8,317,099	30,928,978	-34,850,760
Tüpraş	8,944,515	50,868,957	479,867,886	-53,735,043
MARKET ANALYSIS STATISTICS				
Loghis	8,498,744,831	1,846,855,154	11,249,124,253	5,909,757,973
Logpiy	58,145,595,439	12,662,399,961	84,022,308,369	37,438,481,906
Logimkb	43,723	6,174	58,232	31,951

Table 2.3: Descriptive Statistics (Return Statistics)

Stock	Mean (%)	Standard Deviation (%)	Maximum (%)	Minimum (%)
Akbank	0.155	1.094	3.679	-5.561
Aksigorta	0.246	0.983	3.065	-4.031
Alarko	0.154	1.011	3.186	-4.586
Beko	0.126	0.953	2.895	-2.685
Doğan Holding	0.136	1.467	3.675	-6.498
Enka	0.253	0.871	2.969	-3.168
Ereğli	0.233	0.928	2.658	-2.499
Finansbank	0.274	0.985	3.849	-2.855
Ford	0.217	0.915	3.824	-3.013
Garanti	0.289	1.006	3.513	-2.584
Hürriyet	0.232	1.173	4.746	-6.024
Iş C	0.231	0.953	4.070	-2.016
Koç Holding	0.181	0.946	3.403	-2.442
Migros	0.182	0.685	2.646	-1.722
Petrol Ofisi	0.236	1.115	3.920	-2.880
Sabancı	0.192	0.896	3.347	-2.745
Şişecam	0.167	0.954	3.972	-3.119
Tansaş	0.148	1.322	2.558	-6.538
Tofaş	0.228	1.042	3.752	-2.307
Tüpraş	0.183	0.995	3.210	-5.027

Table 3.1: Unit Root Test Results

H_0= Series contain unit root,

Stock (Series)	Net Foreign Inflow	Return
Akbank	-12.751* (-4.029)**	-13.847 (-4.029)
Aksigorta	-8.845	-12.917
Alarko	-8.811	-11.703
Beko	-10.870	-10.979
Doğan Holding	-5.055	-12.257
Enka	-9.948	-11.719
Ereğli	-8.289	-11.695
Finansbank	-11.943	-10.073
Ford	-12.450	-10.782
Garanti Bankası	-9.659	-11.229
Hürriyet	-9.424	-12.533
Iş C	-9.892	-11.602
Koç	-10.771	-13.746
Migros	-10.346	-13.269
Petrol Ofisi	-9.429	-12.775
Sabancı Holding	-9.883	-12.229
Şişecam	-8.471	-11.177
Tansaş	-10.733	-10.619
Tofaş	-9.779	-11.401
Tüpraş	-10.445	-14.988
Market data:		
Loghis	-0.943	
Logpiy	-1.596	
Logimkb	-1.789	

* (ADF test statistics)

** MacKinnon %1 critical value

Lag length is determined by E-views program based on Schwartz Information Criterion.

Table 3.2: Individual Stock Analysis

Stock	Lagged VAR Analysis		Contemporaneous VAR Analysis	
	$r_t = \alpha + f_{t-i} + \varepsilon_t$	$f_t = \alpha + r_{t-i} + \varepsilon_t$	$r_t = \alpha + f_t + \varepsilon_t$	$f_t = \alpha + r_t + \varepsilon_t$
Akbank	5.98E-25 (0.7287)	-1.68E-09 [-4.099] (L1)	9.71E-25 (1.195)	-3.40E-09 (-8.487)
Aksigorta	3.22E-24 (2.177)	-3.45E-10 (-5.087) (L1)	-7.25E-24 (-5.093)	-3.52E-10 (-5.258)
Alarko	9.60E-25 (0.594)	-2.47E-10 (-0.001) (L2)	7.98E-24 (4.954)	2.32E-10 (10.995)
Beko	5.39E-25 (0.034)	4.37E-11 (6.207) (L1)	1.79E-23 (1.258)	-6.88E-11 (-9.687)
Doğan Holding	-7.86E-24 (-1.568)	-7.03E-10 (-2.298) (L1)	-8.32E-24 (-1.733)	9.53E-10 (3.142)
Enka	1.67E-23 (1.995)	-3.78E-10 (-4.547) (L1)	-2.39E-23 (-2.902)	-6.89E-10 (-8.551)
Ereğli	1.99E-24 (1.900) (L3(	-5.11E-09 (-1.282) (L1)	0.000 (0.000)	1.70E-08 (4.297)
Finansbank	1.64E-24 (1.264)	-1.63E-10 (-0.215) (L1)	0.000 (0.000)	6.92E-10 (0.917)
Ford	-1.18E-23 (-2.545) (L2)	-1.12E-10 (-5.751) (L2)	6.60E-25 (0.145)	9.46E-11 (4.724)
Garanti Bankası	-4.85E-25 (-0.867)	7.29E-10 (3.139) (L1)	9.09E-25 (1.739)	-2.12E-09 (-8.742)
Hürriyet	1.97E-24 (4.465) (L4)	-4.02E-09 (-2.357) (L1)	1.34E-24 (3.043)	2.38E-09 (1.389)
İş C	-1.32E-24 (-1.828)	4.37E-09 (2.841) (L1)	5.29E-24 (7.657)	4.92E-09 (3.260)
Koç	-3.45E-24 (-6.267)	-9.52E-10 (-0.317) (L1)	3.29E-24 (6.250)	1.73E-08 (5.495)
Migros	9.12E-25 (0.543)	-2.27E-09 (-5.629) (L2)	9.87E-24 (5.899)	2.18E-09 (5.758)
Petrol Ofisi	2.11E-24 (0.368)	-1.55E-10 (-0.201) (L1)	-4.31E-24 (-0.772)	3.48E-09 (4.498)
Sabancı	6.55E-26 (0.299)	1.52E-09 (1.721) (L2)	2.17E-24 (9.8019	0.002 (0.001)
Şişecam	5.26E-25 (0.151)	5.35E-10 (7.754) (L1)	-5.50E-24 (-1.605)	2.80E-10 (4.120)
Tansaş	-1.28E-23 (-1.623)	1.38E-10 (0.469) (L1)	2.39E-23 (3.059)	1.04E-09 (3.519)
Tofaş	-1.45E-23 (-2.329) (L4)	6.24E-10 (3.029) (L4)	-3.92E-23 (-6.249)	-1.69E-09 (-7.793)
Tüpraş	1.16E-24 (1.792) (L4)	2.69E-09 (6.968) (L4)	-3.90E-25 (-0.608)	-7.04E-10 (-1.666)

* The values below VAR test coefficients represent t-statistics,
* The values next to t-statistics represent optimum lag length based on AIC criterion, As such, L2 in Alarko represents a significant interaction spanning up to two periods.

Table 3.3: Aggregate Market Analysis

Equation Type	**Lagged VAR Test** $Y_t = \alpha + \beta X_{t-i} + \delta Y_{t-i} + \varepsilon_t$ β	**Contemporaneous Interaction** $Y_t = \alpha + \beta X_t + \delta Y_t + \varepsilon_t$ β
1) ISE Index- Market Value		
Dlogimkb (Y_t) - Dlogpiy (X_t)	-1.14E-16 (L_3) (-1.809)	1.31E-15 (19.322)
Dlogpiy (Y_t) - Dlogimkb (X_t)	-3.18E-16 (L_3) (-7.539)	-5.77E-16 (-13.987)
2) ISE Index-Number of Stocks		
Dlogimkb (Y_t) - Dloghis (X_t)	1.82E-17 (L_5) (1.936)	1.15E-16 (12.188)
Dloghis (Y_t) - Dlogimkb (X_t)	-4.57E-18 (L_5) (-0.613)	3.41E-18 (0.466)

* Dlogimkb = Differenced logarithm of ISE Index
* Dlogpiy = Differenced logarithm of Market Value of Stocks Held by Foreign Investors
* Dloghis = Differenced logarithm of Number of Stocks Held by Foreign Investors

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GLOBAL CAPITAL MARKETS

The global economy continued its downturn in the fourth quarter of 2008 due to the decline in industrial production and trade both in advanced and emerging economies. All economies around the world have been seriously affected due to tightening credit conditions. The global activity is estimated to have contracted by 1.3 percent in 2009. While the U.S. economy suffered from financial strains and the continued fall in the housing sector, European countries and advanced Asia were adversely affected from the collapse in trade as well as rising financial problems of their own and housing corrections in some national markets. In east Asia heavy reliance on manufacturing exports has fallen sharply. Emerging economies also suffered by these events and contracted by 4 percent in the fourth quarter in the aggregate.

As stipulated in the IMF WEO report, since end-October, in advanced economies, spreads in funding markets have gradually narrowed despite government guarantees and those in many creadit markets remain close to their peaks. In emerging economies, despite some recent moderation, sovereign and corporate spreads are still elevated. As economic prospects have deteriorated, equity markets in both advanced and emerging economies have mede little or no gains. Currency markets have been volatile.

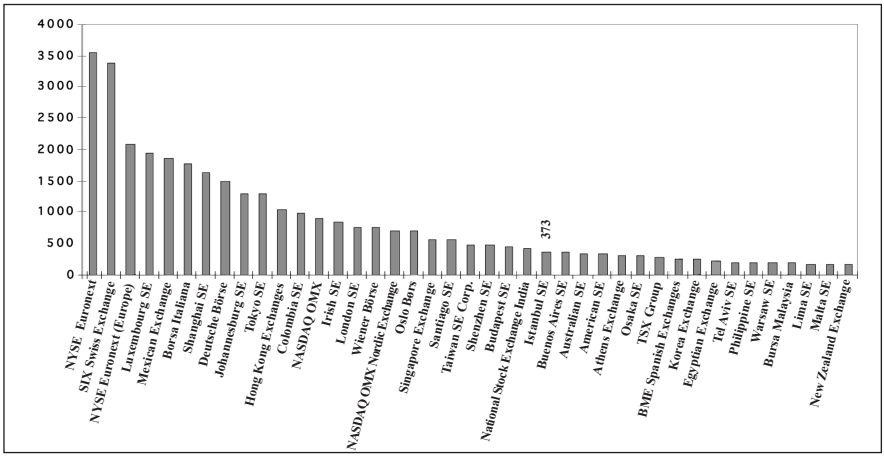
The performances of some developed stock markets with respect to indices indicated that DJIA, FTSE-100, Nikkei-225 and DAX changed by –36.0%, -48.4%, -29.2% and –43.2%, respectively, at December 29th, 2008 in comparison with the December 31, 2007. When US $ based returns of some emerging markets are compared in the same period, the best performer markets were: Chile (-36.7 %), Colombia (-36.7 %), Mexico (-38.8 %), Malaysia (-43.0 %) and S.Africa (-47.1%). In the same period, the lowest return markets were: Russia (-71.9 %), Greece (-67.1 %), and Pakistan (-65.2 %). The performances of emerging markets with respect to P/E ratios as of end of October 2008 indicated that the highest rates were obtained in Jordan (24.7), Czech Rep. (16.8), Chile (16.7) and Taiwan (16.1) and the lowest rates in Brazil (5.2), Thailand (5.4), Russia (5.5) and Hungary (6.5).

Market Capitalization (USD Million, 1986-2007)

	Global	Developed Markets	Emerging Markets	ISE
1986	6,514,199	6,275,582	238,617	938
1987	7,830,778	7,511,072	319,706	3,125
1988	9,728,493	9,245,358	483,135	1,128
1989	11,712,673	10,967,395	745,278	6,756
1990	9,398,391	8,784,770	613,621	18,737
1991	11,342,089	10,434,218	907,871	15,564
1992	10,923,343	9,923,024	1,000,319	9,922
1993	14,016,023	12,327,242	1,688,781	37,824
1994	15,124,051	13,210,778	1,913,273	21,785
1995	17,788,071	15,859,021	1,929,050	20,782
1996	20,412,135	17,982,088	2,272,184	30,797
1997	23,087,006	20,923,911	2,163,095	61,348
1998	26,964,463	25,065,373	1,899,090	33,473
1999	36,030,810	32,956,939	3,073,871	112,276
2000	32,260,433	29,520,707	2,691,452	69,659
2001	27,818,618	25,246,554	2,572,064	47,689
2002	23,391,914	20,955,876	2,436,038	33,958
2003	31,947,703	28,290,981	3,656,722	68,379
2004	38,904,018	34,173,600	4,730,418	98,299
2005	43,642,048	36,538,248	7,103,800	161,537
2006	54,194,991	43,736,409	10,458,582	162,399
2007	64,563,414	46,300,864	18,262,550	286,572

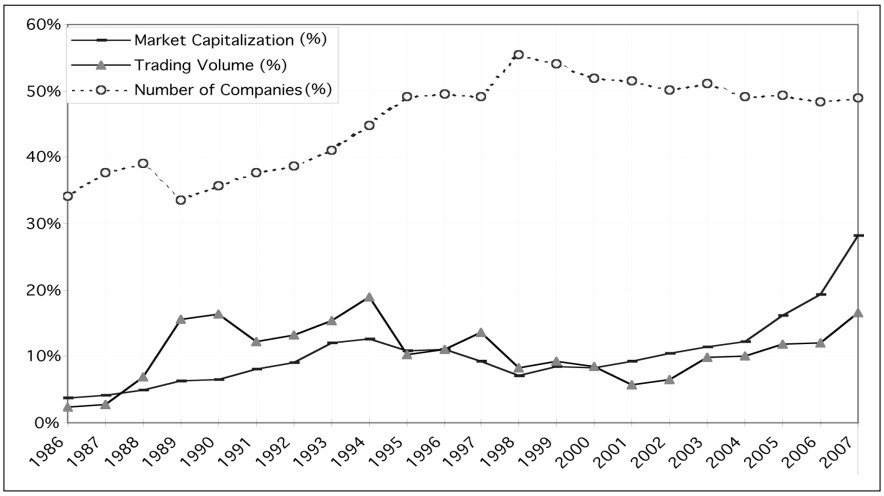
Source: Standard & Poor's Global Stock Markets Factbook, 2008.

Comparison of Average Market Capitalization Per Company (USD Million, Dec. 2008)



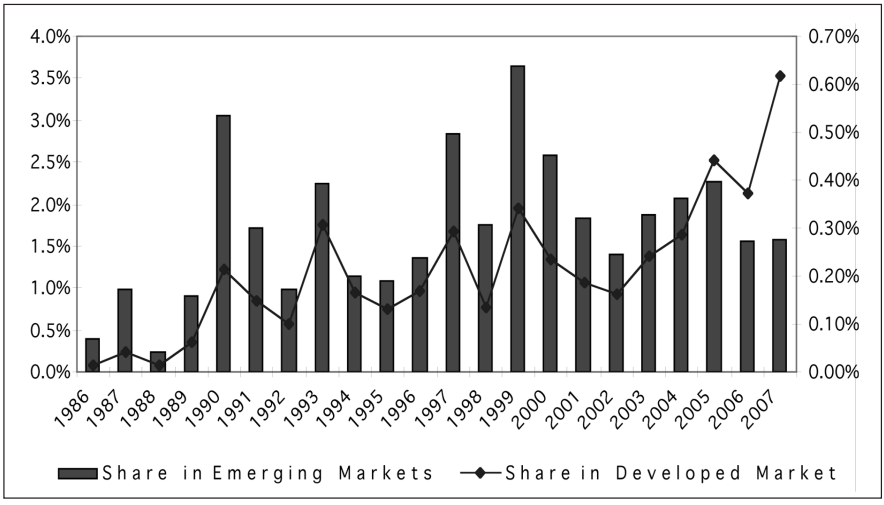
Source: FIBV, Monthly Statistics, December 2008.

Worldwide Share of Emerging Capital Markets (1986-2007)



Source: Standard & Poor's Global Stock Markets Factbook, 2008.

Share of ISE's Market Capitalization in World Markets (1986-2007)



Source: Standard & Poor's Global Stock Markets Factbook, 2008.

Main Indicators of Capital Markets (Dec. 2008)

	Market	Monthly Turnover Velocity (Dec. 2008) (%)	Market	Value of Share Trading (millions, US$) Up to Year Total (2008/1-2008/12)	Market	Market Cap. of Share of Domestic Companies (millions US$) Dec.2008
1	NASDAQ	1026.5%	NASDAQ OMX	36,446,548	NYSE Euronext (US)	9,208,934.1
2	Deutsche Börse	264.0%	NYSE Euonext (US)	33,638,937	Tokyo SE	3,115,803.7
3	NYSE Euronext(US)	240.2%	London SE	6,271,521	NASDAQ OMX	2,396,344.3
4	Shenzhen SE	235.9%	Tokyo SE	5,607,322	NYSE Euronext (Europe)	2,101,745.9
5	Korea Exchange	196.3%	Deutsche Börse	4,678,829	London SE	1,868,153.0
6	Borsa Italiana	182.3%	NYSE Euronext (Europe)	4,411,249	Shanghai SE	1,425,354.0
7	BME Spanish Exchanges	171.4%	Shanghai SE	2,600,209	Hong Kong Exchanges	1,328,768.5
8	London SE	152.7%	BME Spanish Exchanges	2,410,721	Deutsche Börse	1,110,579.6
9	Tokyo SE	151.2%	TSX Group	1,716,228	TSX Group	1,033,448.5
10	Taiwan SE Corp.	145.5%	Hong Kong Exchanges	1,629,782	BME Spanish Exchanges	948,352.3
11	Oslo Børs	143.2%	SIX Swiss Exchange	1,500,366	SIX Swiss Exchange	857,306.3
12	NYSE Euronext (Europe)	141.8%	Borsa Italiana	1,499,457	Australian SE	683,871.6
13	NASDAQ OMX Nordic Exchange	138.0%	Korea Exchange	1,432,480	Bombay SE	647,204.8
14	Istanbul SE	135.1%	NASDAQ OMX Nordic Exchange	1,338,181	National Stock Exchange India	600,281.6
15	Osaka SE	134.1%	Shenzhen SE	1,248,722	NASDAQ OMX Nordic Exchange	563,099.6
16	Swiss Exchange	121.8%	Australian SE	1,213,240	Borsa Italiana	522,087.8
17	Shanghai SE	118.2%	Taiwan SE Corp.	829,612	Johannesburg SE	482,700.0
18	Australian SE	113.0%	National Stock Exchange India	725,399	Korea Exchange	470,797.7
19	TSX Group	103.8%	American SE	561,603	Taiwan SE Corp.	356,710.6
20	Budapest SE	94.5%	Oslo Børs	442,641	Shenzhen SE	353,430.0
21	Hong Kong Exchanges	86.0%	Johannesburg SE	395,235	Singapore Exchange	264,974.4

22	Irish SE	81.3%	Bombay SE	301,648	Mexican Exchange	234,054.9
23	National Stock Exchange India	75.7%	Singapore Exchange	259,885	Bursa Malaysia	189,086.6
24	Egyptian Exchange	66.4%	Istanbul SE	247,893	Osaka SE	147,436.3
25	Wiener Börse	65.7%	Osaka SE	235,619	Oslo Børs	145,906.3
26	Singapore Exchange	63.7%	Athens Exchange	113,666	Tel Aviv SE	134,802.4
27	JSE	63.1%	Mexican Exchange	110,474	American SE	132,367.2
28	Athens Exchange	61.2%	Tel Aviv SE	110,136	Santiago SE	131,808.0
29	Tel Aviv SE	55.0%	Wiener Börse	104,688	Istanbul SE	118,328.7
30	New Zealand Exchange	45.5%	Bursa Malaysia	93,784	Athens Exchange	90,945.0
31	Warsaw SE	43.6%	Egyptian Exchange	93,476	Warsaw SE	90,815.5
32	Bursa Malaysia	36.0%	Irish SE	81,916	Colombia SE	87,716.2
33	Mexican Exchange	29.9%	Warsaw SE	69,499	Egyptian Exchange	85,247.2
34	Bombay SE	29.0%	Santiago SE	36,196	Wiener Börse	76,288.7
35	Tehran SE	26.5%	Budapest SE	30,706	Luxembourg SE	66,614.7
36	Philippine SE	24.2%	Colombia SE	20,274	Philippine SE	52,030.6
37	Santiago SE	19.9%	New Zealand Exchange	18,081	Irish SE	49,489.9
38	Colombia SE	19.3%	Philippine SE	17,090	Tehran SE	48,712.7
39	Colombo SE	13.9%	Tehran SE	15,244	Buenos Aires SE	39,850.4
40	Cyprus SE	13.5%	Buenos Aires SE	6,617	Lima SE	37,876.8
41	Ljubljana SE	11.9%	Lima SE	6,329	New Zealand Exchange	24,209.6
42	Lima SE	9.3%	Ljubljana SE	2,338	Budapest SE	18,465.4
43	Buenos Aires SE	7.0%	Cyprus SE	2,055	Ljubljana SE	11,799.4
44	Mauritius SE	5.5%	Luxembourg SE	1,910	Cyprus SE	7,987.9
45	Bermuda SE	4.0%	Colombo SE	1,016	Mauritius SE	4,662.0

Source: FIBV, Monthly Statistics, September 2008.

Trading Volume (USD millions, 1986-2007)

	Global	Developed	Emerging	ISE	Emerging / Global (%)	ISE/ Emerging (%)
1986	3,573,570	3,490,718	82,852	13	2.32	0.02
1987	5,846,864	5,682,143	164,721	118	2.82	0.07
1988	5,997,321	5,588,694	408,627	115	6.81	0.03
1989	7,467,997	6,298,778	1,169,219	773	15.66	0.07
1990	5,514,706	4,614,786	899,920	5,854	16.32	0.65
1991	5,019,596	4,403,631	615,965	8,502	12.27	1.38
1992	4,782,850	4,151,662	631,188	8,567	13.20	1.36
1993	7,194,675	6,090,929	1,103,746	21,770	15.34	1.97
1994	8,821,845	7,156,704	1,665,141	23,203	18.88	1.39
1995	10,218,748	9,176,451	1,042,297	52,357	10.20	5.02
1996	13,616,070	12,105,541	1,510,529	37,737	11.09	2.50
1997	19,484,814	16,818,167	2,666,647	59,105	13.69	2.18
1998	22,874,320	20,917,462	1,909,510	68,646	8.55	3.60
1999	31,021,065	28,154,198	2,866,867	81,277	9.24	2.86
2000	47,869,886	43,817,893	4,051,905	179,209	8.46	4.42
2001	42,076,862	39,676,018	2,400,844	77,937	5.71	3.25
2002	38,645,472	36,098,731	2,546,742	70,667	6.59	2.77
2003	29,639,297	26,743,153	2,896,144	99,611	9.77	3.44
2004	39,309,589	35,341,782	3,967,806	147,426	10.09	3.72
2005	47,319,584	41,715,492	5,604,092	201,258	11.84	3.59
2006	67,912,153	59,685,209	8,226,944	227,615	12.11	2.77
2007	98,816,305	82,455,174	16,361,131	302,402	16.55	1.85

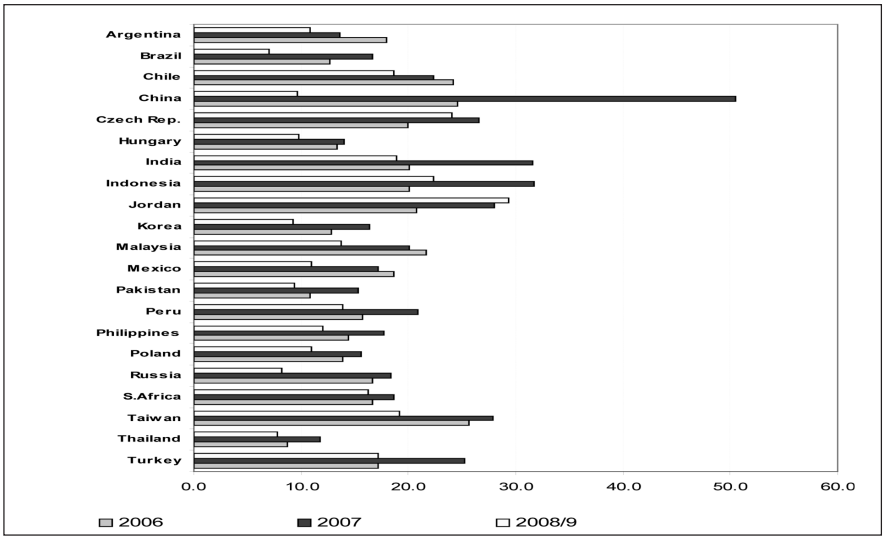
Source: Standard & Poor's Global Stock Markets Factbook, 2008.

Number of Trading Companies (1986-2007)

	Global	Developed Markets	Emerging Markets	ISE	Emerging / Global (%)	ISE/Emerging (%)
1986	28,173	18,555	9,618	80	34.14	0.83
1987	29,278	18,265	11,013	82	37.62	0.74
1988	29,270	17,805	11,465	79	39.17	0.69
1989	25,925	17,216	8,709	76	33.59	0.87
1990	25,424	16,323	9,101	110	35.80	1.21
1991	26,093	16,239	9,854	134	37.76	1.36
1992	27,706	16,976	10,730	145	38.73	1.35
1993	28,895	17,012	11,883	160	41.12	1.35
1994	33,473	18,505	14,968	176	44.72	1.18
1995	36,602	18,648	17,954	205	49.05	1.14
1996	40,191	20,242	19,949	228	49.64	1.14
1997	40,880	20,805	20,075	258	49.11	1.29
1998	47,465	21,111	26,354	277	55.52	1.05
1999	48,557	22,277	26,280	285	54.12	1.08
2000	49,933	23,996	25,937	315	51.94	1.21
2001	48,220	23,340	24,880	310	51.60	1.25
2002	48,375	24,099	24,276	288	50.18	1.19
2003	49,855	24,414	25,441	284	51.03	1.12
2004	48,806	24,824	23,982	296	49.14	1.23
2005	49,946	25,337	24,609	302	49.27	1.23
2006	50,212	25,954	24,258	314	48.31	1.29
2007	51,322	26,251	25,071	319	48.85	1.27

Source: Standard & Poor's Global Stock Markets Factbook, 2008.

Comparison of P/E Ratios Performances



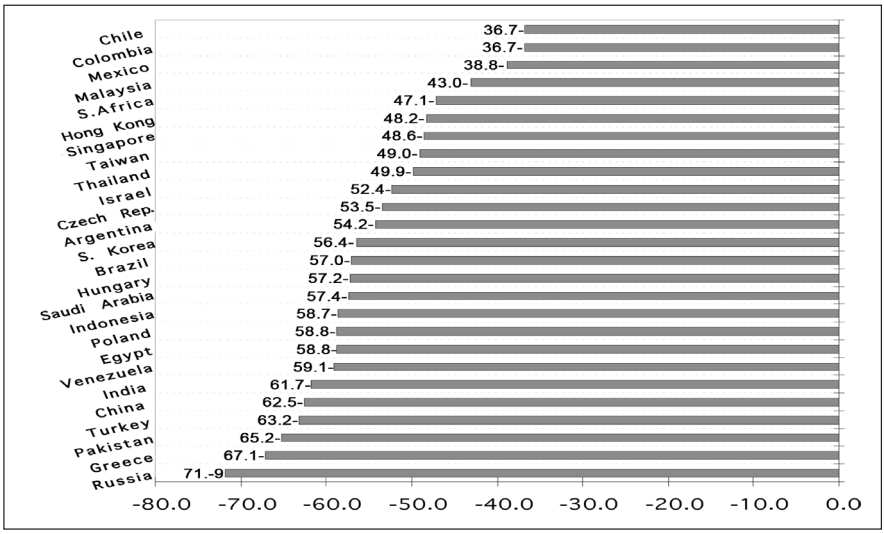
Source: IFC Factbook 2001. Standard & Poor's, Emerging Stock Markets Review, September 2008.

Price-Earnings Ratios in Emerging Markets

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008/9
Argentina	39.4	-889.9	32.6	-1.4	21.1	27.7	11.1	18.0	13.6	10.9
Brazil	23.5	11.5	8.8	13.5	10.0	10.6	10.7	12.7	16.6	7.0
Chile	35.0	24.9	16.2	16.3	24.8	17.2	15.7	24.2	22.3	18.6
China	47.8	50.0	22.2	21.6	28.6	19.1	13.9	24.6	50.5	9.7
Czech Rep.	-14.9	-16.4	5.8	11.2	10.8	25.0	21.1	20.0	26.5	24.1
Hungary	18.1	14.3	13.4	14.6	12.3	16.6	13.5	13.4	14.0	9.8
India	25.5	16.8	12.8	15.0	20.9	18.1	19.4	20.1	31.6	18.9
Indonesia	-7.4	-5.4	-7.7	22.0	39.5	13.3	12.6	20.1	31.7	22.3
Jordan	14.1	13.9	18.8	11.4	20.7	30.4	6.2	20.8	28.0	29.4
Korea	-33.5	17.7	28.7	21.6	30.2	13.5	20.8	12.8	16.4	9.3
Malaysia	-18.0	91.5	50.6	21.3	30.1	22.4	15	21.7	20.1	13.7
Mexico	14.1	13.0	13.7	15.4	17.6	15.9	14.2	18.6	17.2	11.0
Pakistan	13.2	-117.4	7.5	10.0	9.5	9.9	13.1	10.8	15.3	9.4
Peru	25.7	11.6	21.3	12.8	13.7	10.7	12.0	15.7	20.9	13.9
Philippines	22.2	26.2	45.9	21.8	21.1	14.6	15.7	14.4	17.7	12.0
Poland	22.0	19.4	6.1	88.6	-353.0	39.9	11.7	13.9	15.6	11.0
Russia	-71.2	3.8	5.6	12.4	19.9	10.8	24.1	16.6	18.4	8.2
S.Africa	17.4	10.7	11.7	10.1	11.5	16.2	12.8	16.6	18.7	16.2
Taiwan	52.5	13.9	29.4	20.0	55.7	21.2	21.9	25.6	27.9	19.2
Thailand	-12.2	-6.9	163.8	16.4	16.6	12.8	10.0	8.7	11.7	7.8
Turkey	34.6	15.4	72.5	37.9	14.9	12.5	16.2	17.2	25.2	17.2

Source: IFC Factbook, 2004; Standard&Poor's, Emerging Stock Markets Review, September 2008.
Note: Figures are taken from S&P/IFCG Index Profile.

Comparison of Market Returns in USD (31/12/2007-29/12/2008)



Source: The Economist, Jan 3rd 2009.

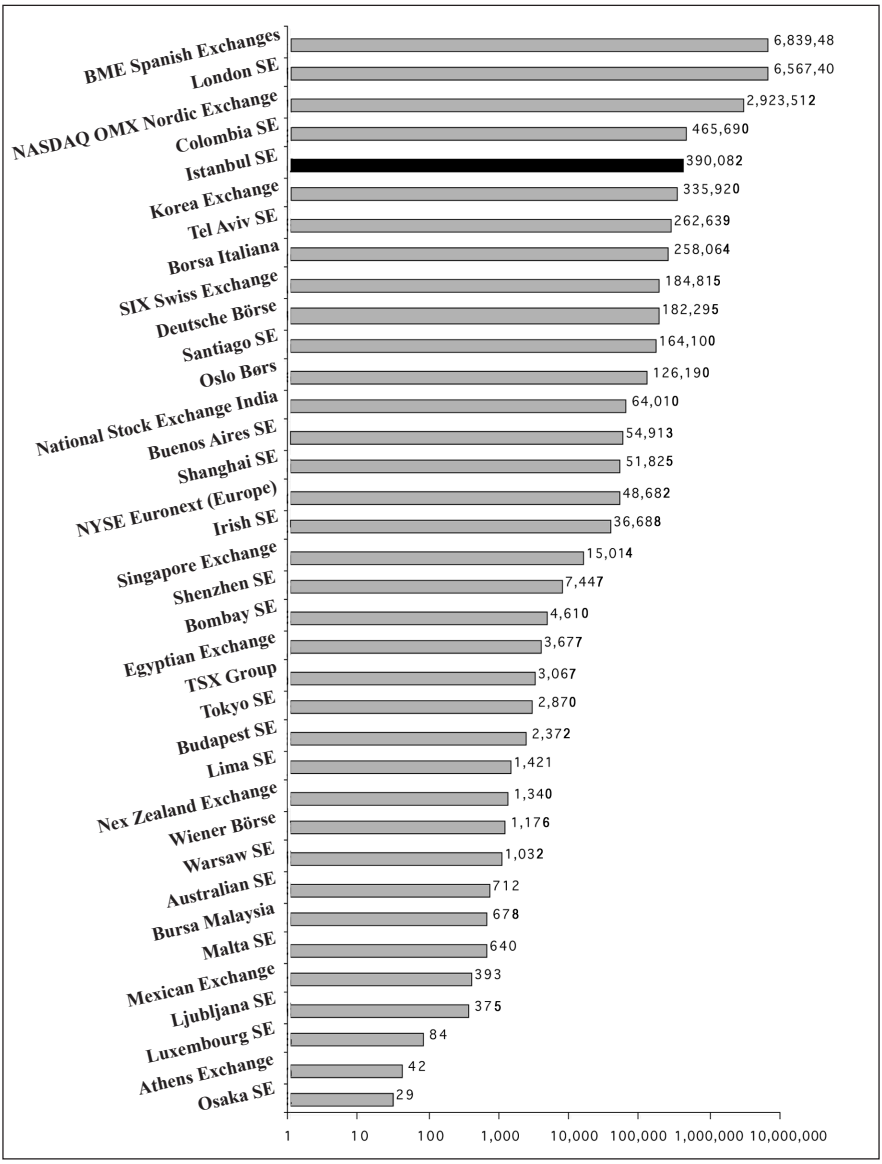
Market Value/Book Value Ratios

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008/9
Argentina	1.5	0.9	0.6	0.8	2.0	2.2	2.5	4.1	3.2	2.6
Brazil	1.6	1.4	1.2	1.3	1.8	1.9	2.2	2.7	3.3	1.4
Chile	1.7	1.4	1.4	1.3	1.9	0.6	1.9	2.4	2.5	2.1
China	3.0	3.6	2.3	1.9	2.6	2.0	1.8	3.1	6.3	1.4
Czech Rep.	0.9	1.0	0.8	0.8	1.0	1.6	2.4	2.4	3.1	2.9
Hungary	3.6	2.4	1.8	1.8	2.0	2.8	3.1	3.1	3.2	2.3
India	3.3	2.6	1.9	2.0	3.5	3.3	5.2	4.9	7.9	4.8
Indonesia	3.0	1.7	1.7	1.0	1.6	2.8	2.5	3.4	5.6	3.9
Jordan	1.5	1.2	1.5	1.3	2.1	3.0	2.2	3.3	4.4	4.7
Korea	2.0	0.8	1.2	1.1	1.6	1.3	2.0	1.7	2.2	1.2
Malaysia	1.9	1.5	1.2	1.3	1.7	1.9	1.7	2.1	2.5	1.7
Mexico	2.2	1.7	1.7	1.5	2.0	2.5	2.9	3.8	3.6	2.5
Pakistan	1.4	1.4	0.9	1.9	2.3	2.6	3.5	3.2	4.7	2.9
Peru	1.5	1.1	1.4	1.2	1.8	1.6	2.2	3.5	6.0	4.2
Philippines	1.4	1.0	0.9	0.8	1.1	1.4	1.7	1.9	2.8	1.8
Poland	2.0	2.2	1.4	1.3	1.8	2.0	2.5	2.5	2.8	2.0
Russia	1.2	0.6	1.1	0.9	1.2	1.2	2.2	2.5	2.8	1.3
S.Africa	2.7	2.1	2.1	1.9	2.1	2.5	3.0	3.8	4.4	3.8
Taiwan	3.4	1.7	2.1	1.6	2.2	1.9	1.9	2.4	2.6	1.8
Thailand	2.1	1.3	1.3	1.5	2.8	2.0	2.1	1.9	2.5	1.6
Turkey	8.9	3.1	3.8	2.8	2.6	1.7	2.1	2.0	2.8	1.9

Source: IFC Factbook, 2004; Standard & Poor's, Emerging Stock Markets Review, September 2008.

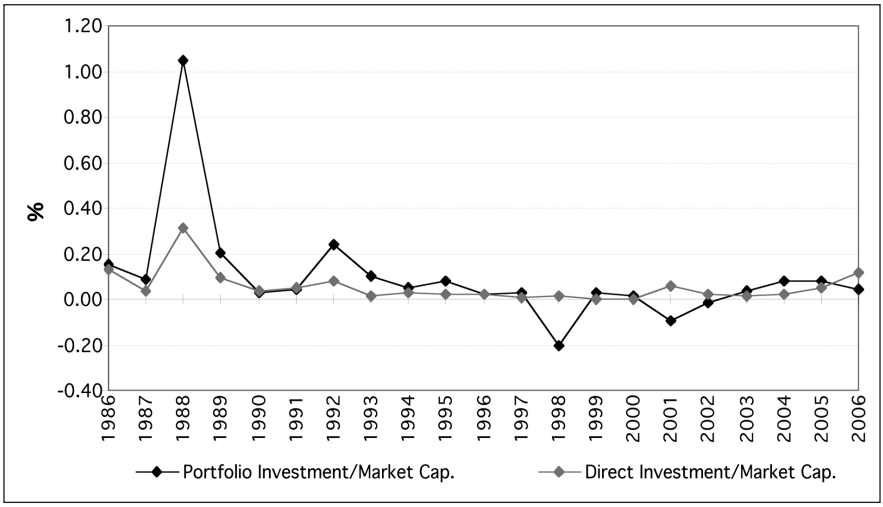
Note: Figures are taken from S&P/IFCG Index Profile.

Value of Bond Trading
(Million USD Jan. 2008-Dec. 2008)



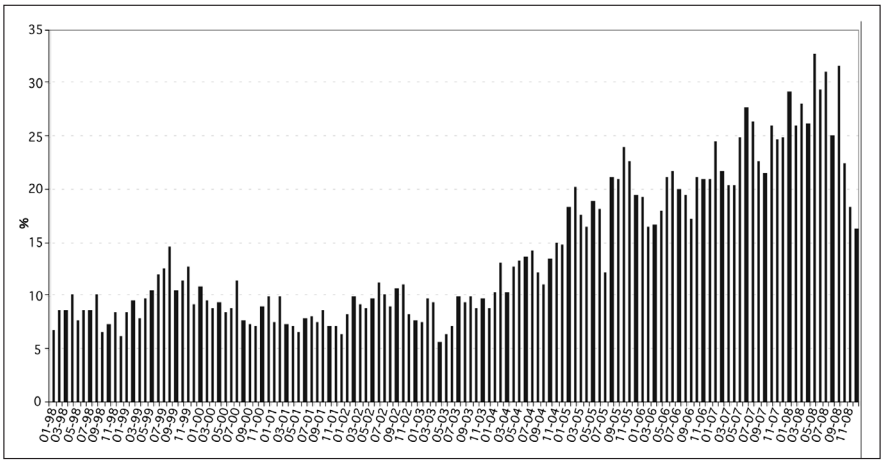
Source: FIBV, Monthly Statistics, December 2008.

Foreign Investments as a Percentage of Market Capitalization in Turkey (1986-2006)



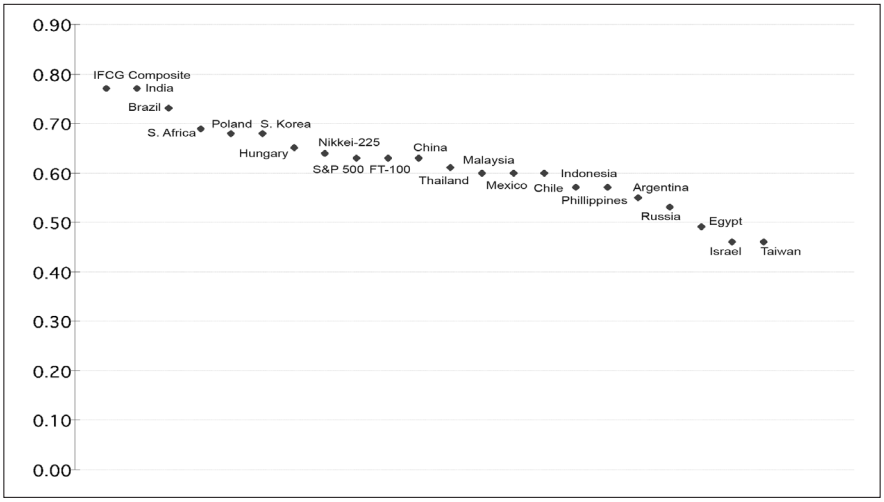
Source: ISE Data. CBTR Databank.

Foreigners' Share in the Trading Volume of the ISE (Jan. 1998-Dec. 2008)



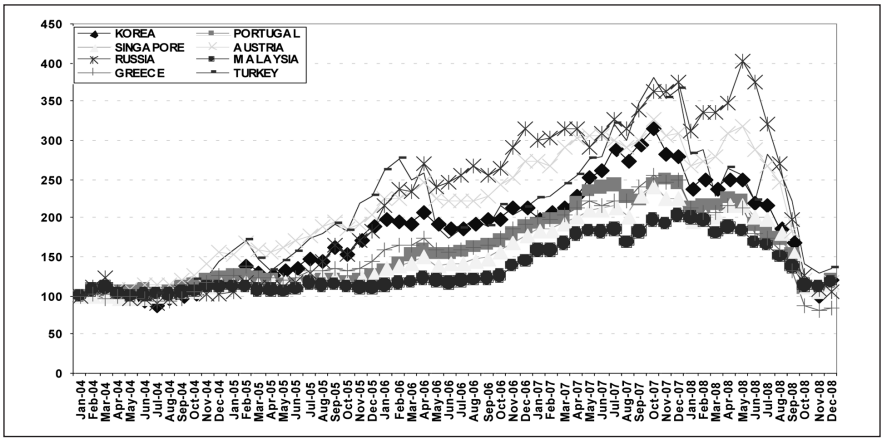
Source: ISE Data.

Price Correlations of the ISE (Sep. 2003- Sep. 2008)



Source : Standard & Poor's, Emerging Stock Markets Review, September 2008.
Notes : The correlation coefficient is between -1 and +1. If it is zero. for the given period. it is implied that there is no relation between two serious of returns.

Comparison of Market Indices (31 Jan. 2004=100)



Source: Bloomberg

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ISE
Market Indicators

	STOCK MARKET										
	Number of Companies	Traded Value				Market Value		Dividend Yield	P/E Ratios		
		Total		Daily Average							
		YTL Million	US$ Million	YTL Million	US$ Million	YTL Million	US$ Million	(%)	YTL(1)	YTL(2)	US$
1986	80	0.01	13	---	---	0.71	938	9,15	5,07	---	---
1987	82	0.10	118	---	---	3	3.125	2,82	15,86	---	---
1988	79	0.15	115	---	---	2	1.128	10,48	4,97	---	---
1989	76	2	773	0.01	3	16	6.756	3,44	15,74	---	---
1990	110	15	5.854	0.06	24	55	18.737	2,62	23,97	---	---
1991	134	35	8.502	0.14	34	79	15.564	3,95	15,88	---	---
1992	145	56	8.567	0.22	34	85	9.922	6,43	11,39	---	---
1993	160	255	21.770	1	88	546	37.824	1,65	25,75	20,72	14,86
1994	176	651	23.203	3	92	836	21.785	2,78	24,83	16,70	10,97
1995	205	2.374	52.357	9	209	1.265	20.782	3,56	9,23	7,67	5,48
1996	228	3.031	37.737	12	153	3.275	30.797	2,87	12,15	10,86	7,72
1997	258	9.049	58.104	36	231	12.654	61.879	1,56	24,39	19,45	13,28
1998	277	18.030	70.396	73	284	10.612	33.975	3,37	8,84	8,11	6,36
1999	285	36.877	84.034	156	356	61.137	114.271	0,72	37,52	34,08	24,95
2000	315	111.165	181.934	452	740	46.692	69.507	1,29	16,82	16,11	14,05
2001	310	93.119	80.400	375	324	68.603	47.689	0,95	108,33	824,42	411,64
2002	288	106.302	70.756	422	281	56.370	34.402	1,20	195,92	26,98	23,78
2003	285	146.645	100.165	596	407	96.073	69.003	0,94	14,54	12,29	13,19
2004	297	208.423	147.755	837	593	132.556	98.073	1,37	14,18	13,27	13,96
2005	304	269.931	201.763	1.063	794	218.318	162.814	1,71	17,19	19,38	19,33
2006	316	325.131	229.642	1.301	919	230.038	163.775	2,10	22,02	14,86	15,32
2007	319	387.777	300.842	1.539	1.194	335.948	289.986	1,90	12,16	11,97	13,48
2008	317	332,615	261,281	1,325	1,041	182,025	119,698	4,93	5,55	5,76	4,63
2008/Ç1	319	96.652	80.737	1.510	1.262	245.394	187.969	2,55	8,70	8,65	8,39
2008/Ç2	320	79.531	63.266	1.262	1.004	235.863	193.695	3,73	7,55	7,64	7,79
2008/Ç3	318	83.562	69.400	1.286	1.068	244.501	198.668	3,68	7,43	7,43	7,34
2008/Ç4	317	72.870	47.878	1.235	811	182.025	119.698	4,93	5,55	5,76	4,63

Q: Quarter

Note: Between 1986-1992, the price earnings ratios were calculated on the basis of the companies' previous year-end net profits. As from 1993,

YTL(1) = Total Market Capitalization / Sum of Last two six-month profits

YTL(2) = Total Market Capitalization / Sum of Last four three-month profits.

US$ = US$ based Total Market Capitalization / Sum of Last four US$ based three-month profits.

- Companies which are temporarily de-listed and will be traded off the Exchange under the decision of ISE's Executive Council are not included in the calculations.
- ETF's data are taken into account only in the calculation of Traded Value.

Closing Values of the ISE Price Indices

YTL Based

	NATIONAL-100 (Jan, 1986=1)	CORPORATE GOVERNANCE (Aug.29.2007= 48.082,17)	NATIONAL-INDUSTRIALS (Dec, 31,90=33)	NATIONAL-SERVICES (Dec, 27.96 =1046)	NATIONAL-FINANCIALS (Dec, 31,90=33)	NATIONAL-TECHNOLOGY (Jun, 30,2000 =14,466.12)	INVESTMENT TRUSTS (Dec 27. 1996=976)	SECOND NATIONAL (Dec 27. 1996=976)	NEW ECONOMY (Sept 02.2004 =20525.92)
1986	1,71	---	---	---	---	---	---	---	---
1987	6,73	---	---	---	---	---	---	---	---
1988	3,74	---	---	---	---	---	---	---	---
1989	22,18	---	---	---	---	---	---	---	---
1990	32,56	---	---	---	---	---	---	---	---
1991	43,69	---	49,63	---	33,55	---	---	---	---
1992	40,04	---	49,15	---	24,34	---	---	---	---
1993	206,83	---	222,88	---	191,90	---	---	---	---
1994	272,57	---	304,74	---	229,64	---	---	---	---
1995	400,25	---	462,47	---	300,04	---	---	---	---
1996	975,89	---	1.045,91	---	914,47	---	---	---	---
1997	3.451,--	---	2.660,--	3.593,--	4.522,--	---	2.934,--	2.761,--	---
1998	2.597,91	---	1.943,67	3.697,10	3.269,58	---	1.579,24	5.390,43	---
1999	15.208,78	---	9.945,75	13.194,40	21.180,77	---	6.812,65	13.450,36	---
2000	9.437,21	---	6.954,99	7.224,01	12.837,92	10.586,58	6.219,00	15.718,65	---
2001	13.782,76	---	11.413,44	9.261,82	18.234,65	9.236,16	7.943,60	20.664,11	---
2002	10.369,92	---	9.888,71	6.897,30	12.902,34	7.260,84	5.452,10	28.305,78	---
2003	18.625,02	---	16.299,23	9.923,02	25.594,77	8.368,72	10.897,76	32.521,26	---
2004	24.971,68	---	20.885,47	13.914,12	35.487,77	7.539,16	17.114,91	23.415,86	39.240,73
2005	39.777,70	---	31.140,59	18.085,71	62.800,64	13.669,97	23.037,86	28.474,96	29.820,90
2006	39.117,46	---	30.896,67	22.211,77	60.168,41	10.341,85	16.910,76	23.969,99	20.395,84
2007	55.538,13	55.406,17	40.567,17	34.204,74	83.822,29	10.490,51	16.428,59	27.283,78	32.879,36
2008	26.864,07	21.974,49	19.781,26	22.169,30	38.054,32	4.858,62	8.655,55	8.645,09	14.889,37
2008/Q1	39.015,44	39.330,78	33.264,72	29.323,22	53.210,19	7.650,83	11.096,39	19.810,76	24.707,47
2008/Q2	35.089,53	34.950,87	33.163,23	25.653,19	45.045,68	6.745,00	10.717,18	15.660,86	22.533,84
2008/Q3	36.051,30	32.961,65	28.573,16	25.371,72	52.318,20	5.708,12	10.894,23	12.790,41	21.859,26
2008/Ç4	26.864,07	21.974,49	19.781,26	22.169,30	38.054,32	4.858,62	8.655,55	8.645,09	14.889,37

US $ Based

Euro Based

	NATIONAL-100 (Jan. 1986=100)	CORPORATE GOVERNANCE (Aug.29,2007= 2,114.37)	NATIONAL-INDUSTRIALS (Dec. 31.90=643)	NATIONAL-SERVICES (Dec. 27,96 =572)	NATIONAL-FINANCIALS (Dec.31.90= 643)	NATIONAL-TECHNOLOGY (Jun. 30,2000 =1.360.92)	INVESTMENT TRUSTS (Dec 27, 96=534)	SECOND NATIONAL (Dec 27,96=534)	NEW ECONOMY (Sept 02, 2004 =796,46)	NATIONAL-100 (Dec.31,98= 484)
1986	131,53	---	---	---	---	---	---	---	---	---
1987	384,57	---	---	---	---	---	---	---	---	---
1988	119,82	---	---	---	---	---	---	---	---	---
1989	560,57	---	---	---	---	---	---	---	---	---
1990	642,63	---	---	---	---	---	---	---	---	---
1991	501,50	---	569,63	---	385,14	---	---	---	---	---
1992	272,61	---	334,59	---	165,68	---	---	---	---	---
1993	833,28	---	897,96	---	773,13	---	---	---	---	---
1994	413,27	---	462,03	---	348,18	---	---	---	---	---
1995	382,62	---	442,11	---	286,83	---	---	---	---	---
1996	534,01	---	572,33	---	500,40	---	---	---	---	---
1997	982,--	---	757,--	1.022,--	1.287,--	---	835,--	786,--	---	---
1998	484,01	---	362,12	688,79	609,14	---	294,22	1.004,27	---	---
1999	1.654,17	---	1.081,74	1.435,08	2.303,71	---	740,97	1.462,92	---	1.912,46
2000	817,49	---	602,47	625,78	1.112,08	917,06	538,72	1.361,62	---	1.045,57
2001	557,52	---	461,68	374,65	737,61	373,61	321,33	835,88	---	741,24
2002	368,26	---	351,17	244,94	458,20	257,85	193,62	1.005,21	---	411,72
2003	778,43	---	681,22	414,73	1.069,73	349,77	455,47	1.359,22	---	723,25
2004	1.075,12	---	899,19	599,05	1.527,87	324,59	736,86	1.008,13	1.689,45	924,87
2005	1.726,23	---	1.351,41	784,87	2.725,36	593,24	999,77	1.235,73	1.294,14	1.710,04
2006	1.620,59	---	1.280,01	920,21	2.492,71	428,45	700,59	993,05	844,98	1.441,89
2007	2.789,66	2.783,03	2.037,67	1.718,09	4.210,36	526,93	825,20	1.370,45	1.651,52	2.221,77
2008	1.027,98	840,87	756,95	848,33	1.456,18	185,92	331,21	330,81	569,76	859,46
2008/Q1	1.739,06	1.753,12	1.482,73	1.307,05	2.371,78	341,03	494,61	883,04	1.101,30	1.289,85
2008/Q2	1.676,85	1.670,22	1.584,79	1.225,91	2.152,63	322,33	512,15	748,40	1.076,84	1.244,13
2008/Q3	1.704,61	1.558,52	1.351,02	1.199,65	2.473,75	269,90	515,11	604,77	1.033,57	1.368,59
2008/Ç4	1.027,98	840,87	756,95	848,33	1.456,18	185,92	331,21	330,81	569,76	859,46

Q: Quarter

BONS AND BILLS MARKET

Traded Value

Outright Purchases and Sales Market

	Total		Daily Average	
	(YTL Million)	(US $ Million)	(YTL Million)	(US $ Million)
1991	1	312	0.01	2
1992	18	2.406	0.07	10
1993	123	10.728	0.50	44
1994	270	8.832	1	35
1995	740	16.509	3	66
1996	2.711	32.737	11	130
1997	5.504	35.472	22	141
1998	17.996	68.399	72	274
1999	35.430	83.842	143	338
2000	166.336	262.941	663	1.048
2001	39.777	37.297	158	149
2002	102.095	67.256	404	266
2003	213.098	144.422	852	578
2004	372.670	262.596	1.479	1.042
2005	480.723	359.371	1.893	1.415
2006	381.772	270.183	1.521	1.076
2007	363.949	278.873	1.444	1.107
2008	300,995	239,367	1,199	954
2008/Q1	99.246	82.986	1.551	1.297
2008/Q2	67.571	53.728	1.073	853
2008/Q3	83.921	69.580	1.291	1.070
2008/Q4	50.256	33.072	852	561

Repo-Reverse Repo Market

Repo-Reverse Repo Market

	Total		Daily Average	
	(YTL Million)	(US $ Million)	(YTL Million)	(US $ Million)
1993	59	4.794	0.28	22
1994	757	23.704	3	94
1995	5.782	123.254	23	489
1996	18.340	221.405	73	879
1997	58.192	374.384	231	1.486
1998	97.278	372.201	389	1.489
1999	250.724	589.267	1.011	2.376
2000	554.121	886.732	2.208	3.533
2001	696.339	627.244	2.774	2.499
2002	736.426	480.725	2.911	1.900
2003	1.040.533	701.545	4.162	2.806
2004	1.551.410	1.090.477	6.156	4.327
2005	1.859.714	1.387.221	7.322	5.461
2006	2.538.802	1.770.337	10.115	7.053
2007	2.571.169	1.993.283	5.102	3.955
2008	2,935,317	2,274,077	11,694	9,060
2008/Q1	669.583	558.817	10.462	8.732
2008/Q2	724.052	576.238	11.493	9.147
2008/Q3	751.333	623.947	11.559	9.599
2008/Q4	790.349	515.075	13.396	8.730

Q: Quarter

ISE GDS Price Indices (January 02, 2001=100)

YTL Based

	3 Months (91 Days)	6 Months (182 Days)	9 Months (273 Days)	12 Months (365 Days)	15 Months (456 Days)	General
2001	102,87	101,49	97,37	91,61	85,16	101,49
2002	105,69	106,91	104,87	100,57	95,00	104,62
2003	110,42	118,04	123,22	126,33	127,63	121,77
2004	112,03	121,24	127,86	132,22	134,48	122,70
2005	113,14	123,96	132,67	139,50	144,47	129,14
2006	111,97	121,14	127,77	132,16	134,48	121,17
2007	112,67	122,83	130,72	136,58	140,49	128,23
2008	112,56	122,69	130,63	136,65	140,81	128,03
2008/Q1	112,41	122,15	129,44	134,57	137,65	125,06
2008/Q2	112,03	121,10	127,46	131,43	133,21	124,37
2008/Q3	112,05	121,48	128,53	133,49	136,51	122,31
2008/Q4	112,56	122,69	130,63	136,65	140,81	128,03

ISE GDS Performance Indices (January 02, 2001=100)

YTL Based

	3 Months (91 Days)	6 Months (182 Days)	9 Months (273 Days)	12 Months (365 Days)	15 Months (456 Days)
2001	195,18	179,24	190,48	159,05	150,00
2002	314,24	305,57	347,66	276,59	255,90
2003	450,50	457,60	558,19	438,13	464,98
2004	555,45	574,60	712,26	552,85	610,42
2005	644,37	670,54	839,82	665,76	735,10
2006	751,03	771,08	956,21	760,07	829,61
2007	887,85	916,30	1.146,36	917,23	1.008,52
2008	1.047,38	1.083,04	1.369,76	1.070,37	1.241,27
2008/Q1	921,98	949,85	1.188,33	944,28	1.045,45
2008/Q2	959,61	988,61	1.236,83	977,05	1.088,12
2008/Q3	1.002,15	1.036,27	1.303,90	1.024,15	1.166,56
2008/Ç4	1.047,38	1.083,04	1.369,37	1.070,37	1.241,27

ISE GDS Portfolio Performance Indices (December 31, 2003=100)

YTL Based

	Equal Weighted Indices			Market Value Weighted Indices			
	EQ 180-	EQ 180+	EQ COMPOSITE	MV 180-	MV 180+	MV COMPOSITE	REPO
2004	125,81	130,40	128,11	125,91	130,25	128,09	118,86
2005	147,29	160,29	153,55	147,51	160,36	154,25	133,63
2006	171,02	180,05	175,39	170,84	179,00	174,82	152,90
2007	203,09	221,63	211,76	202,27	221,13	212,42	177,00
2008	240.13	264.15	251.95	239.21	263.57	252.36	203.07
2008/Q1	210,57	227,06	218,30	209,69	226,29	218,60	182,87
2008/Q2	219,03	231,48	224,73	218,14	230,70	224,66	189,10
2008/Q3	228,73	247,04	237,40	227,72	245,89	237,51	196,16
2008/Q4	240,13	264,15	251,95	239,21	263,57	252,36	203,07

Q: Quarter
GDS: Government Debt Securities

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