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CONTENT

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JBEF
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SHORT TERM UNDERPRICING ANOMALY AND ITS DETERMINANT FACTORS ON SEASONED EQUITY OFFERINGS: A RESEARCH ON THE STOCKS TRADED ON THE BORSA ISTANBUL (BIST)

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ABSTRACT

Purpose - The main objective of this study is to analyze the short-term price performance of the stocks issued by the 58 companies conducted 79 seasoned equity offerings (seos) during the 2010-2015 period in Borsa İstanbul and find out its determinant factors on the short-term price anomalies.

Methodology – Raw and abnormal returns were calculated then t statistics were obtained for each type of returns. All returns were compared to market average and peer groups returns. The hypotheses were tested via the comparison t statistics and t values. Regression analysis was used to determine what kind of determinants affect long-term price performance. To find out underperformance anomaly's determinants regression analysis was used through Panel Dynamic OLS (PDOLS) method. The analysis was also conducted based on year and sector separately.

Findings- Short-term price performance of firms that performed seos during the 2010-2015 period are the function of two dimension consist of time duration and industry because price performance of the stocks can vary depending on these factors.

Conclusion- According to the t-test results, the short-term underpricing anomaly cannot be fully confirmed in Borsa Istanbul during the analysis period. It has been confirmed statistically only in 2011 and 2015 years and in the stocks of the industrial sector. In other words, it is possible for investors to obtain higher returns than market average in the short term if they purchase shares from the seos performed in 2011 and 2015 carried out by companies in the industry sector. Determinants that considered as independent variables in study include; Stock Price, Number of Public Offerings, Company Size, Public Offering Method, Transaction Volume, Difference, Leverage Ratio, Capital Increase Rate, M / B ratio and Volatility. Based on panel regression analysis, leverage ratio change, capital increase rate and public placement have positive effect on share price performance while other variables such as M / B ratio and private placement have a negative impact.

Keywords: Initial Public Offerings (IPO), Seasoned Equity Offerings (SEO), Price anomalies, Underpricing, Panel regression analysis.
JEL Codes: C23, G10, G32

1. INTRODUCTION

The price anomalies oberserved in seasoned equity offerings (seos) in literature are examined separately in terms of time duration as short and long term. In most of the studies conducted in the literature, underpricing anomaly was observed in the short term while underperformance anomaly was detected in the long term. Ritter (1991) found that issuer firms' stocks provided abnormal returns to the investors that means they were underpriced for the short run while in the long term returns turned lower compared to market and peer groups performance. In this study, during the 2010 – 2015 periods in Borsa İstanbul, existence of the short-term underpricing anomaly and its determinant factors will be examined.

Underpricing term comes out when the offering price becomes lower then its fair value at the offering date. From point of this view, underpricing refers to a higher return for the investors, especially in the short run, while express decreasing issue revenue (money left on the table) for the issuer firms.

There have been many studies in the literature regarding underpricing anomaly. The most important ones include the Asymmetric Information Hypothesis, the Monopson Power of Investment Banks Hypothesis, the Waterfall Influence Hypothesis, and the Prestige of Investment Banks Hypothesis. (Ibbotson & Ritter, 1988).

The Asymmetric Information Hypothesis focuses on the different information levels between the parties involved in the offering. If firm management realizes that fair value of the firm is lower than its market value in other words if the firm's shares are overvalued, they will prefer to go to the public for the purpose of maximizing of issue. (Myers & Majluf, 1984).

The Monopson Power Hypothesis deals with the behavior of the investment banks in the pricing process resulting from being the sole buyer. (Logue, 1973).

The Prestige Hypothesis of Investment Banks, argues that offerings conducted by high reputable investment banks are less underpriced than offerings through lower reputable investment banks.

The Waterfall Influence Hypothesis assumes that investors focus on the information and movements of other participants in the public offering, rather than their own knowledge. This hypothesis assumes that investors take into account the actions of other actors in the investment process of the financial assets (Welch, 1992).

2. LITERATURE REVIEW

There are many studies in the literature regarding underpricing anomaly. One of the most important of these studies is the signaling hypothesis conducted by Welch in 1989. This hypothesis suggestes that firms regarded as small and have a low quality, may tend to have a big company image by making some earning management practices in their financials but real operational performance will be clear through seos they made in following periods. Especially the seos of the issuer firm may be perceived by the market as a negative signal related to the financial failure, therefore market generaly gives a negative respond to the the announcement of share issue. Hess and Frost (1982), confirmed the effective market hypothesis suggests that the issuance of new stocks has no impact on the share prices.

Parson and Raviv (1985), observed the underpricing anomaly and argued that this anomaly originated from the demand for issued stocks and the allocation of the stocks between the investors. Gerard and Nanda (1993), investors with insider information lead prices to get lower by selling stocks before seos which causes underpricing anomaly. Corwin (2003), found out that seos were underpriced as %2.2 during the 1980s -1990s period and the size of underpricing gradually increased over time. Altınkılıç and Hansen (2003), calculated underpricing effect as %3 during the 1990s. They observed increase in underpricing size compared to previous period. They concluded that this stems from increased demand of fund providers and high-risk profile of issuer firms. In addition, underpricing effect in the NASDAQ was found higher than the NYSE and AMEX.

Bowen, Chen and Cheng (2008), analyzed 4,766 seos for the 1984-2000 period and found that analyst follow-up list would reduce the size of the underpricing thanks to increased information sharing and transparency. Ruutu (2010), revealed that offerings of fully marketed stocks were being more underpriced than offerings conducted by accelerated pre-demand method by using 364 firms' data during 2000-2005 period. Also, found that capital ownership characteristics do not affect the underpricing anomaly. Lo (2011), showed existence of a negative relationship between the underpricing size and corporate transparency.

Ngo and Varela (2012), by examining 3.304 offerings during the 1989-2009, they showed that if high-quality firms have positive estimates of cash flows for future periods, then they might want to increase aggressively the offering price to reduce the degree of underpricing. Dempere (2012), examined a sample of 1,840 seos between 2003 and 2011 and found a negative relationship between offering price and underpricing level.

Goodwin (2013), investigated real estate investment trusts between 1994 and 2006 and indicated that the underpricing anomaly is a function of asymmetric information level.Jiang, Stohs and Xie (2013), found that firms make high underpricing, experience abnormal increases in stock prices and issue large amounts stocks in ipo; are tend to turn to the market earlier than the other firms. Return of the firms that issue during the first six months after the ipo was %2.69 lower than firms go the public after longer period. Deng, Hrnjić and Ong (2014), worked on real estate investment trusts and found that investor sentiment has a positive relationship with overpricing of investors and issue possibility. He, Wang and Wei (2014), studied on 3,811 seos for the period of 1997-2012 and found that the size of the underpricing was related to the reductions in the liquidity significantly and negatively.

3. UNDERPRICING OF SEASONED EQUITY OFFERINGS IN TURKEY

3.1. Data and Sample Construction

The data of the listed companies that conduct seos in BIST during the 2010-2015 period were used. Daily returns of the firms and Borsa Istanbul 100 National Index (BIST - 100), the capital increase announcements made by the companies, capital increase breakdown information (method, fund size obtained), book value, and other financial information were used in the analysis. Historical price information were obtained from BIST, summary information related to capital increase by years were obtained from Capital Market Board (CMB)'s weekly bulletins, announcements related to capital increase and financial statements of firms were obtained from Public Disclosure Platform (KAP). Especially, in order to compatible with the previous studies in the international literature, the following methods were taken into consideration while choosing the firms included in the sample:

Capital increases that provide cash flow into the issuer company and increase its number of the shareholders were taken into account. Capital increases through the bonus issues do not provide cash flow to the companies and capital increase made in form of private placement do not increase the number of the shareholders of the issuer companies. Therefore, capital increases which are made under any of these 2 methods were excluded from analysis. In addition, one of the seos was excluded from the analysis because it was performed as a secondary offering through the sale of existing shares that doesn't provide cash flows to the company. In final sample, 79 seos conducted by 58 firms were included in the analysis. The breakdown of seos carried out during the analysis period by years and methods is shown in table 1 and 2 respectively.

Table 1: SEOs by the Year

YEARS	2010	2011	2012	2013	2014	2015	TOTAL
NUMBER of SEOS	9 *(%11)*	19 *(%24)*	15 *(%19)*	14 *(%18)*	11 *(%14)*	11 *(%14)*	**79**

Table 2: SEOs by Year and Method

YEARS	2010	2011	2012	2013	2014	2015	TOTAL
Private Placement	3	5	1	4	3		**16**
Public Placement	8	6	13	11	16	9	**63**

Source: www.borsaistanbul.com

3.2. Methodology

In the analysis, short-term was regarded as the first seven days after seos in parallel with the international studies. Firstly, raw returns of stocks were calculated. Then, the adjusted returns which regarded as abnormal returns were calculated by subtracting Bist-100 returns from the raw returns. Raw Returns (R) for any day (t) can be calculated through the following formula:

$$\boldsymbol{R_{it}} = \frac{(\boldsymbol{P_{it}} - \boldsymbol{P_{it-1}})}{\boldsymbol{P_{it-1}}} \quad (1)$$

$\boldsymbol{R_{it}}$: The return of stock i at time t, $\boldsymbol{P_{it}}$: The closing price of the stock i at time t, $\boldsymbol{P_{it-1}}$: The closing price of the stock i at the time t-1 (offering date).

In order to calculate the average adjusted return of stocks for any day, the returns of the Bist 100 index were calculated as the benchmark indicator.

The formula used for this purpose as follows:

$$\boldsymbol{R_{mt}} = \frac{(\boldsymbol{P_{mt}} - \boldsymbol{P_{mt-1}})}{\boldsymbol{P_{mt-1}}} \quad (2)$$

$\boldsymbol{R_{mt}}$: The return of the BIST - 100 index at time t, $\boldsymbol{P_{mt}}$: The closing price of BIST - 100 index at time t,

$\boldsymbol{P_{mt-1}}$: The closing price of the BIST - 100 index at time t-1.

In this study when calculating abnormal returns we assumed that investors are not affected by short-term market volatility and they hold the shares for a certain period. In other words, we carried out analysis under the assumption suggests that investors follow buy and hold investment strategy. The original return of the each stock called abnormal return (AR) in the literature can be calculated by subtracting the market returns calculated in Eq. (2) from the raw returns obtained in Eq. (1). Asquith and Mullins (1986), calculates AR value through the following formula:

$$\boldsymbol{AR_{it} = R_{it} - R_{mt}} \quad (3)$$

$\boldsymbol{AR_{it}}$: Abnormal return of stock i for at time t, $\boldsymbol{R_{it}}$: The raw return of stock i at time t and $\boldsymbol{R_{mt}}$: Market return (Bist 100 return) at time t.

If day t which is the first day of the offering is considered as 0 then the average abnormal return of n shares in any day after the public offering can be calculated via the following formula of Asquith and Mullins (1986):

$$\boldsymbol{\overline{AR}_t = \frac{1}{N}\sum_{i=1}^{n} AR_{it}} \quad (4)$$

Another issue that needs to be examined in such analyzes is the calculation of Cumulative Abnormal Return (CAR) and the t statistic for this return which occur between day t_1 and day t_2 following offering. Asquith and Mullins (1986), calculates CAR value based on following formula:

$$\boldsymbol{CAR_{t_1}^{t_2} = \sum_{t=t_1}^{t_2} AR_t} \quad (5)$$

The average CAR value for each period is calculated using the following formula:

$$\boldsymbol{\overline{CAR}_t = \frac{1}{N}\sum_{i=1}^{N} CAR_{it}} \quad (6)$$

The compound abnormal return can be calculated by following Wu and Kwork (2007) as follows:

$$\boldsymbol{BHAR_{(T_1,T_2)} = \left[\prod_{t=T_1}^{T_2}(1 + R_{it})\right] - \left[\prod_{t=T_1}^{T_2}(1 + R_{mt})\right]} \quad (7)$$

$\boldsymbol{R_{it}}$: The raw return of i stock at time t, $\boldsymbol{R_{mt}}$: Market return (Bist 100 return) at time t.

The average compound abnormal return can be calculated by following Wu and Kwork (2007) as follows:

$$\boldsymbol{AvgBHAR_{(T_1,T_2)} = \frac{1}{N}\sum_{i=1}^{N}\left(\left[\prod_{t=T_1}^{T_2}(1 + R_{it})\right] - \left[\prod_{t=T_1}^{T_2}(1 + R_{mt})\right]\right)} \quad (8)$$

$\boldsymbol{R_{it}}$: The raw return of i stock at time t, $\boldsymbol{R_{mt}}$: Market return (Bist 100 return) at time t. The term $\boldsymbol{OrtBHAR_{(T_1,T_2)}}$ here will be expressed as $\boldsymbol{\overline{BHAR}}$ in terms of ease of use at later stages of the analysis.

In order to test the statistical significance of the average abnormal, cumulative abnormal and compound abnormal returns respectively, t statistics were calculated by using standard deviations. Then by comparing the t statistics and critic values obtained from t table following hypotheses were tested:

H_0: $\boldsymbol{\overline{AR}_t, \overline{CAR}_t, \overline{BHAR}_t \leq 0}$ Underpricing anomaly can be rejected,

H_1: $\boldsymbol{\overline{AR}_t, \overline{CAR}_t, \overline{BHAR}_t > 0}$ Underpricing anomaly can not be rejected.

Hypotheses were tested for each type of returns seperately. The t-statistics required to test these hypotheses are calculated using the following formula: (The t-statistics calculated for each type of returns but here it is shown for the AR variable)

$$\boldsymbol{t_{ist.} = \frac{\overline{AR}_t}{\bar{\sigma}(AR_t)}} \quad (9)$$

Here $\bar{\sigma}(AR_t)$ is the cross-sectional standard deviation at day t, calculated using the following formula:

$$\boldsymbol{\bar{\sigma}(AR_t) = \left[\frac{\sum_{i=1}^{n}(AR_{it} - \overline{AR}_t)^2}{n}\right]^{1/2}} \quad (10)$$

4. RESULTS

4.1. Test Results Related to Short-Term Price Performance

In this part of the study, analyzes were performed via the Excel 2013 and SPSS 22 program. Short-term price performances of stocks were calculated for the first 7 days following the offering. Table 3 shows price performance of stocks for the first seven days as follows:

Table 3: Short - Term Price Performances of Stocks

Period	n	$\bar{R}$	t- ist.	$\overline{AR}$	t- ist.	$\overline{CAR}$	t- ist.	$\overline{BHAR}$	t- ist.
1st day	79	0,10	0,14	-0,03	-0,04	-0,03	-0,04	-0,03	-0,04
2nd day	79	0,29	0,55	0,19	0,37	0,17	0,17	0,28	0,26
3rd day	79	0,03	0,06	0,18	0,33	0,35	0,26	0,70	0,44
4th day	79	0,07	0,12	-0,13	-0,20	0,22	0,12	1,04	0,46
5th day	79	0,44	0,91	0,55	1,07	0,77	0,36	2,08	0,72
6th day	79	0,51	1,02	0,49	0,99	1,26	0,58	2,63	0,82
7th day	79	0,69*	1,44	0,77*	1,62	2,02	0,80	4,21	1,03

Note: n represents the number of observations. Like Tarı's study (2012, pp.500), critical values for the t-test were taken as 1,282, 1,645, 2,326 and for the significance levels of %10, %5 and %1 respectively.

Stock returns for the analzyed period were observed as positive in the first seven-day, but statistically insignificant in the first six days. On the seventh day, there is a positive return at the level of 10% significance. Similarly, the average abnormal returns were statistically insignificant in the first six days, but a positive and statistically significant return was seen on the seventh day. Average cumulative abnormal returns were negative on the first day and positive on the following days, but these values were not statistically significant. In this case, the H0 hypothesis can not be rejected for the first six days and it can be decided that the underpricing case is not valid for the stocks re-offered to the public during the 2010-2015 period. However, in accordance with the basic assumption of this study, the investors would follow buy and hold investment strategy. Therefore, they purchased these stocks in the public offering and hold them during the seven days. Under this assumption, as of seventh day they could get raw return as 0.69 % and could get adjusted return as 0.77% and these values were also statistically significant. As a result, based on statistically significiant and positive values, the H0 hypothesis can be rejected according to the analysis made for the 7th day and it can be claimed that the underpricing anomaly is valid for these stocks included in the sample.

The first seven-day price performances of stocks re-offered to the public by years were calculated and the findings are presented in Table 4 as follows:

Table 4: The First Seven-Day Price Performances of Stocks Re-offered to the Public by Years

	Period	N	$\bar{R}$	t- ist.	$\overline{AR}$	t- ist.	$\overline{CAR}$	t- ist.	$\overline{BHAR}$	t- ist.
2010	**1st day**	9	0,02	0,02	-0,70	-0,51	-0,70	-0,51	-0,70	-0,51
	2nd day	9	-1,41**	-2,22	-1,31**	-1,95	-2,00**	-1,83	-2,05**	-1,91
	3rd day	9	-1,71***	-2,69	-1,42**	-2,04	-3,42***	-3,04	-3,43***	-3,09
	4th day	9	-1,40**	-1,86	-1,49*	-1,62	-4,91***	-3,43	-4,89***	-3,49
	5th day	9	-0,46	-0,67	-0,95*	-1,52	-5,85***	-3,94	-5,83***	-4,02
	6th day	9	0,98	0,91	0,73	0,77	-5,12***	-3,57	-5,17***	-3,71
	7th day	9	1,63	1,24	1,18	1,00	-3,94**	-1,88	-4,01**	-1,94
2011	**1st day**	19	1,16	0,89	0,94	0,72	0,94	0,72	0,94	0,72
	2nd day	19	-0,13	-0,10	-0,47	-0,34	0,47	0,21	0,66	0,26
	3rd day	19	0,51	0,35	0,61	0,40	1,08	0,30	1,80	0,42
	4th day	19	0,85	0,64	0,82	0,60	1,91	0,39	3,56	0,56
	5th day	19	1,13	1,24	1,34*	1,32	3,25	0,59	5,60	0,74
	6th day	19	-0,58	-0,42	-0,61	-0,45	2,63	0,58	3,68	0,65
	7th day	19	1,43	1,03	2,01*	1,49	4,64	0,82	6,89	0,88
2012	**1st day**	15	-1,82*	-1,51	-2,50**	-2,18	-2,50**	-2,18	-2,50**	-2,18
	2nd day	15	0,18	0,18	-0,16	-0,19	-2,66*	-1,40	-2,54*	-1,33
	3rd day	15	0,63	0,59	0,62	0,54	-2,04	-0,85	-1,91	-0,78
	4th day	15	-1,73*	-1,41	-1,75*	-1,28	-3,79**	-2,02	-3,91**	-2,12

	5th day	15	-0,49	-0,66	-0,40	-0,55	-4,19***	-2,35	-4,31***	-2,45
	6th day	15	0,17	0,24	0,19	0,30	-3,99**	-2,21	-4,16***	-2,35
	7th day	15	-0,74*	-1,48	-1,10**	-1,95	-5,09***	-2,66	-5,25***	-2,85
2013	**1st day**	14	-1,48	-1,22	-0,96	-0,84	-0,96	-0,84	-0,96	-0,84
	2nd day	14	0,71	1,18	1,26**	2,00	0,31	0,28	0,27	0,25
	3rd day	14	-2,43***	-2,49	-1,31**	-2,06	-1,00	-0,76	-1,05	-0,82
	4th day	14	1,22*	1,60	0,41	0,64	-0,59	-0,35	-0,59	-0,37
	5th day	14	0,00	0,00	0,44	0,52	-0,15	-0,08	-0,11	-0,06
	6th day	14	0,33	0,39	0,49	0,58	0,34	0,17	0,34	0,17
	7th day	14	-0,29	-0,43	-0,52	-0,87	-0,18	-0,08	-0,15	-0,06
2014	**1st day**	11	-0,79	-0,35	-0,51	-0,22	-0,51	-0,22	-0,51	-0,22
	2nd day	11	0,30	0,17	0,26	0,15	-0,25	-0,08	-0,22	-0,08
	3rd day	11	0,20	0,20	0,04	0,04	-0,21	-0,09	-0,33	-0,13
	4th day	11	-0,63	-0,28	-0,12	-0,05	-0,33	-0,07	0,08	0,02
	5th day	11	-0,33	-0,26	-0,52	-0,37	-0,85	-0,17	-0,34	-0,07
	6th day	11	0,58	0,72	0,48	0,54	-0,37	-0,07	0,07	0,02
	7th day	11	0,52	0,70	0,59	0,98	0,22	0,04	0,82	0,16
2015	**1st day**	11	3,84*	1,38	3,88*	1,44	3,88*	1,44	3,88*	1,44
	2nd day	11	2,05	1,05	1,62	0,87	5,50*	1,35	5,86*	1,33
	3rd day	11	2,79*	1,48	2,20	1,05	7,70*	1,29	8,98	1,25
	4th day	11	1,63	0,70	0,84	0,32	8,53	1,05	11,34	1,05
	5th day	11	2,61	1,14	2,93	1,18	11,47	1,15	16,35	1,10
	6th day	11	2,63*	1,33	2,58*	1,35	14,05	1,21	21,94	1,12
	7th day	11	2,02	1,11	2,64*	1,50	16,69	1,26	28,09	1,13

Note: n represents the number of observations. Like Tarı's study (2012, pp.500), critical values for the t-test were taken as 1,282, 1,645 and 2,326 for the significance levels of %10, %5 and %1 respectively.

According to findings related to 2010, we find that the raw returns for the first, sixth and seventh days are positive but statistically insignificant. Abnormal returns are negative during the first five days and except for the first day they are statistically significant. However, on the sixth and seventh days abnormal returns were observed as positive but statistically insignificant. Average cumulative abnormal returns and average compound returns were negative for the first seven days and they were statistically significant except for the first day. Based on these findings, H0 hypotheses cannot be rejected and it is decided that the underpricing anomaly for the stocks offered to the public again in 2010 is not valid. Morever, by looking at the negative and statistically significant values, it is available to say that overvaluation anomaly is valid for these stocks. The investors who bought these stocks on the day of the public offering and hold them during the seven days would suffer an average loss of 4%.

When analyzed figures for 2011, it shows that returns were positive and statistically insignificant on the first day and the other days were fluctuating. Average abnormal returns, on the fifth and seventh day are positive and statistically significant values. Looking at the average abnormal returns, the H0 hypothesis is rejected at a significance level of 10% and it can be decided that the underpricing anomaly is valid for the stocks of firms that are re-offered to the public in 2011. Given cumulative abnormal returns and compound abnormal returns, it is not possible to mention about underpricing because it is statistically insignificant although they are positive during the first seven days. It is obvisously seen that investors who bought these stocks on the first day in the offering and hold them for seven days earned 4.64% more than the market, but this value can not be fully confirmed as a statistically. As a result, the existence of underpricing anomaly for seos conducted in 2011 has been confirmed by looking at only average abnormal returns.

The returns calculated for the 2012 were negative and statistically significant on the first day and the other days were fluctuating. As a result, the H0 hypothesis can not be rejected and it is decided that the underpricing anomaly for the stocks of the companies that were offered to the public in 2012 is not valid. Based on negative and statistically significant values, it can be claimed that overvaluation is valid for these stocks included in the sample. Depeding on this findings on the table, it is seen that investors who bought these shares on the offering day and hold them during the seven days suffered more than an average of 5% losses.

Returns observed in 2013 are negative and statistically insignificant. Positive returns can be observed on the second-day but only the average abnormal return was statistically significant. On the third day, the average raw returns and average abnormal returns are found to be negative and statistically significant. On the 7th day, it is found that the average raw returns, the average abnormal returns, the cumulative abnormal returns and the average compound abnormal returns are negative and statistically insignificant. According to these results, the H0 hypothesis cannot be rejected and it is stated that the underpricing anomaly is not valid in 2013.

According to the findings shown in the table for 2014, the returns followed a fluctuating course of the first seven days but these values were not statistically significant. In this case, the H0 hypothesis cannot be rejected and it can be said that the underpricing anomaly is not valid in 2014.

In 2015, returns are positive and statistically significant during the first seven days. Especially average abnormal returns are positive on the 7th day and statistically significant. In this case, the H0 hypothesis can be rejected at the level of 10% significance and it is seen that the underpricing anomaly is valid in 2015.

The price performance analysis by sectors for the first seven days following issuance were calculated and the findings are presentend in Table 5 as follows :

Table 5: First Seven-Day Price Performances of Stocks Re-Offered to the Public by Sector

	Period	n	$\bar{R}$	t- ist.	$\overline{AR}$	t- ist.	$\overline{CAR}$	t- ist.	$\overline{BHAR}$	t- ist.
INDUSTRY	**1st day**	33	2,13**	1,83	2,02**	1,68	2,02**	1,68	2,02**	1,68
	2nd day	33	1,40	1,20	1,12	0,98	3,14**	1,66	3,33*	1,60
	3rd day	33	0,25	0,21	0,21	0,18	3,35	1,14	4,18	1,19
	4th day	33	0,11	0,09	0,07	0,05	3,42	0,87	5,25	1,01
	5th day	33	1,09	1,10	0,81	0,75	4,23	0,91	7,11	1,07
	6th day	33	0,45	0,48	0,55	0,61	4,78	0,99	8,06	1,09
	7th day	33	1,41*	1,52	1,64**	1,78	6,41	1,14	11,61	1,22
FINANCIAL	**1st day**	22	-0,81	-0,58	-0,89	-0,71	-0,89	-0,71	-0,89	-0,71
	2nd day	22	-0,39	-0,85	-0,42	-1,10	-1,31	-0,99	-1,30	-1,00
	3rd day	22	-0,09	-0,11	0,42	0,59	-0,89	-0,62	-0,91	-0,65
	4th day	22	1,00**	1,65	0,69	1,26	-0,20	-0,13	-0,21	-0,14
	5th day	22	-0,66	-1,09	-0,14	-0,27	-0,34	-0,19	-0,25	-0,14
	6th day	22	-0,65	-0,80	-0,44	-0,54	-0,78	-0,51	-0,86	-0,59

	7th day	22	0,36	0,49	0,27	0,42	-0,51	-0,31	-0,61	-0,39
SERVICE	**1st day**	9	-1,34**	-1,81	-1,35*	-1,64	-1,35*	-1,64	-1,35*	-1,64
	2nd day	9	-0,66	-1,03	-0,34	-0,45	-1,69	-1,18	-0,34	-0,45
	3rd day	9	-0,10	-0,28	-0,61	-0,94	-2,30	-1,40	-0,61	-0,94
	4th day	9	0,72	0,71	0,34	0,33	-1,96*	-1,64	0,34	0,33
	5th day	9	0,88	0,69	1,55	1,04	-0,41	-0,17	1,55	1,04
	6th day	9	2,59**	2,23	1,15	0,80	0,74	0,37	1,15	0,80
	7th day	9	0,38	0,31	0,60	0,42	1,34	0,45	0,60	0,42
CONSTRUCTION	**1st day**	5	-4,16	-1,15	-4,36	-1,18	-4,36	-1,18	-4,36	-1,18
	2nd day	5	-1,97	-0,89	-2,03	-0,86	-6,39	-1,09	-6,00	-1,09
	3rd day	5	0,55	0,37	0,88	0,61	-5,51	-1,18	-5,44	-1,18
	4th day	5	-4,19	-1,06	-4,51	-1,08	-10,02	-1,17	-9,03	-1,18
	5th day	5	-0,94**	-2,07	-1,19**	-1,73	-11,21*	-1,29	-10,04*	-1,32
	6th day	5	1,43	0,81	0,95	0,54	-10,25	-1,19	-9,31	-1,23
	7th day	5	-0,38	-0,48	-0,92**	-1,74	-11,17	-1,26	-10,08*	-1,31
ENERGY	**1st day**	10	-1,16***	-2,51	-1,53***	-2,36	-1,53***	-2,36	-1,53***	-2,36
	2nd day	10	0,15	0,24	0,07	0,11	-1,45*	-1,50	-1,44*	-1,49
	3rd day	10	-0,58	-0,98	-0,07	-0,12	-1,53*	-1,56	-1,50*	-1,57
	4th day	10	-0,54	-0,54	-0,84	-0,95	-2,36*	-1,54	-2,30*	-1,52
	5th day	10	1,03	1,02	1,23	1,24	-1,13	-0,57	-1,08	-0,54
	6th day	10	0,92	0,96	1,49**	1,74	0,36	0,20	0,29	0,16
	7th day	10	-0,15	-0,14	-0,02	-0,02	0,34	0,14	0,26	0,11

Note: n represents the number of observations. Like Tarı's study (2012, pp.500), critical values for the t-test were taken as 1,282, 1,645 and 2,326 for the significance levels of %10, %5 and %1 respectively.

According to the findings represented in table, the average returns of the industrial firms are positive and statistically significant during the first seven days. In this case, H0 hypothesis are rejected at the 10% significance level and it is seen that underpricing is valid for the industrial sector stocks. The average returns of the financial firms generally are found statistically insignificant. The values observed for 7th day is not statistically significant, so the existence of underpricing is not fully confirmed. The initial average daily returns for the service firms' stocks are negative and statistically significant. Rest on this finding, it can be claimed that the H0 hypothesis cannot be rejected and overvaluation can be regarded as a valid for these firms. On the following days, a fluctuating price movement was observed. The average raw returns are positive on the sixth day and statistically significant but on the seventh day, the raw returns are positive and statistically insignificant. Under the assuming that investors are following the buy and hold strategy, it can be stated that the cumulative abnormal return of the investor holds the shares from the issuance until the 7th day is 1.34%. However, the result obtained at the end of the seventh day is not confirmed as statistically. Therefore, it can be concluded that underpricing anomaly is not valid for the service sector firms. The returns of the construction sector firms were found as negative and the results were statistically significant. In this case, the H0 hypothesis cannot be rejected and it can be assumed that the overvaluation anomaly is valid for these firms. The returns of energy sector companies are negative and statistically significant on the first day. This continued for the average cumulative abnormal returns and the average compound abnormal returns for the first four days after the issuance. Average abnormal returns, average cumulative abnormal returns and average compound abnormal returns at the end of the seventh day are not statistically significant. Therefore, although the cumulative abnormal returns and the cumulative compound abnormal returns are positive at the

end of the 7th day, because the results are not statistically significant we cannot confirm that the investor can gain more than market average during the analysis period. Therefore we cannot confirm fully H0 hypothesis.

4.2. Determinants of Short-Term Price Performance of Equities

At this stage of the analysis, regression model was performed by using AR and CAR values calculated in previous analysis as dependent variables and 10 determinant factors as independent variables.

Variables used in these analyzes are show in Table 6. as follows:

Table 6: List of Independent Variables

Offering Price (LnOP)	Prices the stocks are offered to the public
Public Offering Frequency (POF)	Frequency of the offering during the period.
Volatility (V)	Standard deviations of stocks
Asset Size (LnASSET)	Assets of the firms presented based on IFRS.
Offering Method ($_{OM}$)	Public & Private placement.
Volume (LnVol)	Total transaction amounts come from the trading of the shares during analysis period.
Difference (DF)	Difference between obtained income and target income
Leverage Change (LC)	Total Liabilities / Total Assets
Capital Increase Rate (CIR)	The increase reflected as % change by comparing to previous capital amount.
Market to Book Value Ratio (M/B)	Market Value / Book Value

In order to prevent the varying variance problem, offer price, asset size and volume variables were included in the analyzes by taking the natural logarithm. AR and CAR values were used as dependent variables in this analysis. Volatility change was used as the standard deviation of the AR (V_AR) and CAR (V_CAR). The econometric models that are used in the analysis through AR and CAR dependent variables are shown below. The models were set up based on one explanatory variable to test the effects of all variables seperately.

$$\text{Model (1): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 LnOP_{it} + e_{it} \quad (11)$$

$$\text{Model (2): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 POF_{it} + e_{it} \quad (12)$$

$$\text{Model (3): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 LnASSET_{it} + e_{it} \quad (13)$$

$$\text{Model (4): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 K_{OM1_{it}} + e_{it} \quad (14)$$

$$\text{Model (5): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 K_{OM2_{it}} + e_{it} \quad (15)$$

$$\text{Model (6): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 LnVol_{it} + e_{it} \quad (16)$$

$$\text{Model (7): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 DF_{it} + e_{it} \quad (17)$$

$$\text{Model (8): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 LC_{it} + e_{it} \quad (18)$$

$$\text{Model (9): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 CIR_{it} + e_{it} \quad (19)$$

$$\text{Model (10): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 M/B_{it} + e_{it} \quad (20)$$

$$\text{Model (11): } AR_{it} \,\&\, CAR_{it} = \beta_0 + \beta_1 V\_AR_{it} + e_{it} \quad (21)$$

Since the time dimension is enough, models are estimated by panel data analysis method.

The steps followed in the analysis are as follows:

* Panel unit root test used to determine stationarity level of the series,

* In order to see the existence of the interaction between the series in each model, panel causality test was conducted,

* Panel cointegration test was performed to determine whether the series was moving together in the long run,

* Finally according to previous analysis results panel regression analyzes were performed.

In this context, firstly, the panel unit root test was performed and it was tested whether the series were stationary.

The stability of the series was examined by Im, Pesaran and Shin (2003) (IPS). These tests are based on the following model:

$$\Delta Y_{i,t} = \delta_i Y_{i,t-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta Y_{i,t-j} + X'_{i,t}\theta + \varepsilon_{i,t} \quad (22)$$

p_i; represents the optimum lag length,

$X'_{i,t}$; refers to external variables that contain any fixed effect or individual trend component.

In the panel unit root tests, it is tried to determine how the value of the series at the time t is affected by the value at the time t-1. In IPS (2003) test, it is accepted that δ_i, which is a unit root parameter, may be different between the series.

IPS panel unit root test was performed in the study and the results obtained are presented in Table 7.

Table 7: Panel Unit Root Test Results

Independent Varible	***Original Level Values***		***First Differences of the Series***	
	Test Statistic	**Prob.Value**	***Test Statistic***	**Prob.Value**
AR	-1.62*	0.05	-10.77***	0.00
CAR	1.33	0.90	-4.79***	0.00
LnOP	The unit root test cannot be performed because the series has the same values throughout the analysis period, therefore, it is accepted that the series is stationary because it is composed of fixed values.			
POF	The unit root test cannot be performed because the series has the same values throughout the analysis period, therefore, it is accepted that the series is stationary because it is composed of fixed values.			
LnASSET	The unit root test cannot be performed because the series has the same values throughout the analysis period, therefore, it is accepted that the series is stationary because it is composed of fixed values.			
Public Placement	The unit root test cannot be performed. However, since the series consists of two values of 0 and 1, it is accepted stationary at an original level value.			
Private Placement	The unit root test cannot be performed. However, since the series consists of two values of 0 and 1, it is accepted stationary at an original level value.			
LnVol	0.19	0.57	-9.96***	0.00
DF	The unit root test cannot be performed because the series has the same values throughout the analysis period, therefore, it is accepted that the series is stationary because it is composed of fixed values.			
LC	The unit root test cannot be performed because the series has the same values throughout the analysis period, therefore, it is accepted that the series is stationary because it is composed of fixed values.			
CIR	The unit root test cannot be performed because the series has the same values throughout the analysis period, therefore, it is accepted that the series is stationary because it is composed of fixed values.			
M/B	The unit root test cannot be performed because the series has the same values throughout the analysis period, therefore, it is accepted that the series is stationary because it is composed of fixed values.			
V_AR	-0.87	0.19	-8.27***	0.00
V_CAR	3.13	0.99	-2.12**	0.01

Note: *, ** and *** indicate stationary at the level of significance of 10%, 5% and 1%, respectively. Fixed and trendy model was used for the test for the original level of the series, and the fixed model was used for the test for the first differences. The ideal lag length is determined according to the Schwarz information criterion.

According to the findings in Table 7, the AR series are stationary at a 10% significiant level, but generally, it is found that all series are not stationary in their original levels and become stationary when the first differences are taken. Therefore, it is available to infer that even in a seven-day period, the series contained significant fluctuations. In this case, the regression analyzes that is performed with the original level values of these series may contain the spurious regression problem. For this reason, it is necessary to perform the cointegration test before performing to the regression analysis.

Before performing the cointegration test, a panel causality test was conducted to measure the interaction between the series. The interaction between series included to analysis is important for the accuracy of the regression models (Göçer, 2015). For this reason, before econometric models are established, it is useful to test the causality relationships between

the series. In this study, the existence of causality relations among the series was examined by Granger (1969) panel causality test.

This test is performed throught following equations.

$$Y_{it} = \alpha_i + \sum_{k=1}^{p} \gamma_i Y_{i,t-k} \sum_{k=1}^{p} \beta_i X_{i,t-k} + \varepsilon_{i,t} \quad (23)$$

$$X_{it} = \theta_i + \sum_{k=1}^{p} \delta_i X_{i,t-k} \sum_{k=1}^{p} \varphi_i Y_{i,t-k} \quad (24)$$

p_i; represents the optimum lag length. Equation (24) examines the existence of a causality relation from X to Y and Equation (23) from Y to X. Granger (1969) panel causality test was conducted and the results are presented in Table 8.

Table 8: Panel Causality Test Results

Model	*H_0 Hypothesis*	*F-statistic*	Prob.Value
Model 6	$\boldsymbol{LnIH \nrightarrow AR}$	6.46**	0.01
Model 11	$\boldsymbol{V\_AR \nrightarrow AR}$	0.00	0.99
Model 6	$\boldsymbol{LnIH \nrightarrow CAR}$	2.68*	0.06
Model 11	$\boldsymbol{V\_CAR \nrightarrow CAR}$	0.67	0.41

Note: * and ** indicate causality relation from the first variable to second one at the level of significance of 10% and 5%, respectively. The ideal lag length is determined according to the Schwarz information criterion.

According to the results represented in Table 8, we observed causality relationship between transaction volume and abnormal returns at 5% significance level while we couldn't find causality relation between volatility and abnormal returns. Panel cointegration test was applied to determine whether the non-stationary series move together in the long run. In this study, the existence of cointegration among the series was examined by the Perdroni (2004) test. Pedroni (2004) panel unit root test is based on the following equation:

$$y_{it} = \alpha_i + \delta_i t + \beta_{1i} x_{1i,t} + \beta_{2i} x_{2i,t} + \cdots + \beta_{Mi} x_{Mi,t} + \varepsilon_{i,t} \quad (25)$$

Pedroni (2004) developed seven different test statistics to test the cointegration relationship between the series. In the study, Pedroni panel cointegration test (2004) was performed separately for each model and the obtained results are presented in Tables 9-12.

Table 9: Panel Cointegration Test Results for Model (6) (Dependent Variable AR)

	Test Statistic	Prob. Value	*Weighted Test Statistic*	Prob. Value
Panel v	-1.40	0.91	-1.77	0.96
Panel ρ	-2.68***	0.00	-2.13**	0.01
Panel t	-20.45***	0.00	-17.30***	0.00
Panel ADF	-9.03***	0.00	-9.30***	0.00
Group ρ	2.03	0.97	-	-
Group t	-22.33***	0.00	-	-
Group ADF	-10.31***	0.00	-	-

Note: *** and ** indicate cointegration relationship at the level of significance of 1% and 5%, respectively.

According to the results shown in table 9, there is a cointegration relationship between volume and abnormal returns at the 1% significance level. In other words, these series are moving together in the long-run, and the model predictions that are made with the original level values of these series will not contain the spurious regression problem.

Table 10: Panel Cointegration Test Results for Model (11) (Dependent Variable AR)

	Test Statistic	**Prob. Value**	***Weighted Test Statistic***	**Prob. Value**
Panel v	-0.17	0.57	-1.18	0.88
Panel ρ	-2.49***	0.00	-2.33***	0.00
Panel t	-12.89***	0.00	-15.49***	0.00
Panel ADF	-3.41***	0.00	-5.87***	0.00
Group ρ	2.02	0.97	-	-
Group t	-17.37***	0.00	-	-
Group ADF	-5.21***	0.00	-	-

Note: *** and ** indicate cointegration relationship at the level of significance of 1% and 5%, respectively.

According to the results shown in table 10, there is a cointegration relationship between volatility and abnormal returns at the 1% significance level. In other words, these series are moving together in the long-run and the model predictions that are made with the original level values of these series will not contain the spurious regression problem.

Table 11: Panel Cointegration Test Results for Model (6) (Dependent Variable CAR)

	Test Statistic	**Prob. Value**	***Weighted Test Statistic***	**Prob. Value**
Panel v	0.42	0.33	-0.87	0.81
Panel ρ	1.39	0.91	1.37	0.91
Panel t	-6.55***	0.00	-4.72***	0.00
Panel ADF	-2.82***	0.00	-3.44***	0.00
Group ρ	5.04	1.00	-	-
Group t	-4.90***	0.00	-	-
Group ADF	-3.19***	0.00	-	-

Note: *** and ** indicate cointegration relationship at the level of significance of 1% and 5%, respectively.

According to the results shown in table 11, there is a cointegration relationship between volume and cumulative abnormal returns at the 1% significance level. In other words, these series are moving together in the long-run and the model predictions that are made with the original level values of these series will not contain the spurious regression problem.

Table 12: Panel Cointegration Test Results for Model (11) (Dependent Variable CAR)

	Test Statistic	**Prob. Value**	***Weighted Test Statistic***	**Prob. Value**
Panel v	0.96	0.16	-1.10	0.86
Panel ρ	0.71	0.76	-0.35	0.35
Panel t	-5.50***	0.00	-11.27***	0.00
Panel ADF	-9.33***	0.00	-12.78***	0.00
Group ρ	4.15	1.00	-	-
Group t	-12.64***	0.00	-	-
Group ADF	-29.74***	0.00	-	-

Note: *** and ** indicate cointegration relationship at the level of significance of 1% and 5%, respectively.

According to the results shown in table 12, there is a cointegration relationship between volatility and cumulative abnormal returns at the 1% significance level. In other words, these series are moving together in the long-run and the model predictions that are made with the original level values of these series will not contain the spurious regression problem.

At this stage of the study, regression analysis was performed by using the Panel Dynamic Ordinary Least Squares (PDOLS) method, which considers cointegration relations between the series and avoids the problems by using pre and lag values in the estimating model.

The results of the models based on the AR and CAR dependent variables are presented in Table 13 and Table 14 respectively.

Table 13: First Seven Days Price Performance Analysis Results (Dependent Variable - AR)

Independent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
LnOP	0.21* [1.45]										
POF		0.24** [1.75]									
LnAsset			0.016** [1.95]								
Public Placement				0.29** [1.77]							
Private Placement					-0.29** [-1.77]						
LnVol						0.04*** [2.62]					
DF							-0.45*** [-3.80]				
LC								0.02** [1.65]			
CIR									0.005*** [12.24]		
M/B										-0.004* [-1.61]	
V_AR											-0.02* [-1.43]
R^2	0.13	0.46	0.33	0.10	0.10	0.07	0.12	0.04	0.23	0.03	0.06
~~R~~^{2}	0.13	0.46	0.33	0.09	0.09	0.07	0.12	0.04	0.23	0.03	0.06

Note: *, **, and *** indicate that the relevant parameters are statistically significant at 10%, 5% and 1% significance level, respectively. Figures in the square brackets refer to t statistics while figures in the normal brackets represent probability values

Table 14: First Seven Days Price Performance Analysis Results (Dependent Variable - CAR)

Independent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
LnOP	-0.02 [-1.11]										
POF		0.16* [1.57]									
LnAsset			0.009* [1.37]								
Public Placement				0.84** [1.76]							
Private Placement					-0.84** [-1.76]						
LnVol						3.23*** [5.78]					
DF							-2.19*** [-4.75]				
LC								0.15** [2.23]			
CIR									0.001*** [12.62]		
M/B										-0.06*** [-6.27]	
V_AR											0.02* [2.38]
R^2	0.19	0.66	0.11	0.10	0.10	0.82	0.27	0.02	0.40	0.14	0.31
~~R^2~~	0.19	0.66	0.11	0.09	0.09	0.79	0.27	0.02	0.40	0.14	0.31

Note: *, **, and *** indicate that the relevant parameters are statistically significant at 10%, 5% and 1% significance level, respectively. Figures in the square brackets refer to t statistics while figures in the normal brackets represent probability values

5. THE RESULTS OF ANALYSIS PERFORMED FOR SHORT AND LONG-TERM PRICE ANOMALIES AND ITS DETERMINANTS

As a result of the analysis, short-term underpricing anomaly could not be fully confirmed for the selected sample and analysis period in Borsa Istanbul. In the analysis conducted, it was determined that the underpricing anomaly observed only for average abnormal returns in 2011 and 2015. The average abnormal return of the investor who purchases shares from the issuance and holds them during the 7 days, gets 2,01% in 2011 and 2.64 % in 2015 higher than the market average and these findings are statistically significant. Based on this finding, the existence of an underpricing anomaly can be accepted partially in our study. In seos made in 2010 and 2012, it was determined that there was overvaluation anomaly and investors who bought shares from these offerings, obtained negative returns after the first 7 days. The underpricing anomaly for seos made in 2013 has not been fully confirmed.

When analyzed the study by sector, in the calculations made during the review period, in line with the international literature, it was determined that there was underpricing anomaly for the short-term in 34 seos conducted in the industrial sector. In all other sectors considered in the analysis except for the industrial sector, underpricing anomaly was not observed. By taking into consideration 7 days period returns in the construction sector, first and 3 days period returns in the energy sector and first day period returns in the service sector, it is possible to claim that overvaluation anomaly was experienced. It was determined that investors who bought stocks from seos in these sectors will obtain a negative return as of the 7th day. In the financial sector, underpricing is not fully confirmed statistically.

When the analysis results are evaluated in terms of price performance determinants;

Based on the findings of price performance determinant analysis for the first seven day that consider AR as dependent variable; it is determined that increase observed in the offer price, in the number of seos, in the company asset size, in the transaction volume, in leverage ratio and in capital increase ratio affect price performance of shares positively. In addition, issue method made through public placement would affect short-term price performance of shares positively. However, it

has been found that the increase observed in the difference between obtained and targeted offering income, in the market value/book value ratio and in the volatility would affect price performance of shares negatively. By the way, issue method made through private placement also affect short-term price performance of shares negatively.

When analyzing price performance determinant analysis for the first seven day that consider CAR as dependent variable; it was determined that increase observed in the number of seos, in the company asset size, in the transaction volume in leverage ratio, capital increase ratio would affect price performance of shares positively. In addition, issue method made through public placement would affect short-term price performance of shares positively. However, it has been found that the increase observed in the difference between obtained and targeted offering income, in the market value/book value ratio and in the volatility would affect price performance of shares negatively. By the way, issue method made through private placement also affect short-term price performance of shares negatively.

The effect of the factors on the short-term stock price performance of firms that perform seos is summarized in Table 15 below.

Table 15: Short Term Price Determinants

Independent Variable / Period	First Day	The First 3 Day - AR	The First 3 Day - CAR	The First 7 Day - AR	The First 7 Day - CAR
OP	+	-	-	+	N/A
POF	+	-	-	+	+
V	N/A	N/A	N/A	-	+
LnAsset	-	-	-	+	+
Public Placement	+	+	+	+	+
Private Placement	-	-	-	-	-
LnVol	-	-	-	+	+
DF	+	+	+	-	-
LC	+	+	+	+	+
CIR	+	+	+	+	+
M/B	-	-	-	-	-

6. CONCLUSION

As can be seen from the analysis in the study, underpricing anaomaly is not valid for all years and sectors included in the study. When looking for the other short – term periods such as the first day and the first three days, different results can be obtained for each period. In other words, the underpricing may be confirmed at any time of the short term but it cannot be fully confirmed at other time periods. In addition, if period that is considered as the short-term cover more days than 7 days, there may occur other factors that can affect the stock prices. For example, if the short-term period is defined as covers 15 days, in this stiuation, it is possible to see many of any developments that can affect the firm or its industry. Therefore, the price of the stock may be affected not only by seos but also by other factors. As a result, the short-term underpricing is actually a function of the chosen period.

Varying of the short-term stock price performance of firms that perform seos from year to year may be regarded as important in terms of the existence of the relationship between seos and general macroeconomic conjuncture. In this study, the effects of the micro factors that include firm and offerings method etc. on the abnormal returns are examined and a more detailed study can be obtained by including the macro factors in the analysis. The existence of the relationship between seos and the macroeconomic conjuncture will reveal that the opportunity window hypothesis that assumes issuer firms are looking for a good macroeconomic environment for the issue is valid for Borsa Istanbul.

The short-term underpricing anomaly was confirmed only in 2011 and 2015 years and only in the industry sector. It can be considered that this is related with underpricing seen in the initial public offerings in order to maximize the income raised by the following offerings. Especially overvaluation case seen in some sectors is a consequence of the firms' underpricing application in order to maximize issue revenue that will be conducted in later periods. This assumption will be tested with price analysis of the sample firms in the initial public offerings. It would be a reasonable decision for the investors to buy shares of industrial sector firms in order to earn a higher return than the market average in the short term. In addition, the holding period of shares and issuance years should be taken into consideration.

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HOW DOES INVENTORY MANAGEMENT AFFECT ANALYST FORECAST ACCURACY?

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ABSTRACT

Purpose - This paper aims to examine the association between inventory level and analyst forecast accuracy. Firms can potentially manage earnings through inventory manipulation, and we hypothesize that it is therefore more difficult to forecast earnings in companies with large inventories.

Methodology - Analyst forecast accuracy is measured by forecast error, computed as the absolute value of the difference between forecasted earnings per share and actual earnings per share, normalized by the firm's stock price. Univariate tests and regression models are used to examine the relation between forecast error and inventory level. We further investigate whether analyst experience and the level of institutional ownership can reduce the forecast error.

Findings - The results show that forecast error is greater in firms with relatively higher levels of inventories and the size of the error decreases as analyst experience and the level of institutional ownership increase.

Conclusion - This study demonstrates that it is important for analysts to take extra care in forecasting earnings for companies with a history of high inventory levels.

Keywords: Earnings management, inventories, forecast accuracy, institutional investors, analyst experience.
JEL Codes: G17, G30, M41

1. INTRODUCTION

Literature has documented that firms have incentives to engage in earnings management. The incentives include: enjoy a higher stock return (Bartov et al., 2002), avoid a decline in managerial compensation and career turnover rate (Guidry et al., 1999; Healy, 1985; Matsunaga and Park, 2001; Bergstresser and Philippon, 2006; Hazarika et al., 2012; Mergenthaler et al., 2012), affect the offering prices of the stocks prior to initial public offerings (Teoh, et al., 1998a), seasoned equity offerings (Rangan, 1998; Teoh et al., 1998b; Shivakumar, 2000; DuCharme et al., 2004; Cohen and Zarowin, 2010), and management buyout offerings (DeAngelo, 1986; Perry and Williams, 1994; Chou et al., 2006), reduce political costs (Key, 1997; Watts and Zimmerman, 1986), signal manager's private information (Healy and Papepu, 1995), and avoid debt covenant violations (DeFond and Jiambalvo, 1994).

Firms can mask their true performance by manipulating accruals or employing real activities. This paper focuses on potential inventory manipulation and empirically examines the impact of the relative size of inventories on forecast accuracy. Roychowdhury (2006) finds that when earnings are close to zero, management often engages in overproduction, which results in lower fixed cost per unit and accordingly lower cost of goods sold, higher inventories, and higher profit. Bruggen et al. (2011) also find that companies with high fixed manufacturing overhead tend to overproduce if managers believe earnings will fall short of the levels of income needed for executive bonuses.

Though if a firm overproduces, it will have higher inventory level. However, declining sales can also cause excess inventories. The determination of inventory values and cost of sales for a manufacturing company can be complex especially if there is a high level of fixed overhead. High inventories can also be a consequence of poor forecasts of demand by management, or subpar operational performance, resulting in less sales and higher inventories. High inventory level may also signal that a company is uncertain of sales and thus maintains a large safety stock consistent with the "stock out model" (see Kahn, 1987; Bernard and Noel, 1991). Prior studies report that complexity decreases forecast accuracy (Plumlee, 2003; Gu and Wang, 2005). For these reasons, it should be more difficult to forecast earnings for companies with higher levels of inventories and thus one would expect larger forecast errors or less forecast accuracy if analysts do not fully incorporate the potential earnings management via large inventories into the forecasting models.

We find that there is a positive relationship between a firm's inventory level and forecast error. We further investigate whether analyst experience can reduce the forecast error. Prior studies find that experienced analysts make more accurate forecasts because their analytic skills, relationship with the managers, or understanding of the companies and industries improve over time through experience (Mikhail et al., 1997; 2003; Clement, 1999). Along this line, we find that forecast error associated with inventories is negatively related to analyst experience. We also find that forecast errors are reduced for high institutional ownership firms.

The remainder of the paper proceeds as follows: Section 2 reviews the literature, Section 3 presents data and Section 4 describes our methods. Section 5 reports the findings of our univariate and multivariate analysis while Section 6 gives the concluding remarks.

2. LITERATURE REVIEW

Firms can engage in earnings management activities by manipulating accruals or employing real activities. Accruals manipulation is generally achieved by the flexibility of accounting choices. Managers alter financial reports via accounting estimates and methods to mislead stakeholders of firm performance. For example, managers can change the depreciation method for fixed assets and/or LIFO/FIFO method for cost of goods sold. There is plenty of direct evidence that firms engage in accruals manipulation (see Schipper, 1989; Healy and Wahlen, 1999; Fields et al., 2001 for a comprehensive review of this literature).

Roychowdhury (2006) defines real activities management as "departures from normal operational practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations." Real management activities are employed by altering the timing of transactions and investment, boosting sales by price discounts, reducing R&D and advertising expenses, lowering the cost of goods sold per unit by overproduction, etc.

Prior studies have documented empirical evidence on real activities manipulation. For example, Dechow and Sloan (1991), Baber et al. (1991) and Bushee (1998) find that managers reduce R&D expenditures to meet or beat earnings targets. Thomas and Zhang (2002) and Jiambalvo et al. (1997) report evidence that firms overproduce to manipulate income. Empirical studies also document that firms engage in real activities manipulation through a reduction in advertising expenditures (Cohen et al., 2010), asset sales (Herrmann et al. 2003; Bartov, 1993), sales price reductions (Jackson and Wilcox 2000), and stock repurchases (Hribar et al., 2006).

The main difference between accrual-based and real earnings strategies is that real management activities have a direct influence on a firm's operating activities and cash flows while accrual-based manipulation does not. Real activities manipulation can therefore potentially reduce firm value because actions taken to boost short-term earnings by changing a firm's operating activities and cash flows can have a negative impact on a firm's long-term performance (Bushee, 1998; Roychowdhury, 2006). For example, reducing R&D and advertising expenses can reduce sales volumes in future periods. Conversely, accrual manipulation is less likely to have a negative impact on firm value since it involves only changes to the accounting methods, if such changes are within the limits of generally accepted accounting principles (Cohen and Zarowin, 2010; Zang, 2012).

Cohen et al. (2008) document that the level of accrual-based earnings management declines while the level of real activities manipulation increases after the passage of Sarbanes-Oxley Act (SOX) in 2002. Their results suggest the importance of scrutiny of accounting practice on accruals management. However, empirical findings presented in Dechow et al. (1996) report evidence that real activities are more difficult to be detected by regulators, auditors, and financial analysts than accruals manipulation. Along this line, a survey conducted by Graham et al. (2005) find that most companies prefer to use real activities to manipulate earnings.

A large body of literature has noted a positive impact of corporate governance on earnings management activities. For example, several studies find board independence can reduce the extent of earnings management (see for example, Klein, 2002; Xie et al., 2003). Other corporate governance mechanisms that can mitigate earnings management include audit committees (Bedard et al., 2004; Agrawal and Chadha, 2005), institutional shareholders (Chung et al., 2002; Hadani et al., 2011), and large shareholdings of managers and block-holders (Warfield et al., 1995; Dechow et al., 1996).

3. DATA AND METHODOLOGY

3.1. Data Description

We collect analysts' earnings forecasts from IBES over the years between 2001 and 2012. To enter into the sample, we require at least one earnings forecast made by individual analyst during the three months after the announcement of prior-year's earnings. We focus on this three-month window to examine analysts' responses to freshly released market risk. The institutional ownership data are from the 13F database of Thomson Reuters. We obtain financial data from Compustat database.

3.2. Methodology

3.2.1. Computing Analyst Forecast Error

We compute analyst forecast error to measure analyst forecast accuracy. Small forecast errors represent a high level of accuracy. In each calendar year t, we identify a firm's earnings announcement date for fiscal year t. We then obtain individual analyst's earnings forecasts for the coming fiscal year t+1 from the IBES, made within three months after the announcement date of fiscal year *t*. If during the three months there are multiple forecasts made by analyst *i* on firm *j*, we only keep the latest one. We calculate the forecast error (FE) by analyst *i* on firm *j* for fiscal year t+1 as the absolute value of the earnings forecast error, normalized by firm *j*'s stock price at the end of year *t* as follows:

$$FE_{j,i,t+1} = \left| \frac{EPS_{FOR_{j,i,t+1}} - EPS_{ACT_{j,i,t+1}}}{StockPrice_{j,t}} \right| \quad (1)$$

In equation (1), EPS_{FOR} is the forecasted earnings per share and EPS_{ACT} is the actual earnings per share.

3.2.2. Multivariate Framework

Following Clement and Tse (2003) we specify the relation between FE and inventories as follows:

$$FE_{j,i,t+1} = f\ (Inventories_{j,i,t},\ Frequency_{j,i,t},\ Companies_{j,i,t},\ Experience_{j,i,t},\ Institutional\ Ownership_{j,i,t},\ Market\text{-}to\text{-}Book_{j,i,t},\ Size_{j,i,t},\ Accruals_{j,i,t},\ Year\ Dummies) \quad (2)$$

Inventories are measured as inventories over sales. Frequency is the number of earnings forecasts on the firm *j* provided by the analyst *i* for year t. Companies are defined as the number of companies analyst *i* follows for year t. Experience is the number of years prior to the time of measuring forecast error, for which analyst *i* has issued earnings forecasts for firm *j*. We expect a negative relation between FE and frequency, companies and experience (see Mikhail et al., 1997; 2003; Clement, 1999). Institutional ownership, used as a proxy for analyst incentive, is computed as the percentage of shares outstanding owned by institutional investors. Ljungqvist et al. (2007) argue a demand-side disciplinary effect; that is, with the presence of institutional investors, analysts are less likely to succumb to investment banks since institutional investors demand for accurate and unbiased equity research.

Market-to-Book is measured as the ratio of market value of equity to the book value of equity. Literature documents that low market-to-book firms are more difficult to forecast (see for example Siegel et al., 2011). Size is measured as the natural logarithm of total assets and is expected to be negatively related to FE since larger firms have less information uncertainty. Accruals are the total current accruals computed by using modified Jones (1991) model and are expected to be negatively associated with FE (see Kasznik, 1999). We also include year dummy variables to control for the possible time effects on FE.

Table 1 presents summary statistics for all variables used in our study. The mean (median) of forecast error is around 3.68% (0.73%). Inventory level is on average about 9.92% of total sales with a median of 5.99%. The mean (median) of forecast frequency is 21 (18) and the mean (median) number of companies covered by an analyst is 20 (19).

Table 1: Summary Statistics of Variables

Panel A: Analyst Characteristics

Variable	N	Mean	Median	Standard Deviation
Forecast error	273,193	0.03684	0.00726	0.11676
Frequency	247,295	20.87341	18.00000	15.79845
Companies	273,193	20.24300	19.00000	11.08630
Experience	273,193	3.14826	2.00000	2.99334

Panel B: Firm Characteristics

Variable	**N**	**Mean**	**Median**	**Standard Deviation**
Inventories	32,309	0.09921	0.05994	0.13710
Institutional ownership	39,394	0.58096	0.61270	0.30555
Market-to-Book	28,302	2.12338	1.53167	2.00953
Total assets (millions)	33,386	11,356.07	868.86	83,114.76
Accruals	26,872	-0.04267	-0.04053	0.12968

4. FINDINGS AND DISCUSSIONS

4.1. Univariate Results

To conduct the univariate test, we first sort all firms with their levels of inventories. The bottom decile (10) includes firms with the highest level of inventories in our sample. We then average all FE for each decile and calculate the difference in mean values of FE between deciles 1 and 10. Table 2 provides the results. We find an overall increase in FE with inventory level. Firms with the lowest level of inventories have an average FE of 0.0386 or 3.86% compare to 5.838% for firms with the highest level of inventories. The difference in FE between deciles 1 and 10 is 1.978% and is significant at 1% level.

Table 2: Forecast Error and Inventories

Grouped by inventories	**Mean Forecast Error**
1 (smallest)	0.03860
2	0.02906
3	0.02947
4	0.03186
5	0.02913
6	0.02894
7	0.02818
8	0.02616
9	0.03792
10 (highest)	0.05838
Portfolio 10 - Portfolio 1	0.01978***

***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

We next investigate if analyst experience can reduce FE associated with the inventory level. A more experienced analyst may better understand a firm's earning management strategy and therefore make a more accurate forecast. In each year t, we sort firms into 10 portfolios based on their levels of inventories and then within each portfolio we sort FE into four quartiles based on analyst experience. We calculate the mean values of FE for each portfolio and the difference in mean values of FE for the portfolios with the most (Q4) and least (Q1) experienced analysts.

Table 3 reports our results. Within each analyst experience quartile, we find that the higher the inventory level is, the larger the forecast error. For example, for the most experienced analyst quartile (Q4), the mean value of FE is 3.167% for the lowest level of inventories and is 5.571% for the highest level of inventories. The difference is 2.404% and is significant at 1% level. We further find that FE decreases as analyst experience increases. For the portfolio with the lowest level of inventories, the average value of FE for the least experienced analysts is 4.07% and 3.167% for the most experienced analysts, which represents a significant (1% level) difference of 0.902%. The reduction in FE associated with analyst experience is significant for all levels of inventories except for the highest level of inventories.

Table 3: Forecast Error, Inventories and Analyst Experience

	Analyst Experience Quartiles					
Grouped by Inventories	**Q1 (Low)**	**Q2**	**Q3**	**Q4 (High)**	**High - Low**	**t-stat**
1 (smallest)	0.04070	0.04098	0.03795	0.03167	-0.00902***	5.84
2	0.03160	0.03417	0.03192	0.01679	-0.01481***	4.89
3	0.03280	0.03155	0.03002	0.02242	-0.01038***	5.7
4	0.03356	0.03365	0.03023	0.02956	-0.00399*	1.91
5	0.03153	0.03037	0.02851	0.02585	-0.00567***	2.98
6	0.03067	0.03065	0.03247	0.02309	-0.00758***	4.22
7	0.03327	0.02909	0.02851	0.02197	-0.01131***	5.93
8	0.02920	0.03322	0.02336	0.02049	-0.00871***	5.42
9	0.04060	0.04339	0.03387	0.03411	-0.00649***	2.94
10	0.05560	0.06211	0.06260	0.05571	0.00011	-0.04
Group 10 - Group 1	0.01490***	0.02112***	0.02465***	0.02404***		
t-stat	7.23	6.75	8.34	8.80		

***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

We then examine how institutional ownership affects the relation between FE and inventories. Our hypothesis is that the positive impact of inventory level on FE can be mitigated by the demands from institutional investors for accurate and unbiased equity research. Follow the same procedure we do earlier, in each year t, we sort firms into 10 portfolios based on their levels of inventories and then within each portfolio we sort FE into four quartiles based on the levels of institution ownership and finally calculate the mean value of FE for each portfolio.

We present the results in Table 4 Panel A. We find that within each institutional ownership quartile, there is a positive association between FE and inventory level. For example, for the highest rank of institutional ownership (Q4), we find that the mean value of FE for the lowest level of inventories is 2.241% and is 3.783% for the highest level of inventories, which represents a significant (1% level) difference of 1.542%. We further find that FE tends to decrease as the level of institutional ownership increases. The reduction in FE associated with institutional ownership is significant at 1% level for all levels of inventories. The most significant differences in mean values of FE are for the two highest levels of inventories (groups 9 and 10). For group 9, the mean value of FE for the lowest rank of institutional ownership (Q1) is 9.464% and is 1.873% for the highest rank of institutional ownership (Q4). The difference is 7.591% and is significant at 1% level.

We further investigate the relation between institutional ownership, analyst experience, inventories, and FE. We first sort firms into five portfolios based on their levels of inventories. Within each portfolio, we then sort firms into 3 terciles based on their levels of institutional ownership and we finally sort FE into quartiles based on analyst experience.

Table 4 Panel B, C, D report the relation between inventories, FE, and analyst experience for the low, median, and high institutional ownership tercile, respectively. Again, we find that across analysts with similar experience, there is a positive relation between FE and inventory level. For example, in Panel B, for the most experienced analysts (Q4), the mean value of FE is 5.75% for the lowest level of inventories and is 9.14% for the highest level of inventories. The difference is 3.39% and is significant at 1% level. Across firms with similar level of inventories, FE generally decreases as analyst experience increases. However, the reduction is the largest in magnitude for inventory group 2 in the high institutional ownership tertile. In particular, the difference in the mean values of FE between analyst experience quartile 4 and 1 is 1.747% for inventory group 2 in the high institutional ownership tertile while the largest difference in FE for the low institutional ownership tertile is 1.03% (inventory group 3) and 0.598% for median institutional ownership tertile (inventory group 4).

Table 4: Forecast Error, Inventories, Analyst Experience, and Institutional Ownership

Panel A: Average Forecast Error for Portfolios Sorted by Inventories and Institutional Ownership

Grouped by Inventories	**Institutional Ownership Quartiles**					
	Q1 (Low)	**Q2**	**Q3**	**Q4 (High)**	**High - Low**	**t-stat**
1 (smallest)	0.07350	0.02848	0.02755	0.02241	-0.05109***	28.07
2	0.04214	0.01994	0.02157	0.02810	-0.01404***	3.24
3	0.04235	0.02199	0.02296	0.02807	-0.01428***	6.21
4	0.04497	0.03381	0.02388	0.02206	-0.02291***	10.21
5	0.04414	0.03298	0.02071	0.01866	-0.02548***	12.09
6	0.05577	0.01921	0.02066	0.02564	-0.03012***	10.55
7	0.06194	0.02016	0.02359	0.01610	-0.04585***	15.92
8	0.06327	0.01922	0.01529	0.01806	-0.04521***	15.46
9	0.09464	0.03002	0.01991	0.01873	-0.07591***	21.69
10	0.09236	0.05780	0.03723	0.03783	-0.05452***	16.22
Group 10 - Group 1	0.01885***	0.02932***	0.00968***	0.01542***		
t-stat	5.56	11.69	4.75	8.72		

***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel B: Average Forecast Error for Portfolios Sorted by Inventories and Analyst Experience

Low Institutional Ownership Tercile

	Analyst Experience Quartiles					
	Q1 (Low)	**Q2**	**Q3**	**Q4 (High)**	**High - Low**	**t-stat**
1 (smallest)	0.06165	0.06420	0.07097	0.05750	-0.00415	0.87
2	0.03882	0.04157	0.04375	0.03240	-0.00642	1.40
3	0.04665	0.04336	0.04274	0.03635	-0.01030***	2.35
4	0.05095	0.05214	0.05272	0.04565	-0.00531	1.22
5	0.06836	0.07364	0.09202	0.09140	0.02303***	-3.71
Group 5 - Group 1	0.00672	0.00944***	0.02105***	0.03390***		
t-stat	1.16	2.59	4.90	6.48		

***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel C: Average Forecast Error for Portfolios Sorted by Inventories and Analyst Experience

Median Institutional Ownership Tercile

	Analyst Experience Quartiles					
	Q1 (Low)	**Q2**	**Q3**	**Q4 (High)**	**High - Low**	**t-stat**
1 (smallest)	0.02759	0.02490	0.02955	0.02743	-0.00016	0.07
2	0.02224	0.02345	0.02722	0.02416	0.00193	-0.99
3	0.02382	0.02316	0.02586	0.02043	-0.00339*	1.79
4	0.02136	0.02130	0.01750	0.01538	-0.00598***	3.99
5	0.03722	0.03763	0.03412	0.03559	-0.00163	0.65
Group 5 - Group 1	0.00963***	0.01273***	0.004567*	0.00816***		
t-stat	4.26	4.49	1.72	3.12		

***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel D: Average Forecast Error for Portfolios Sorted by Inventories and Analyst Experience

High Institutional Ownership Tercile

	Analyst Experience Quartiles					
	Q1 (Low)	**Q2**	**Q3**	**Q4 (High)**	**High - Low**	**t-stat**
1 (smallest)	0.02092	0.02190	0.02315	0.02369	0.00277*	-1.82
2	0.03441	0.02502	0.02643	0.01694	-0.01747***	6.65
3	0.02110	0.02166	0.02309	0.02194	0.00084	-0.59
4	0.01580	0.01957	0.01516	0.01584	0.00004	-0.04
5	0.02455	0.02403	0.02728	0.02635	0.00180	-1.00
Group 5 - Group 1	0.00363**	0.00214	0.00413**	0.00266		
t-stat	2.52	1.10	2.13	1.42		

***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

4.2. Regression Results

Table 5 reports the regression results of the estimated relation between FE and inventories. The coefficient on inventories is positive and significant at 1% level. In particular, the estimated coefficient of 0.0164 on inventories indicates that forecast error increases by 1.64% for each 1% increase in the ratio of inventories to total sales. Consistent with prior research, we find that analyst experience is significantly negatively correlated with FE. The negative and significant coefficient on institutional ownership also supports the argument of a demand-side disciplinary effect raised in Ljungqvist et al. (2007). As expected, we find a negative association between FE and market-to-book, size and accruals.

Table 5: Regression of Forecast Error on Inventories

	coefficient	**p-value**
Intercept	0.1389	<.0001
Inventories	0.0164***	<.0001
Log Frequency	0.0029***	<.0001
Log Companies	-0.0003	0.4725

Log Experience	-0.0029***	<.0001
Institutional ownership	-0.0536***	<.0001
Log Market-to-Book	-0.0275***	<.0001
Size	-0.0075***	<.0001
Accruals	-0.0467***	<.0001
Year Dummies	Yes	
Number of Observations	165,504	
Adj. R^2	0.078	

***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Next, we further investigate the effect of analyst experience and institutional ownership on the relation between FE and inventories. We first include the interaction term of inventories*experience into the regression model in Table 5. We then test whether the learning effect is stronger when analysts are facing a demand-side disciplinary effect from institutional investors. We sort institutional ownership into three terciles: low, median, and high and include three interaction terms into the previous regression: inventories*experience*low institutional ownership, inventories*experience*median institutional ownership, and inventories*experience*high institutional ownership.

Table 6 Model 1 reports the results when the interaction of inventories and experience is included. Consistent with the findings in Table 5, the coefficient on inventories is still positive and significant at 1% level. We also find that the coefficient on the interaction of inventories and experience is significantly negative, which indicates that forecast error decreases with forecasting experience.

Table 6 Model 2 reports the results when the interactions of inventories, experience, and institutional ownership are included. Consistent with our hypothesis, we find negative and significant coefficients on inventories*experience*median institutional ownership and inventories*experience*high institutional ownership, but we fail to find the same negative coefficient on inventories*experience*low institutional ownership. Our results suggest that the forecast error associated with inventories is reduced when analysts have more experience and are motivated from institutional investors to deliver timely and accurate forecasts.

Table 6: Regression of Analyst Forecast Error on Inventories, Experience, and Institutional Ownership

	Model 1		**Model 2**	
	coefficient	**p-value**	**coefficient**	**p-value**
Intercept	0.1384***	<.0001	0.1365	<.0001
Inventories	0.0229***	<.0001	0.0209***	<.0001
Inventories x Experience	-0.0078**	0.0144		
Inventories x Experience x Low Institutional ownership			0.0158***	0.0005
Inventories x Experience x Median Institutional ownership			-0.0195***	<.0001
Inventories x Experience x High Institutional ownership			-0.0083***	0.0229
Log Frequency	0.0029**	<.0001	0.0029***	<.0001
Log Companies	-0.0003	0.4666	-0.0003	0.4336
Log Experience	-0.0022***	<.0001	-0.0022***	<.0001
Institutional ownership	-0.0535***	<.0001	-0.0513***	<.0001
Log Market-to-Book	-0.0275***	<.0001	-0.0274***	<.0001
Size	-0.0075***	<.0001	-0.0075***	<.0001
Accruals	-0.0470***	<.0001	-0.0466***	<.0001
Year Dummies	Yes		Yes	

Number of Observations	165,504	165,504
Adj. R^2	0.0778	0.0782

***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

5. CONCLUSION

Financial analysts have played an important informational role in the financial markets and their forecast accuracy is crucial for investors. Companies' stock prices are often impacted if companies miss or beat the analysts' earnings forecasts (Kasznik, 1999; Athanasakou et al., 2009; Bartov et al., 2002). Our finding shows that firms with higher levels of inventories tend to have larger forecast errors and cautions investors and regulators that inventory level might undermine analysts' informational role.

Further, we find that the forecast error associated with inventories decreases with an increase in analyst experience and the level of institutional ownership. Our findings support the notion that experienced analysts make more accurate forecasts and that the presence of institutional investors motivates analysts to provide accurate and unbiased equity research (Frankel et al., 2006; Ljungqvist et al., 2007; Hong et al., 2000; Hong and Kubik, 2003; and Kothari, 2001).

Our findings overall suggest that when forecast earnings for firms with large inventories, analysts should carefully look at past data for possible inventory manipulation to assess its impact on future earnings. Further research also needs to be conducted to gain an understanding of better forecast models and data collection methods for inventory intensive firms and how to deter earnings management with inventory policy due to the ability of managers to manage earnings through inventory decisions.

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INCOME DIVERSIFICATION AND BANK PERFORMANCE: THE JORDANIAN CASE

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ABSTRACT

Purpose - The purpose of this paper is to examine Jordanian banks in terms of the impact of income diversification on their performance (profitability and net interest margin).
Methodology - Based on the period 2009-2017 and all thirteen Jordanian commercial banks, the econometric models are estimated using the Seemingly Unrelated Regression (SUR). Bank performance is measured by return on assets and net interest margin. As far as banks' income diversification is concerned, we use a myriad of measures including net commission income to total assets, proportion of bank credit to individuals, SME sector, corporate sector to total credit, and the real estate sector.
Findings - Based on the statistical analyses, we conclude that that income diversification impacts bank profitability in a positive manner. However, this impact (positive) comes only at the expense of widening net interest margins.
Conclusion - It is in the interest of the banking system in Jordan to promote financial inclusion at the national level. Indeed, this aspect is important to, not only the concerned individuals, but also to their (banks) performance. Moreover, with greater levels of financial inclusion, net interest margin might also narrow.

Keywords: Financial development, dollarization, net-interest margin, return on assets, financial inclusion.
JEL Codes: G20, G21, G24

1. INTRODUCTION

The economic importance of financial systems has led to the publication of numerous theoretical and empirical papers. However, the classical aspect of this literature is not conclusive. Back in 1873, Bagehot, for example, argued that the financial system mobilized the necessary capital for England's industrialization. Joan Robinson (1952), on the other hand, argued that it is businesses and economic growth lead finance. Within this context, Lucas (1988) argued that the interplay between finance and economic growth, on average, is overstressed. Nobody can deny that banks, as well as stock markets, provide economies with a myriad of economically useful financial services. Indeed, banks "facilitate the trading, hedging, diversifying, and pooling of risk, allocate resources, monitor managers and exert corporate control, mobilize savings, and facilitate the exchange of goods and services" (Levine, 1997).

Given the economic implications of financial systems, the World Bank publishes the Global Financial Development Database. This database provides researchers with annual financial system characteristics for more than 200 economies since 1960. The characterizations (109 in total) include measures of financial depth, financial access, financial efficiency, and financial stability. Following the publication of the classical theoretical models of Ho and Saunders (1981), Allen (1988), and Angbazo (1997), numerous empirical papers looked at the profitability (return on assets) aspect and cost of intermediation (net interest margin) of banks.

The empirical side of this literature, on average, regresses bank profitability and net interest margin on a number of variables that include bank-specific variables, banking-sector variables, and macroeconomic variables.

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Some of the more recent papers that examine country-level bank performances include Almarzoqi and Ben Naceur (2015), Nassar et al (2015), Helhel (2015), Catao et al. (2016), Hashem (2016), Jima (2018), Kohlscheen et al. (2018), and others.Within the context of the subject matter of banks' performance, the impact of their income diversification has caught some special attention.

Again, the theoretical impact of income diversification on bank performance is not conclusive. It is argued that more diversification results in superior performance (Klein and Saidenberg, 1997). In other words, if the sources of income (diversified) are not perfectly correlated, they would result in more stable and higher profits (Chiorazzo et al., 2008). On the other hand, if the diversified activities are riskier, they might make banks' balance sheets riskier and deteriorate performance (Boyd et al., 1993).

The empirical literature that examines the impact of income diversification on bank performance, as one might expect, is also not conclusive. In other words, it is really an empirical issue. For example, Berger et al. (2010) examined a panel of 88 Chinese banks during the period 1996–2006 and found that diversification (non-interest income) results in lower profits.

Similarly, Maudos (2017) report that increases in the share of non-interest income to total income has a negative effect on profitability. In contrast, Elsas et al. (2010), using banking data from Australia, Canada, France, Germany, Italy, UK, US, Spain and Switzerland, show that diversification improves bank profitability. This finding (positive impact) is also supported by the findings of Nisar et al. (2018) who examined a total of 200 commercial banks in South Asia over the period 2000-2014.

Within the context of the interplay between income diversification and bank performance, it is interesting to note that other researchers have used different measures of income diversification. For example, Adzobu et al. (2017) examine whether diversification of credit portfolios across economic sectors result in higher profitability and lower credit risks for a panel of 30 Ghanaian banks (2007-2014). The results indicate that loan portfolio diversification does not improve profitability nor does it reduce credit risks (non-performing loans). Within the same spirit, using pooled, fixed, random and System GMM analysis (2006-2013) of 250 commercial banks in 30 Sub-Saharan countries, it is reported that diversification of operational activities impact (positively) their financial performance (Olarewaju et al., 2017).

Relative to the above-mentioned arguments and observations, this paper contributes to the ongoing research on the benefits of bank revenue diversification. Indeed, this is important, not only because banks in Jordan, as far as the researcher is aware, have not been investigated in terms of this issue (sectoral diversification of income sources), but also for two additional reasons.

First, relative to the size of the Jordanian economy, the banking system is large. Licensed banks' 2017 assets are equivalent to about 173 percent of Gross Domestic Product (GDP). Second, Jordanian banks differ significantly in terms of various measures that are important in their respective income diversification. These measures include commission income, ratio of credit to individuals, corporate, real estate, and SMEs to total credit, and proportion of each bank's investment in fixed-income government securities to total assets. The rest of the paper is organized as follows. In section II, we provide some basic information about the Jordanian commercial banks. In section III, we discuss the data and methodology, and present and discuss the empirical results. Finally, section V summarizes and concludes the paper.

2. THE JORDANIAN BANKING SECTOR: SOME INFORMATION

Currently, licensed banks in Jordan are composed of thirteen national banks (commercial), three Islamic banks, and nine foreign banks (commercial). As stated in the introduction, relative to the size of the national economy, the Jordanian banking sector is large. The total assets of all licensed banks are equivalent to more than 170 percent of GDP (Table 1).

This ratio is larger than that in, for example, Poland (around 60 percent), Saudi Arabia (around 95 percent), and comparable to the 190 percent that prevails in Japan (World Bank database). Similarly, total deposits and total credit facilities have surpassed the 100 percent and 80 percent of GDP respectively by the end of 2017.

Table 1: Size of Licensed Banks in Jordan Relative to Economy

Year	Total Assets / GDP	Total Deposits / GDP	Total Credit / GDP
2010	186.4%	119.9%	77.0%
2011	184.0%	119.1%	77.4%
2012	178.8%	113.7%	81.1%
2013	179.5%	115.7%	79.4%
2014	176.4%	119.0%	75.8%
2015	176.9%	122.4%	79.2%
2016	176.3%	119.9%	83.5%
2017	172.6%	116.7%	87.0%

Licensed banks in Jordan can be commented on in terms of a number of characteristics. These are outlined below. First, foreign exchange deposits constitute a significant proportion of total deposits. In 2017, for example, these deposits constituted about 23 percent of total deposits (Table 2). In other words, one can argue that the banking system in Jordan is dollarized.

Table 2: Bank Deposits in Jordan According to Currency

Year	Local Currency	Foreign Currencies
2010	78.3%	21.7%
2011	78.4%	21.6%
2012	70.9%	29.1%
2013	76.1%	23.9%
2014	79.4%	20.6%
2015	79.8%	20.2%
2016	78.9%	21.1%
2017	77.2%	22.8%
Source: Central Bank of Jordan		

Second, the construction, individuals (retail), general trade, and the industrial sectors account for the largest shares in terms of their respective credit allocation. For example, 23.1 percent of total banks' credit facilities are allocated to the retail end of the market (Figure 3).

Table 3: Sectoral Distribution of Bank Credit

Year	Trade	Construction	Individuals	Industry	Other
2010	24.9%	21.9%	21.4%	13.3%	18.5%
2011	23.8%	21.9%	21.5%	14.5%	18.3%
2012	21.1%	20.7%	21.5%	14.1%	22.6%
2013	20.8%	21.6%	21.9%	14.0%	21.8%
2014	19.1%	23.6%	23.3%	13.1%	20.8%
2015	18.4%	23.2%	24.6%	10.2%	23.6%
2016	17.8%	25.4%	23.5%	9.6%	23.7%
2017	17.1%	26.7%	21.3%	11.0%	23.9%
Source: Central Bank of Jordan					

Third, in 2017, Jordanian banks' credit to the private sector was equivalent to 72 percent of GDP. This ratio is relatively low (Table 4).

Table 4: Bank Credit to the Private Sector to GDP Ratio

Country	Ratio	Country	Ratio	Country	Ratio
Lebanon	39.7%	Qatar	76.5%	Turkey	128.7%
Egypt	41.0%	Kenya	88.5%	Australia	131.6%
Algeria	41.3%	UAE	89.8%	Tunisia	132.8%
Japan	47.0%	Bahrain	90.4%	Saudi Arabia	134.9%
Palestine	50.1%	Indonesia	93.2%	Georgia	140.3%
Ghana	70.7%	Poland	96.6%	Finland	143.8%
Jordan	72.4%	Malaysia	96.6%	Chile	150.0%
Morocco	74.1%	Germany	97.0%	Portugal	152.3%
Czech Rep.	74.2%	Slovenia	98.7%	Sweden	199.6%
India	76.2%	Switzerland	100.4%	Denmark	319.7%
Source: World Bank Database					

Fourth, financial inclusion in Jordan is relatively low. For example, the prevailing 42 percent is much lower than those that exist in Denmark (100 percent), UAE (88 percent), and in Turkey (69 percent).

Table 5: Financial Inclusion

Denmark	100%	China	80%	Jordan	42%
Germany	99%	Chile	74%	Tunisia	37%
UK	96%	Saudi Arabia	72%	Egypt	33%
USA	93%	Turkey	69%	Morocco	29%
UAE	88%	Bangladesh	50%	Iraq	23%
Bahrain	83%	Lebanon	45%	Afghanistan	15%
Source: World Bank Database					

Finally, and to put licensed banks in Jordanian in terms of their international counterparts, we report below (Tables 6-9) some of the main ratios that measure banks' soundness. These include bank regulatory capital to risk-adjusted assets, non-performing loans to total gross loans, Z-score ((ROA + (equity / assets)) / Standard Deviation of ROA), where ROA refers to gross profit divided by total assets, equity is equity capital, and return on assets.

Table 6: Performance of Banks: Bank Regulatory Capital to Risk-Adjusted Assets

Country	**Ratio**	**Country**	**Ratio**	**Country**	**Ratio**
India	12.8%	Lebanon	16.3%	Germany	18.8%
Chile	13.4%	Cyprus	16.6%	Belgium	18.8%
Australia	14.0%	Greece	16.8%	Saudi Arabia	19.3%
USA	14.3%	Switzerland	17.2%	UK	20.3%
Korea	14.4%	W. Bank & Gaza	17.6%	Denmark	20.8%
Canada	14.6%	Czech Rep.	17.8%	Latvia	21.0%
Spain	15.0%	Austria	17.8%	Finland	22.6%
Italy	15.1%	France	17.9%	Luxembourg	24.2%
Turkey	16.0%	UAE	18.4%	Sweden	25.8%
Japan	16.3%	Jordan	18.5%	Estonia	29.7%
Source: IMF Database (International Financial Statistics).					

Table 7: Performance of Banks: Non-Performing Loans to Total Loans

Country	**Ratio**	**Country**	**Ratio**	**Country**	**Ratio**
Korea	0.5%	Saudi Arabia	1.4%	Jordan	4.5%
Canada	0.5%	Finland	1.5%	Czech Rep.	4.6%
Switzerland	0.7%	Germany	1.7%	Lebanon	4.9%
Luxembourg	0.8%	Chile	1.9%	Spain	5.4%
Estonia	0.9%	W. Bank & Gaza	2.2%	Latvia	5.5%
UK	0.9%	Austria	2.8%	UAE	5.6%
Australia	0.9%	Turkey	3.0%	India	8.3%
Sweden	1.1%	Denmark	3.1%	Italy	16.5%
USA	1.3%	Belgium	3.4%	Greece	39.5%
Japan	1.4%	France	3.6%	Cyprus	45.5%

Table 8: Performance of Banks: Z-Scores

Country	**Ratio**	**Country**	**Ratio**	**Country**	**Ratio**
Greece	5.6%	Sweden	13.9%	Denmark	20.6%
Chile	6.8%	Australia	14.2%	Spain	21.9%
Estonia	7.6%	Czech Rep.	14.4%	Germany	23.0%
Turkey	8.0%	Japan	15.6%	Austria	24.6%
Cyprus	10.3%	Switzerland	16.2%	UAE	26.8%
Korea, Rep.	10.4%	India	17.4%	USA	29.2%

Finland	11.0%	W. Bank & Gaza	17.7%	Lebanon	32.7%
UK	11.4%	Saudi Arabia	18.2%	Luxembourg	41.7%
Italy	12.1%	France	19.3%	Jordan	50.0%
Source: IMF Database (International Financial Statistics).					

Table 9: Performance of Banks: Returns on Assets (ROA)

Country	**Ratio**	**Country**	**Ratio**	**Country**	**Ratio**
Greece	-0.9%	Spain	0.5%	Korea	1.2%
Cyprus	-0.6%	Austria	0.6%	Chile	1.3%
Italy	0.1%	Finland	0.6%	Latvia	1.3%
Switzerland	0.3%	Belgium	0.6%	UAE	1.5%
Japan	0.3%	Denmark	0.7%	W. Bank & Gaza	1.5%
UK	0.3%	Luxembourg	0.7%	Turkey	1.8%
USA	0.4%	Sweden	0.9%	Saudi Arabia	1.9%
Germany	0.4%	Canada	1.1%	Estonia	2.0%
India	0.4%	Czech Rep.	1.2%	Jordan	1.2%
France	0.4%	Lebanon	1.2%	Australia	1.1%
Source: IMF Database (International Financial Statistics).					

Based on the reported values in Tables 6-9 inclusive, we can state that the Jordanian banking system is relatively profitable (ROA) and maintains much lower probability of bankruptcy (Z-score) than other banking systems. In other words, licensed banks in Jordan are financially sound.

3. THE DATA, METHODOLOGY AND EMPIRICAL RESULTS

As mentioned in the introduction, this paper examines the impact of income diversification on the performance of Jordanian banks. Bank performance is measured by return on assets and net interest margin. The data that enters the empirical analyses includes all 13 licensed commercial banks, and covers the period 2009-2017. Foreign banks are not included in the analysis because of the unavailability of their financial statements. In addition, Islamic banks are also excluded from the analysis as they operate under different principle from commercial banks.

Based on the collected data, we estimate the following two seemingly unrelated regression models:

$$ROA_{i,t} = \beta_1 COM_{i,t} + \beta_2 RETAIL_{i,t} + \beta_3 SME_{i,t} + \beta_4 CORPORATE_{i,t} + \beta_5 RESTATE_{i,t} + \beta_6 BONDS_{i,t} + \beta_1 FED_{i,t} + \beta_2 TA_{i,t} + \beta_3 EQUITY_{i,t} + \beta_4 EXPENSE_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$NIM_{i,t} = \beta_1 COM_{i,t} + \beta_2 RETAIL_{i,t} + \beta_3 SME_{i,t} + \beta_4 CORPORATE_{i,t} + \beta_5 RESTATE_{i,t} + \beta_6 BONDS_{i,t} + \beta_1 FED_{i,t} + \beta_2 TA_{i,t} + \beta_3 EQUITY_{i,t} + \beta_4 EXPENSE_{i,t} + \varepsilon_{i,t} \quad (2)$$

where, the subscripts i and t denote banks (i = 1, …, 13) and time (t = 1, …, T = 2009-2017) respectively.

The definitions of the dependent variables are as follows:

ROA = Gross income divided by total assets (return on assets).

NIM = Net interest margin [Interest income – Interest expense] / Total assets.

The independent variables include the followings:

COM = Net commission income to total assets.

RETAIL = Proportion of bank credit to individuals to total credit.

SME = Proportion of bank credit to the SME sector to total credit.

CORPORATE = Proportion of bank credit to the corporate sector to total credit.

RESTATE = Proportion of bank credit to the real estate sector to total credit.

BONDS = Proportion of bank investment in government bonds to total assets.

FED = Foreign exchange deposits to total deposits.

TA = natural logarithm of total assets.

EQUITY = Equity capital to total assets.

EXPENSE = Total operating expenses to total assets.

In Table 10, we report some descriptive statistics for both the dependent and independent variables. These reported values reveal the following observations. First, during the period 2009-2017, the overall mean value of banks' ROA and NIM were equal to 1.8 percent and 3.1 percent respectively. In relative terms, net interest margin in Jordan is high. For example, this measure is equal to 0.8 percent in Luxemburg, 1.6 percent in Finland, and 2.9 percent in Germany (Kasman et al., 2014).

Second, our sample of bank reflect some significant variations in their respective credit to individuals, SMEs, corporate, real estate sector. For example, the maximum and minimum values of credit to the retail sector are equal to 54.3 percent and 1.1 percent respectively. This indicates that some banks have very limited exposure to the retail end of the credit market.

Third, our sample of banks differ in terms of their investments in government fixed-income securities (bonds). Again, while the overall mean value of this measure is equal 21.6 percent, its maximum and minimum values are equal to 36.6 percent and 0.2 percent respectively. These two values indicate that 36.6 percent of a bank's assets and 0.2 percent of another bank's assets are in the form of government securities respectively.

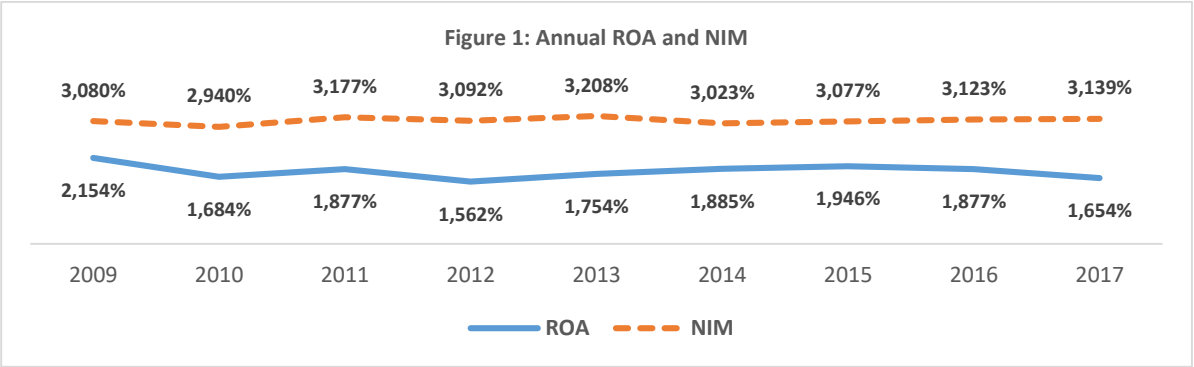
Fourth, it is important to note that the mean ratio of foreign exchange deposits to total deposits was equal to 27.4 percent. Whilst this proportion is high, it is not as high as that which prevails in, for example, Lebanon (more than 150 percent), and in Egypt (about 90 percent).

Table 10: Bank Performance: Descriptive Statistics

Measure	MEAN	MEDIAN	MAXIMUM	MINIMUM	STD.DEV.
ROA	0.018	0.019	0.036	-0.001	0.007
NIM	0.031	0.030	0.044	0.015	0.006
COM	0.007	0.006	0.020	0.002	0.003
RETAIL	0.193	0.167	0.543	0.011	0.132
SME	0.091	0.086	0.220	0.000	0.054
CORPORATE	0.459	0.438	0.833	0.118	0.167
RESTATE	0.143	0.146	0.303	0.014	0.056
BONDS	0.216	0.212	0.366	0.002	0.071
FED	0.274	0.277	0.649	0.006	0.115
TA	21.353	21.335	23.976	19.435	1.009
EQUITY	0.078	0.075	0.209	0.022	0.038
EXPENSE	0.025	0.025	0.043	0.010	0.006

ROA stands for gross income divided by total assets (return on assets). NIM is net interest margin [Interest income – Interest expense] / total assets. COM is net commission income to total assets, RETAIL, SME, CORPORATE, and RESTATE stand for the proportion of bank credit to individuals, SME sector, corporate sector, and real estate sector to total credit respectively. BONDS is the proportion of bank investment in government bonds to total assets. FED stands for foreign exchange deposits to total deposits. TA is the natural logarithm of total assets. EQUITY is equity capital to total assets. EXPENSE is total operating expenses to total assets.

In addition, it is also useful to realize that return and assets reflected, on average, a downward trend. Indeed, this measure decreased from 2.254 percent in 2009 to 1.754 in 2013 and to 1.654 percent in 2017 (Figure 1). Net interest margin, on the other hand, was more stable. Again this measure was equal to 3.080 percent in 2009, 3.208 percent in 2013, and 3.139 percent in 2017 (Figure 1).



The estimation results of models 1 and 2 are reported in Tables 11-13 below. In Tables 11 and 12, we introduce each of the proxy measures of income diversification alone as possible determinants of ROA and NIM respectively. In Table 13, we introduce all the proxy measures of income diversification in the model. Again, based on the reported results, the following comments are provided.

First, banks that rely more on commission income achieve higher profits (ROA). However, this diversification aspect implies decreasing net interest income. The signs and magnitudes of these coefficients are equal to +0.446 and -291 respectively. These coefficients indicate that banks with more diversified sources of income pass on this "advantage" on to their customers by narrowing their net interest margins.

Table 11: Regression Results: Return on Assets (ROA)

Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
TA	0.001*	0.001*	0.001*	0.001*	0.001*	0.00*	0.001*
EQUITY	0.005	0.002	0.020	0.012	0.004	0.017	0.010
EXPENSE	-0.329*	-0.406*	-0.276*	-0.246*	-0.224*	-0.267*	-0.271*
COM	0.446*	---	---	---	---	---	---
RETAIL	---	0.0256*	---	---	---	---	---
SME	---	---	-0.025*	---	---	---	---
CORPORATE	---	---	---	-0.001	---	---	---
RESTATE	---	---	---	---	0.010*	---	---
BONDS	---	---	---	---	---	-0.002*	---
FED	---	---	---	---	---	---	0.0173*
Adj. R-Sq.	0.573	0.687	0.598	0.585	0.678	0.580	0.767
F-Statistic	52.940	85.883	58.500	55.615	82.328	54.312	128.292
D-W Stat.	1.962	1.985	1.954	1.970	1.948	1.941	1.967

ROA stands for gross income divided by total assets (return on assets). NIM is net interest margin [Interest income – Interest expense] / total assets. TA is the natural logarithm of total assets. EQUITY is equity capital to total assets. EXPENSE is total operating expenses to total assets. COM is net commission income to total assets, RETAIL, SME, CORPORATE, and RESTATE stand for the proportion of bank credit to individuals, SME sector, corporate sector, and real estate sector to total credit respectively. BONDS is the proportion of bank investment in government bonds to total assets. FED stands for foreign exchange deposits to total deposits.

Table 12: Regression Results: Net Interest Income (NIM)

Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
TA	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*	0.001*
EQUITY	0.012	-0.003	0.019	0.010	-0.007	0.015	0.011
EXPENSE	0.534*	0.380*	0.482*	0.483*	0.513*	0.495*	0.478*
COM	-0.291*	---	---	---	---	---	---
RETAIL	---	0.018*	---	---	---	---	---
SME	---	---	-0.025*	---	---	---	---

CORPORATE	---	---	---	0.002	---	---	---
RESTATE	---	---	---	---	0.022*	---	---
BONDS	---	---	---	---	---	0.002	---
FED	---	---	---	---	---	---	0.010*
Adj. R-Sq.	0.891	0.847	0.851	0.853	0.921	0.847	0.853
F-Statistic	315.813	214.458	223.384	225.041	450.903	215.409	225.586
D-W Stat.	1.905	1.947	1.861	1.876	1.863	1.873	1.883

NIM is net interest margin [Interest income – Interest expense] / total assets. TA is the natural logarithm of total assets. EQUITY is equity capital to total assets. EXPENSE is total operating expenses to total assets. COM is net commission income to total assets, RETAIL, SME, CORPORATE, and RESTATE stand for the proportion of bank credit to individuals, SME sector, corporate sector, and real estate sector to total credit respectively. BONDS is the proportion of bank investment in government bonds to total assets. FED stands for foreign exchange deposits to total deposits.

Second, the sign of the coefficient (RETAIL) is positive and significant in both model 1 and 2. Banks that lend more to the retail end of the market, earn wider net interest margins and greater profitability levels. This observation is due to two main reasons. First, banks require individuals to pay the interest expense of their borrowed funds up-front (from the beginning of the borrowing period). Secondly, due to the extra cost of dealing with individuals, banks that lend more to individuals tend to earn wider net interest margins.

Third, the sign of the coefficient (SME) is negative and significant when the dependent variable is bank profitability. Also, banks that lend more to the SME, earn narrower net interest margins. On average, this is due to the fact that the performance of this sector was poor during the period 2009-2017. Indeed, one can appreciate this observation from the total taxes paid to the treasury. This expense (taxes) has been a downward trend since 2009.

Fourth, the sign of the coefficient (CORPORATE) is not significant when the dependent variable is bank profitability or net interest margin. Again, this is due to the fact that the performance of this sector has been poor during the period 2009-2017. On average, this sector has been realizing accounting losses during the period 2009-2017.

Fifth, the sign of the coefficient (RESTATE) is positive and significant in both model 1 and 2. Banks that lend more to finance real estate activities, earn wider net interest margins and greater profitability levels. This observation is due to two main reasons. First, banks require borrowers to pay higher interest rates on their borrowed funds. Secondly, due to the extra risk of this sector, banks that lend more to real estate activities tend to earn wider net interest margins.

Sixth, banks' investment in government securities (BONDS) negatively impacts their return on assets. This is expected given the relatively low interest rate on these assets. Within this context, it is important to note that in Jordan there is no secondary market for government securities. Banks are required by the Central Bank of Jordan to subscribe to these issues, and each bank is allocated a share of these issues according to its relative size. However, the fact that investing in government securities reduce banks' risk, this "benefit" is not shared with bank customers in the form of narrower net interest margin.

Seventh, the sign of the coefficient (FED) is positive and significant in both equations. Foreign exchange deposits impact bank profitability (ROA) in a positive manner. However, this positive impact comes at the expense of widening net interest margin. This result is what one would expect. Indeed, lending in foreign exchange incurs greater levels of risk, and hence the wider interest margin. In addition, the minimum reserve requirement on foreign exchange deposits is higher than that on local currency deposits.

Eighth, licensed banks in Jordan do benefit from economies of scale. The coefficient of bank size (SIZE) is consistently positive when the dependent variable is profitability. However, the sign of this coefficient is also consistently positive when the dependent variable is net interest margin.

Ninth, the impact of bank expenses on profitability is negative. However, this expense is passed-on to the customers in the form of wider net interest margin. These imply that while less efficient banks realize lower return on assets, they ask of their customers to pay for their inefficiencies by widening their net interest margins.

Finally, when we include all the proxy measures of income diversification in the models, the results do not really change (Table 13). Indeed, commission income, retail credit, SME credit, corporate credit, real estate credit, and bank investments in government securities do not change their signs and their significance. The same is also true for net interest margin.

Table 13: Regression Results: Determinants of Bank Performance (ROA)

Variable	**ROA**	**NIM**
	Coefficient	Coefficient
TA	0.001*	0.001*
EQUITY	0.003	-0.014
EXPENSE	-0.554*	0.319*
COM	0.347*	-0.319*
RETAIL	0.023*	0.023*
SME	-0.028*	-0.027*
CORPORATE	0.003	0.008*
RESTATE	0.023*	0.022*
BONDS	-0.009*	-0.016*
FED	0.011*	0.008*
Adj. R-Squared	0.770	0.954
F-Statistic	44.132	268.808
D-W Statistic	1.901	1.941

ROA stands for gross income divided by total assets (return on assets). NIM is net interest margin [Interest income – Interest expense] / total assets. TA is the natural logarithm of total assets. EQUITY is equity capital to total assets. EXPENSE is total operating expenses to total assets. COM is net commission income to total assets, RETAIL, SME, CORPORATE, and RESTATE stand for the proportion of bank credit to individuals, SME sector, corporate sector, and real estate sector to total credit respectively. BONDS is the proportion of bank investment in government bonds to total assets. FED stands for foreign exchange deposits to total deposits.

4. SUMMARY AND CONCLUSIONS

Given that finance is important, the financial economics literature contains numerous papers that examine various aspects related to financial development. One of these aspects is the determinants of bank performance in terms of their profitability and net interest margin (cost of intermediation). This paper examined the Jordanian banking sector in terms of one major issue: **(1)** The impact of income diversification on the performance licensed Jordanian commercial banks over the period 2009-2017. The empirical results indicate a number of observations and conclusions. Some of these are briefly outlined below. First, net commission income is the dominant factor in affecting bank profitability and net interest margin. The coefficients of this variable are equal to + 0.347 and -0.319 respectively. Second, retail lending is also significant (statistically and extent) in affecting bank performance (positively) and cost on intermediation (positively). Based on the results of this paper, the implications are clear. It is in the interest of the banking system in Jordan to promote financial inclusion at the national level. Indeed, this aspect is important to, not only the concerned individuals, but also to their (banks) performance. Moreover, with greater levels of financial inclusion, net interest margin might also narrow.

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SPEED OF ADJUSTMENT TOWARD CAPITAL STRUCTURE IN CROSS BORDER AND CROSS INDUSTRY MERGERS AND ACQUISITIONS

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ABSTRACT

Purpose - In this study, the speed of adjustment (SOA) toward target capital structure is investigated in cross border and cross industry mergers and acquisitions (M&A).
Methodology - As a measure of capital structure both book leverage (BLEV) and market leverage (MLEV) ratios are used in the analysis. The sample consists of 6,520 M&A deals for the period of 2000-2016.
Findings - The findings show that for both the BLEV and MLEV, the cross border M&A deals move faster toward the target capital structure compared to non-cross border M&A deals. While the SOA rate for the same and cross industry M&A cases does not show too much difference for BLEV and MLEV.
Conclusion - Overall the firms adjust to their target capital structure in maximum three years following the M&A

Keywords: Speed of adjustment, cross border M&A, cross industry M&A, target capital structure, merger and acquisition.
JEL Codes: G34, G30, F65, D53

1. INTRODUCTION

Capital structure is an important concern for corporate finance. Determining the optimal capital structure, maintaining a target capital structure and if deviated from the target leverage range, then rebalancing are major issues faced by managers (Auerbach, 1985; Flannery and Rangan, 2006; Jalilvand and Harris, 1984; Leary and Roberts, 2005; Marsh, 1982; Opler and Titman, 1994; Taggart, 1977). The focus of this study is mainly on the adjustment to target capital structure in cross border and cross industry M&A deals, therefore the changes in capital structure surrounding the M&A activities are investigated. In the literature, M&A is considered as an expansion or organic growth for the firms (Moatti et al., 2015). Several advantages are achieved through M&A such as; increase in market share, financial growth, operational synergies, economies of scale, tax benefits and elimination of compensation threats (Jarrell et al., 1988; Staikouras, 2006).

According to the related literature, two different scenarios are observed while considering the adjustment of capital structure and M&A activities. The first is that M&A decisions are made solely for financial motives and the intention of managers is to adjust to target capital structure (Leland 2007; Lewellen, 1971; Scott, 1977; Gugler and Konrad, 2002). While in the second scenario, nonfinancial motives such as; market share growth, operational synergies, economies of scales are the motives behind the M&A decisions (Lintner, 1971, Markham, 1973, Mitchell & Mulherin 1996, Weston 2001, Harford 2005).

In the first case, where the motives are financial, a firm may undertake an M&A activity to adjust to the target capital structure by targeting a firm and absorbing the debt and equity of the acquired firm (Gugler and Konrad, 2002). Vermaelen and Xu (2012) found that 80% of their M&A sample firms out of 3,097, came closer to their target leverage, which was predicted by using Kayhan and Titman (2007) model, following the M&A. Yang (2011) states that most of the M&A decisions narrowed the gap between actual and target leverage ratios after the M&A. Similarly, Leland (2007) observes that adjusting to target capital structure may be the primary motive underlying the M&A decisions. At the same time distinguishing between different motives underlying M&A decisions is very difficult. For example, Gugler and Konrad (2002) argue that in M&A decisions, the financial motive may be difficult to separate from motives of increasing market power and operational synergy.

In the second case, when firms enter an M&A deal, the financial structure as stated in the literature is expected to change and according to the tradeoff theory (Shyam-Sunder and Myers, 1999), these firms will start adjusting to target capital structure in post-M&A period (Byoun, 2008). In a financial surplus or deficit, the firms will focus on adjusting their capital structures. Leary and Roberts (2005) state that a large number of firms is actively busy in rebalancing their leverages to sustain their targeted range. Graham and Harvey, (2001:211) states that most of the companies have flexible targets or target ranges rather than an exact status point of target capital structure, hence the capital structure fluctuates between the higher and lower ends of the range. The other reason why firms are not able to fix an optimal point as their target capital structure is due to the "cost of adjustment" (Fischer et al., 1989; Faulkender et al., 2010). In this regard, it could also be stated that adjustment to the target capital structure range may be dependent on the cost of adjustment.

If the cost of adjustment is kept constant, in other words in a frictionless world, every firm would be at its optimal capital structure. As stated by the tradeoff theory of capital structure, firms target to be at their optimal capital structure where the costs and benefits of debt and equity financing are balanced (Myers, 1984). In this context, the target capital structure depends on the cost of bankruptcy, the agency costs of debt and equity financing, the costs and benefits of signaling, and tax benefits of debt (Modigliani and Miller, 1963; Ross, 1977; Jensen and Meckling, 1976; Myers, 1977; Stulz, 1990).

In the capital structure literature, different studies have shown that firms consider a target debt ratio or a target range when making their debt decisions (Graham and Harvey, 2001; Vermaelen and Xu, 2012). Graham and Harvey (2001) found that 81% of their survey sample of 392 CFO has admitted that they have a target debt-equity ratio or a target range. In which 71% of the firms have a flexible or somewhat tight target ratio or target range while the remaining 10% have a strict target debt ratio. Therefore, in the M&A literature, it is found that firms adjust back to their target capital structures in post-M&A period if they move away from their target capital structures during the M&A (Varmaelen and Xu, 2012; Yang, 2011; Harford et al., 2009). According to Vermaelen and Xu (2012), 80% of their M&A sample firms move toward their target leverage ratio after the M&A. Harford, Sandy and Nathan (2009) investigated the target leverage in the context of larger acquisitions. Their sample consisted of 1,188 takeovers of only those firms that the target firm is at least 20% of the bidder's size. They found that firms maintain a target capital structure and managers try not to divert too far from it. Their results indicated that within the first five post-merger years, 75% of the financing effects is reversed (Harford, Sandy and Nathan, 2009: 11).

This study focuses on evaluating the speed of adjustment toward target capital structure in cross border and cross industry M&A. The companies engaged in cross border and cross industry M&A deals may adjust faster toward their target capital structure compared to the ones engaged in non-cross border or same industry M&A deals. Oztekin and Flannery (2012) conducted a comparative study, which explores the firms' capital structure adjustments and investigated whether a country's financial and legal institutional structures play a role in the adjustment speed. Their sample consisted of 15,177 firms from 37 different countries. The findings showed that the book to leverage adjustment speed was 21.11% across all the 37 countries and the estimated adjustment speed varied from country to country, starting from 4% (in Columbia) to 41% (in New Zealand) per year (Oztekin and Flannery, 2012: 108). Therefore, if a cross border M&A deal is conducted in a country where the legal and financial institutional structures are effective and ease of doing business is high then the speed of adjustment would also be high. Oztekin and Flannery (2012: 89) explain their findings by stating that the country's legal and financial institutions significantly affect both the costs and the benefits of moving toward target leverage.

Regarding the same industry M&A, Schwartz and Aronson (1967) state that firms in the same industry have an optimum range in which their capital structure varies. Cross industry M&A deals diversify the market and expand the customer base of the firms, create a market oriented environment. According to Higgins and Schall (1975), the bankruptcy cost decreases in the cross industry M&A deals due to diverse markets and imperfect correlated cash flows. Mai, Meng and Ye (2017:292) found that high growth rate of GDP per capita and market oriented environment increase the firm's speed of adjustment toward target capital structure. Cross industry M&A deals diversify the customer base and increase the economic activities leading to more cash flows as compared to same industry M&A deals (Mueller, 1977; Amihud, 1981). Diverse markets and cash flows will provide a better

chance to adjust quickly to their target capital structures for the firms engaged in cross industry M&A deals compared to the firms engaged in the same industry M&A deals.

Different studies illustrate that firms adjust toward a target leverage (Taggart, 1977; Marsh, 1982; Auerbach, 1985; Jalilvand and Harris, 1984; Opler and Titman, 1994), but the speed of adjustment may vary between same industry and cross industry or same region and cross border M&A deals. The findings of the related literature, in respect of the speed of adjustment rate could be divided into two parts, i) fast speed of adjustment, and, ii) slow speed of adjustment. Jalilvand and Harris (1984), Leary and Roberts (2005), Flannery and Rangan (2006), Harford, Sandy and Nathan (2009), Cook and Tang (2010) and Oztekin and Flannery (2012) reported a fast speed of adjustment, while Fama and French (2002), Kayhan and Titman (2007), Qian, Tian and Wirjanto (2009), Huang and Ritter (2009) found that firms adjust slowly toward the target leverage level. Cook and Tang (2010) and Oztekin and Flannery (2012) suggest that macroeconomic conditions such as better legal and financial regulations would lead to faster speed of adjustment due to lower transaction costs.

In light of the above explanations, this study aims to investigate: i) the SOA difference between non-cross border and cross border M&A deals, ii) the SOA difference between same industry and cross industry M&A deals, and, iii) to compare SOA of cross border (non-cross border) and cross industry (same industry) M&A deals. The sample period of this study is 2000 to 2016. The sample of the study consists of 6,520 non-financial firms engaged in M&A deals globally. The book leverage (BLEV) and market leverage (MLEV) are used as measures of leverage in the analysis. The findings of the study show that the SOA toward target leverage for both BLEV and MLEV is higher in the cross border than in non-cross border M&A deals. On the other hand, the firms engaged in same industry M&A move toward the target BLEV and MLEV almost at the same speed as the ones in cross industry M&A. The study aims to contribute to the SOA and capital structure literature in the area of M&A by being one of the pioneering studies that explore the SOA in the area of cross border and cross industry M&A.

The remainder of the paper is organized as follows: section 2, provides the hypotheses of the study, section 3, discusses the sample and methodology, section 4 presents the empirical results. The conclusion is presented in section 5.

2. HYPOTHESES

The speed of adjustment across the border and among different industries varies depending on the firm's internal and external characteristics. As discussed earlier, Oztekin and Flannery (2012) state that the speed of adjustment of a firm toward capital structure varies across different countries. Different studies investigating different country firms have also found different speeds of adjustment. Some studies report a fast speed of adjustment (Cook and Tang, 2010; Flannery and Rangan, 2006; Harford, Sandy and Nathan, 2009; Jalilvand and Harris, 1984; Leary and Roberts, 2005; and Oztekin and Flannery, 2012), while in contrast other studies reported a slow speed of adjustment (Fama and French, 2002; Huang and Ritter, 2009; Kayhan and Titman, 2007; Qian, Tian and Wirjanto, 2009).

Oztekin and Flannery (2012) found that SOA varies across different countries where the countries with strong financial and legal institutions have a faster SOA compared to weak institutions. These institutions significantly influence both costs and the benefits of moving toward target leverage. Hence it can be inferred that the SOA in post-M&A may vary when firms make cross border and cross industry M&A deals. This also leads to the first hypothesis, that is:

H1: The speed of adjustment is higher in cross border than non-cross border M&A deals.

Along the same lines, the SOA of same industry and cross industry M&A deals may differ from each other. According to the literature, cross industry M&A deals widen the target market, may create imperfectly correlated cash flows, which will reduce bankruptcy costs and will help in making changes in the capital structure (Higgins and Schall, 1975; Ghosh and Jain, 2000). According to Mai et al. (2017), firms having a market orientation environment and surrounded with better economic conditions move faster toward the target capital structure. Same industry M&A deals have an optimum range in which their capital structure varies (Schwartz and Aronson, 1967). Also, if diverted from their target capital structure, firms will move slower because of the less diversified market as compared to cross industry firms (Mueller, 1977; Amihud, 1981). Therefore, the second hypothesis of the study is that firms engaged in cross industry M&A deals will move faster than firms in same industry M&A deals. This leads to the second hypothesis, that is:

H2: The speed of adjustment is lower in same industry than cross industry M&A deals.

In the first two hypothesis the SOA of the financial leverage is tested across different M&A cases. For example, the BLEV is tested for non-cross border and cross border deals; similarly MLEV is compared for non-cross and cross border. This is extended to test the BLEV and MLEV adjustment rate for same versus cross industry M&A deals also. In the first two hypotheses, it is

argued that the SOA is slower toward target adjustment for non-cross border and same industry deals as compared to cross border and cross industry. On the other hand, the SOA literature argues that the MLEV has more strength and capture the monetary value not just the assets in place, while BLEV has limited association (Borio, 1990; Harford et al., 2009). Therefore, the SOA rate for the BLEV and MLEV for the same M&A deals would be different and would have a difference gap. In addition to the above hypotheses, the SOA for BLEV and MLEV is also compared for the same M&A deals. For example, the SOA difference of BLEV and MLEV is analyzed for non-cross border, cross border, same industry and cross industry M&A deals separately. The difference gap of BLEV and MLEV is compared between non-cross border and same industry as well as cross border and cross industry. Therefore, based on the discussion four different hypotheses are developed as follows:

H3: There exists a difference between SOA for BLEV and MLEV for non-cross border deals.

H4: There exists difference between SOA for BLEV and MLEV for cross border deals.

H5: There exist difference between SOA for BLEV and MLEV for same industry deals.

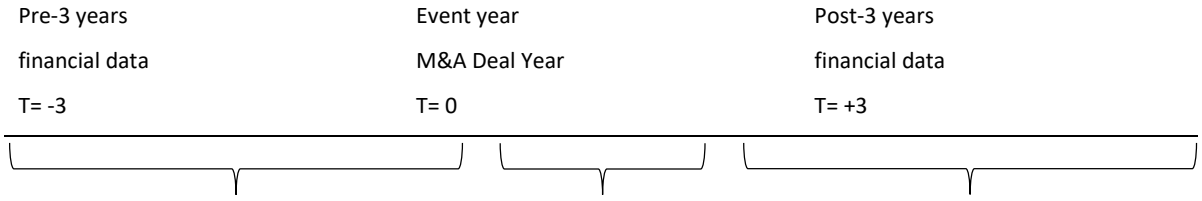
H6: There exist difference between SOA for BLEV and MLEV for cross industry deals.

3. SAMPLE DATA AND METHODOLOGY

Two types of data were required for this research; firstly, the M&A cases data and secondly, the financial data. The M&A cases data was taken from Securities Data Corporation (SDC), the sample period for the M&A was from 2003 to 2013. The financial data sample period starts from 2000 to 2016 because three year pre and post financial data is required for the analysis. When determining which M&A deal to include in the sample, the following were considered: i) the announcement date and effective date of the deal to be in the same year, and, ii) both the acquirer and target firms to be public non-financial firms. There were 19,140 M&A deals that satisfied these criteria. The financial data was collected from DataStream from Thomson One database. There were wide ranges of missing values and outliers, after cleaning the dataset, the M&A cases left totaled 6,520.

The total number of firm year observations is 45,640. For each firm 7 years of financial data is obtained; the event year, in which the deal took place and 3 years pre and post financial data as shown in Figure 1.

Figure 1: Classification of Data for the Study



3.1. Modeling the Speed of Adjustment toward Target Capital Structure

In a frictionless world, the firms would always be maintaining their target capital structure. However, in the real world, mostly different adjustment costs prevent the firms from adjusting to their target capital structures (Altinkilic and Hansen, 2000; Faulkender et al., 2012; Zhou et al., 2016). In the literature, different procedures are used to measure the incompleteness or partial adjustment toward target capital structure based on different methods (Rajan and Zingales, 1995; Hovakimian et al., 2001; Fama and French, 2002; Flannery and Rangan, 2006; Kayhan and Titman, 2007; Byoun, 2008; Öztekin and Flannery, 2012; Warr et al., 2012). The speed of adjustment model of the present study is constructed in two stages. In the first-stage the target capital structure is estimated, while in the second stage the speed of adjustment is estimated using the target capital structure that is estimated in the first stage. In this study, Flannery and Rangan (2006) SOA model is adopted where they use the market to debt ratio as their primary leverage measure. However, different than their study, in this study both book leverage (BLEV) and market leverage (MLEV) ratios are used as leverage measures.

The SOA model is explained in detail in this section. The standard model of speed of adjustment is provided in equation (1):

$$BLEV_{i,t+1} - BLEV_{i,t} = \lambda\left(BLEV^{*}_{i,t+1} - BLEV_{i,t}\right) + \varepsilon_{i,t+1} \quad (1)$$

where $BLEV_{i,t}$ and $BLEV_{i,t+1}$ are the firms debt to book value of total assets for firm *i* at time t and *t*+1, respectively. $BLEV_{i,t}$ is measured as shown in equation (2),

$$BLEV_{i,t} = \frac{(Long\text{-}term\ debt_{i,t} + Short\text{-}term\ debt_{i,t})}{Total\ assets_{i,t}} \quad (2)$$

In equation (1), the "λ" estimates the average speed of adjustment to the target level. Each year the firm closes the gap between the actual and the desired leverage level. The equation regresses the change in the actual debt to book value of total assets ratio ($BLEV_{i,t+1} - BLEV_{i,t}$) and the change in the expected debt to book value of total assets ratio ($BLEV^{*}_{i,t+1} - BLEV_{i,t}$). If the firms adjust their leverage to their target level completely the value of the coefficient λ will be 1. On the other hand, if the firm does not adjust its leverage level then the coefficient λ will be zero. The value of coefficient may also move above the value "1", if the firm moves above the target leverage level. In contrast, it will move below the value "0" if the firm diverts in the opposite direction from the target leverage value and lower than the pre-M&A leverage level.

Similarly, the speed of adjustment model for the market leverage is as follows.

$$MLEV_{i,t+1} - MLEV_{i,t} = \lambda\left(MLEV^{*}_{i,t+1} - MLEV_{i,t}\right) + \varepsilon_{i,t+1} \quad (3)$$

Where $MLEV_{i,t}$ and $MLEV_{i,t+1}$ are the firms market leverage for firm *i* at time t and *t*+1, respectively. $MLEV_{i,t}$ is measured as shown in equation (4),

$$MLEV = \frac{(Long\text{-}term\ debt_{i,t} + Short\text{-}term\ debt_{i,t})}{(\text{Total assets}_{i,t} - \text{Book equity}_{i,t} + \text{Market Value of Equity}_{i,t})} \quad (4)$$

In equation (3), the actual change in $MLEV$ from time *t* to *t*+1 is regressed with the difference between the target market leverage, $MLEV^{*}$, at time *t*+1 and market leverage, $MLEV$, at time *t*. The speed of adjustment is determined by the coefficient λ as explained above.

In both equations (1) and (3), the target book leverage, $BLEV^{*}$, and target market leverage $MLEV^{*}$, are estimated through equation 5 and 6, respectively:

$$BLEV^{*}_{i,t+1} = \beta X_{i,t} \quad (5)$$

and

$$MLEV^{*}_{i,t+1} = \beta X_{i,t} \quad (6)$$

where the $BLEV^{*}_{i,t+1}$ and $MLEV^{*}_{i,t+1}$ are the firms desired book and market debt ratios respectively for firm *i* at time *t*+1. On the other hand, in equations (5) and (6), the vector $X_{i,t}$ is a set of firm characteristics adapted from the previous studies of Flannery and Rangan (2006), Rajan and Zingales (1995), Hovakimian (2006), Hovakimian et al. (2001), Fama and French (2002), whereas β is the coefficient vector.

The construct and possible effects of the variables included in vector "X" are:

i. Profitability: Earnings before Interest and Taxes as a Proportion of Total Assets (EBIT_TA)

A proxy for profitability, the earnings before interest and taxes as a proportion of total assets (EBIT_TA) is used. This variable is calculated as shown in equation (7).

$$EBIT\_TA = \frac{\text{Operating Income + Interest and Related Expense + Current Income Taxes}}{\text{Total Assets}} \quad (7)$$

If the firms with high profitability, EBIT_TA ratio, prefer higher leverage to operate with relatively high cash flows, the firm might reflect and signal a stable financial status maintaining the ability to meet debt payments (Flannery & Rangan, 2006). On the other hand, if they prefer lower leverage, it might be a result of higher retained earnings which mechanically reduce the chance of taking debt (Asgharian, 1997).

ii. Growth Opportunities: Market to book ratio of assets (MB)

The market to book ratio of assets variable is a measure used to determine the growth opportunities of a firm (Hovakimian et al., 2004; Baker and Wurgler, 2002; Flannery & Rangan, 2006). It is calculated as in equation (8).

$$MB = \frac{\text{Long-term debt + Short-term debt + Preferred capital + Market Value of Equity}}{\text{Total assets}} \quad (8)$$

Higher market to book ratio sends a positive signal to the market that more attractive future growth options are awaiting. Mixed evidence regarding the relationship between growth opportunities and leverage are found in the literature (Myers, 1977; Rajan and Zingales, 1995; Mittoo and Zhang, 2008). Firms face difficulties to access new external financing during their earlier growth stages, therefore they are forced to use retained earnings. Also, high debt levels put the future profitable investment opportunities at risk and increase the bankruptcy costs. As discussed earlier, to provide a positive signal to the market, limiting leverage is a trend adopted by firms to portray a higher MB.

iii. Nondebt Tax Shield: Depreciation as a proportion of total assets (DEP_TA)

Following Fama and French (2002), the nondebt tax shield is proxied by DEP_TA which is calculated as in equation (9).

$$\text{DEP\_TA} = \frac{\text{Total Depreciation and Amortization}}{\text{Total assets}} \quad (9)$$

Depreciation expense also works as a substitute to interest for tax shield. If the level of depreciation expenses are high then it may reduce the need for debt finance to create a tax shield (Antoniou et al., 2008; Flannery & Rangan, 2006).

iv. Firm Size: Log of total assets (LnTA)

Firm size is measured by natural logarithm of total assets as shown in equation (10).

$$\text{LnTA} = Log\ Total\ assets \quad (10)$$

Larger firms having large amounts of total assets are assumed to be highly diversified with less volatile earnings, hence have low default risk and stable cash flows (Hovakimian et al., 2001). As a proxy of diversification and default risk, firm size is expected to have a positive relationship with leverage ratio (Rajan and Zingales, 1995; Flannery and Rangan, 2006).

v. Tangibility: Fixed assets as a proportion of total assets (FA_TA)

Tangibility is measured by the percentage of fixed assets in total assets as shown in equation (11).

$$\text{FA\_TA} = \frac{\text{Fixed assets}}{\text{Total assets}} \quad (11)$$

Firms with greater tangible assets possess a capacity for higher debt (Jensen and Meckling, 1976; Rajan and Zingales, 1995). Firms with more fixed assets are normally larger firms; hence the risk of bankruptcy is reduced (Hovakimian et al., 2001; Flannery and Rangan, 2006). In the event of bankruptcy, the tangible assets are easy to collateralize which lead to a smaller loss in value compared to intangible assets.

vi. Intangibility: Research and development expenses as a proportion of total assets (R&D_TA)

The intangible assets of the firm is measured by the R&D_TA variable, which is calculated as in equation (12).

$$\text{R\&}D\_TA = \frac{\text{Research and Development Expense}}{\text{Total assets}} \quad (12)$$

Firms with higher proportion of intangible assets in the form of R&D expenses will prefer to operate with more equity and thus a lower debt ratio (Flannery and Rangan, 2006). According to Uysal (2011:606) firms with higher R&D expenses tend to have higher growth opportunities and are expected to have low leverage. Bankruptcy cost is also expected to be higher for firms with high R&D expenses which also lower the chance of getting debt financing (Titman, 1984; Titman and Wessels, 1988).

Vii. Research and development dummy variable (R&D_DUM)

A dummy variable for the existence of R&D activities is included. The R&D_DUM variable takes a value equal to one for firms that have not reported any R&D expense and zero for firms that have reported R&D expense in their financial statements. In contrast, R&D_TA variable takes the value zero if the firm did not report any R&D expense (Flannery and Rangan, 2006). The reason of the dummy variable is to differentiate the firms that have not reported any R&D expense since these firms are likely

to have made no R&D expense. Firms with high R&D expense are expected to have less debt so firms having no R&D expense would be expected to have higher leverage. Thus, the dummy variable is expected to have a positive sign.

viii. Industry median (IND_MED) of debt ratio

The industry median debt ratio is included to capture the industry characteristics that may not be captured by other explanatory variables (Flannery and Rangan, 2006). In the literature, it is found that the level of target leverage ratio is dependent on the industries the firms operate in (Smith, Chen and Anderson, 2015; Stoja and Tucker, 2007). The classification of the industries was based on the Fama and French (1997) industry definitions.

In Table 1 the descriptive statistics of all variables are presented. There are 45,640 firm years' observations consisting of 6,520 non-financial acquiring firms and 7 years financial data.

Table 1: Descriptive statistics

Sample includes all nonfinancial acquiring firms with complete data starting from year 2000 to 2016. Each firm's 7 years of financial data is retrieved, Total: 6,520 firms and 45640 firm years Observations

	Mean	Median	Maximum	Minimum	Std. Dev.
BLEV	0.1644	0.1376	0.9137	0.0000	0.1528
MLEV	0.1199	0.0816	0.9136	0.0000	0.1304
EBIT_TA	0.0451	0.0708	4.1823	-17.0152	0.2826
MB	1.7666	1.1848	64.4936	0.0001	2.4319
DEP_TA	0.1505	0.1169	0.8926	0.0000	0.1224
LNTA	20.2208	20.1659	27.4051	11.4080	2.2776
FA_TA	0.3313	0.2747	0.9890	0.0001	0.2382
RD_TA	0.0259	0.0000	0.9484	0.0000	0.0634
RD_DUM	0.6384	1.0000	1.0000	0.0000	0.4805
IND_MED_BLEV	0.1568	0.1376	0.8578	0.0000	0.1337
IND_MED_MLEV	0.1130	0.0818	0.9136	0.0000	0.1158

4. EMPIRICAL FINDINGS

In this section the empirical findings are reported for both the cross border and cross industry M&A cases. In the first part of the empirical findings, the results of the analysis of the target book leverage (BLEV*) of both cross border and cross industry cases are discussed. While in the second part the target market leverage (MLEV*) results of cross border and cross industry cases are presented.

Table 2 displays the regression estimators for target book leverage (BLEV*) for both cross border and cross industry M&A cases. Column (1) presents the estimators for the non-cross border M&A, column (2) presents the cross border M&A, column (3) presents estimators for the same industry M&A and column (4) presents the cross industry M&A. The fixed effects regression model is suggested by Hausman test for all the four different M&A cases. The results show that EBIT_TA and DEP_TA variables are negatively significantly associated with the BLEV in all four cases. All the other variables are positively significantly related with BLEV except RD_TA dummy variable. The RD_TA variable is positively associated with BLEV in the cross border (column 3) M&A deals but the relationship is found to be statistically not significant. The magnitude of the coefficient of IND_MED is the highest compared to the other variables.

It shows that if 1 percent change appeared in IND_MED it will increase the BLEV by 83.60%, 89.65%, 83.95% and 86.68% in non-cross border, cross border, same industry and cross industry M&A, respectively. The F-statistic is significant and R square is 91.7% for non-cross border, 95.0% for cross border, 92.1% and 93.2% for same industry and cross industry respectively. The high R-square values may be due to the high number of firm year observations. High R-square values are also reported in similar SOA studies in literature (Cook and Tang, 2010).

Table 2: Target Capital Regression Estimators for BLEV* for Cross Borders and Cross Industry M&A Cases

The target book leverage (BLEV*) estimator are displayed here. The column (1) presents the BLEV* estimators for the non-cross border M&A, column (2) presents the cross border M&A, column (3) presents the BLEV* estimators for the same industry M&A and column (4) presents the cross industry M&A. The measurement of variables are (i) EBIT_TA=(Operating Income + Interest and related expense + Current Income Taxes)/(Total assets), (ii) MB=(Long-term debt +Short-term debt + Preferred capital + Market Value of Equity)/(Total assets), (iii) DEP_TA=(Total Depreciation and Amortization)/(Total assets), (iv) LnTA=Log Total assets, (v) FA_TA=(Fixed assets)/(Total assets), (vi) R&D_TA=(Research and Development Expense)/(Total assets), (vii) IND_MED: Industry median, (ix) R&D_DUM: Research and development dummy variable. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

	Non-cross border (1)	**Cross border (2)**	**Same Industry (3)**	**Cross Industry (4)**
INTERCEPT	-0.231*** (0.000)	-0.0786* (0.094)	-0.2348*** (0.000)	-0.1540*** (0.000)
EBIT_TA	-0.007** (0.022)	-0.0111** (0.026)	-0.0123** (0.019)	-0.0052* (0.081)
MB	0.001*** (0.000)	0.0005* (0.089)	0.0020*** (0.000)	0.0005* (0.078)
DEP_TA	-0.056*** (0.005)	-0.1517*** (0.000)	-0.0801*** (0.001)	-0.0839*** (0.000)
LNTA	0.012*** (0.000)	0.0049** (0.025)	0.0131*** (0.000)	0.0081*** (0.000)
FA_TA	0.054*** (0.000)	0.0722*** (0.000)	0.0389*** (0.003)	0.0751*** (0.000)
RD_TA	0.164*** (0.000)	0.026 (0.303)	0.1077*** (0.000)	0.1361*** (0.000)
IND_MED	0.8360*** (0.000)	0.8965*** (0.000)	0.8395*** (0.000)	0.8668*** (0.000)
RD_TA_DUM	0.005 (0.247)	-0.0014 (0.783)	0.0032 (0.570)	0.0035 (0.439)
Fixed effect	Yes	Yes	Yes	Yes
Observations	13095	6465	9042	10518
R-squared	0.917	0.950	0.921	0.932
F	22.025*** (0.000)	37.966*** (0.000)	23.482*** (0.000)	27.433*** (0.000)

Table 3 shows the estimators of target market leverage (MLEV*) for all the four types of M&A cases. The table exhibits that in all the four M&A cases the IND_MED has the highest positive significant association with MLEV. The MB has the lowest significant association with MLEV. The variable EBIT_TA, MB and DEP_TA are significantly negatively associated with MLEV in all the four cases. The RD_TA dummy and RD_TA variable coefficient are non-significant in all the cases except non-cross border M&A cases where RD_TA is significant at 10%. Three variables including LNTA, FA_TA and IND_MED are positively significantly associated with the dependent variable MLEV.

Table 3: Target Capital Regression Estimators for MLEV* for Cross Borders and Cross Industry M&A Cases

The target market leverage (MLEV*) estimator are displayed here. The column (1) presents the MLEV* estimators for the non-cross border M&A, column (2) presents the cross borders M&A, column (3) presents the MLEV* estimators for the same industry M&A and column (4) presents the cross industry M&A. The measurement of variables are (i) EBIT_TA=(Operating Income + Interest and related expense + Current Income Taxes)/(Total assets), (ii) MB=(Long-term debt +Short-term debt + Preferred capital + Market Value of Equity)/(Total assets), (iii) DEP_TA=(Total Depreciation and Amortization)/(Total assets), (iv) LnTA=Log Total assets, (v) FA_TA=(Fixed assets)/(Total assets), (vi) R&D_TA=(Research and Development Expense)/(Total assets), (vii) IND_MED: Industry median, (ix) R&D_DUM: Research and development dummy variable. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

	Non-cross borders (1)	**Cross borders (2)**	**Same Industry (3)**	**Cross Industry (4)**
INTERCEPT	-0.2785*** (0.000)	-0.1790*** (0.000)	-0.2727*** (0.000)	-0.2416*** (0.000)
EBIT_TA	-0.0075*** (0.002)	-0.0159*** (0.000)	-0.0184*** (0.000)	-0.0056** (0.015)
MB	-0.0011*** (0.000)	-0.0005** (0.036)	-0.0009*** (0.000)	-0.0011*** (0.000)
DEP_TA	-0.1162*** (0.000)	-0.0833*** (0.000)	-0.0783*** (0.000)	-0.1526*** (0.000)
LNTA	0.0155*** (0.000)	0.0100*** (0.000)	0.0155*** (0.000)	0.0130*** (0.000)
FA_TA	0.0608*** (0.000)	0.0320*** (0.004)	0.0222** (0.022)	0.0926*** (0.000)
RD_TA	0.0302* (0.053)	0.0008 (0.964)	0.0262 (0.155)	0.0141 (0.395)
IND_MED	0.8011*** (0.000)	0.8545*** (0.000)	0.8027*** (0.000)	0.8288*** (0.000)
RD_TA_DUM	-0.0005 (0.894)	-0.0034 (0.370)	-0.0007 (0.869)	-0.0024 (0.495)
Fixed effect	Yes	Yes	Yes	Yes
Observations	13095	6465	9042	10518
R-squared	0.923	0.946	0.925	0.934
F	24.018*** (0.000)	34.928*** (0.000)	24.672*** (0.000)	27.995*** (0.000)

In Table 4, the Speed of Adjustment for the book leverage (BLEV) is displayed for both cross border and cross industry M&A cases. The table shows that the speed of adjustment (SOA) for non-cross border M&A cases (33.79%) is lower than the cross border M&A cases (41.40%). On the other hand, the SOA in the same industry M&A cases (35.51%) compared to the cross industry M&A cases (36.35%) is almost the same. The cross industry M&A deals move almost 0.8% faster than the same industry M&A cases. All the values are significant at 1% level and R-square values are lower compared to the previous regression results because of the lower number of observations.

Table 4: Speed of Adjustment BLEV for Cross Border and Cross Industry M&A Cases

		Post 1st Year	Post 2nd Year	Post 3rd Year	Avg SOA per year	No. of Years
Non-cross border	Adj_speed	0.3864*** (0.000)	0.3426*** (0.000)	0.2848*** (0.000)	0.3379	2.9593
	Observations	4365	4365	4365		
	R-squared	0.274	0.243	0.189		
Cross border	Adj_speed	0.4303*** (0.000)	0.3978*** (0.000)	0.4140*** (0.000)	0.4140	2.4152
	Observations	2155	2155	2155		
	R-squared	0.349	0.291	0.314		
Same Industry	Adj_speed	0.3927*** (0.000)	0.3390*** (0.000)	0.3337*** (0.000)	0.3551	2.8161
	Observations	3014	3014	3014		
	R-squared	0.293	0.240	0.229		
Cross Industry	Adj_speed	0.4041*** (0.000)	0.3727*** (0.000)	0.3136*** (0.000)	0.3635	2.7513
	Observations	3506	3506	3506		
	R-squared	0.295	0.268	0.221		

It could also be observed in Figure-2 (a) and (b), that the average SOA line moves upward in part (a) and is a straight line in part (b). The total number of years for non-cross border M&A to adjust is 2.959 years while in cross border M&A cases it will take 2.415 years to adjust to its target BLEV*. In the case of same and cross industry M&A cases, the adjustment to target BLEV* is 2.816 years and 2.751 years, respectively.

Figure-2: Cross Border and Cross Industry Speed of Adjustment Graph

(a) Non-cross border and cross border, M&A BLEV* Graph

(b) Same and cross industry M&A, BLEV* Graph

(c) Non-cross border and cross border M&A, MLEV* Graph

(d) Same and cross industry M&A, MLEV* Graph

Table 5 shows the SOA for the MLEV for cross border and cross industry M&A cases. The average SOA is lower in the non-cross border than cross border M&A cases, which is 34.38% and 38.39% per year, respectively. In this regard, it will take approximately around 2.9 and 2.6 years to rebalance to the target capital structure for both non-cross border and cross border M&A cases, respectively.

Table 5: Speed of Adjustment MLEV for Cross Border and Cross Industry M&A Cases

		Post 1st Year	Post 2nd Year	Post 3rd Year	Avg SOA per year	No. of Years
Non-cross border	Adj_speed	0.3887*** (0.000)	0.3461*** (0.000)	0.2964*** (0.000)	0.3438	2.9090
	Observations	4365	4365	4365		
	R-squared	0.279	0.240	0.203		
Cross border	Adj_speed	0.4223*** (0.000)	0.3732*** (0.000)	0.3561*** (0.000)	0.3839	2.6051
	Observations	2155	2155	2155		
	R-squared	0.320	0.282	0.269		
Same Industry	Adj_speed	0.4142*** (0.000)	0.3394*** (0.000)	0.3115*** (0.000)	0.3550	2.8167
	Observations	3014	3014	3014		
	R-squared	0.308	0.246	0.212		
Cross Industry	Adj_speed	0.3795*** (0.000)	0.3663*** (0.000)	0.3144*** (0.000)	0.3534	2.8296
	Observations	3506	3506	3506		
	R-squared	0.270	0.258	0.229		

In the M&A deals of same industry and cross industry M&A, the difference between SOA is narrow. The same industry M&A firms adjust slightly faster than the cross industry M&A cases when MLEV is included in the model. The SOA is 35.50% for same industry M&A and they may adjust to target MLEV in 2.81 years. While in the cross industry M&A cases, the SOA is 35.34% and readjustment to target capital structure in 2.83 years. The results of MLEV speed of adjustment analysis are graphically presented in Figure-2, (c) and (d).

From Figure 2(c) it can be observed that the average SOA line have an upward movement from non-cross border to cross border M&A graph. There is almost 4% different in the average SOA between non-cross border and cross border M&A cases. While in part (d) for the same and cross industry M&A cases, the figure shows that SOA average move in a straight line from the same to cross industry M&A cases. The difference between the same industry and cross industry for MLEV is approximately 0.2%.

The findings of the study show support for the first hypothesis that the speed for cross border M&A is higher than the non-cross border M&A deals. This can be attributed to different countries having different legal and financial structures, which influence the SOA, as also argued by Oztekin and Flannery (2012). If the legal and financial structures are well established, the SOA will be high as compared to weak legal and financial structures. Additionally, literature shows that firms operating in countries having high growth rates of GDP per capita has high SOA rate (Mai et al., 2017). The findings of the present study, provide evidence that the cross border M&A deals have higher SOA rates compared to non-cross border M&A deals for both BLEV and MLEV. The reason for this finding can be that the acquiring firm's country may have strong legal and financial structure and better macroeconomic conditions. Hence, the findings of SOA toward target BLEV and MLEV support hypothesis-1 that the SOA is higher in cross border than non-cross border M&A cases.

Contrarily, the SOA analysis results for same industry and cross industry M&A cases do not provide supporting evidence to hypothesis 2. In the BLEV analysis, there is an approximately 0.8% difference in the SOA for same industry and cross industry M&A cases. The movement toward target BLEV* in cross industry M&A cases move slightly faster than same industry M&A deals. In contrast, for the MLEV analysis, the SOA of same industry is 0.2% higher than cross industry M&A cases. This shows that there is mixed results for SOA for the same and cross industry for BLEV and MLEV. Therefore, The second hypothesis that the speed of adjustment is lower in same industry than cross industry M&A deals, could not be accepted because the SOA is almost the same for both the same and cross industry M&A deals.

While comparing the SOA for BLEV and MLEV across the four M&A cases, it is observed that the SOA rate trend is almost the same for BLEV and MLEV in non-cross border and same industry M&A cases. For example, for non-cross border M&A cases the average SOA for BLEV is 33.79% as shown in Table 4, while MLEV is 34.38% as reported in Table 5, the difference is 0.59%. Similar average SOA pattern is seen for the same industry deals, where BLEV is 35.51% and MLEV is 35.50%, difference is 0.01%. This result shows that the gap between BLEV and MLEV in non-cross border and same industry M&A cases is narrow. In contrast the difference in cross border M&A cases is wider between BLEV and MLEV, in which the BLEV (41.40%) moves 3.01% faster toward target capital structure compared to MLEV (38.39%). On the other hand the gap between BLEV and MLEV in the cross industry M&A deals also wider. The BLEV adjustment speed is 36.35% while MLEV is 35.34%, indicating that the BLEV moves 1.01% faster than MLEV. The results indicate that hypothesis 3 and 5 could not be accepted while hypothesis 4 and 6 may be accepted.

In summary, firstly, the SOA rate for BLEV across the four different M&A cases was investigated, secondly, the MLEV SOA rate was analyzed, and finally both the BLEV and MLEV were compared across all four M&A cases. It was found that that the SOA rate for both BLEV and MLEV, non-cross border and cross border M&A cases had a difference in the speed of adjustment toward target capital structure. In contrast, the SOA rate, comparing the same and cross industry M&A cases, does not show much difference for BLEV and MLEV. Lastly, the SOA rate difference gap for BLEV and MLEV were almost the same in all M&A cases except for cross border where the BLEV moved slightly faster than MLEV toward target capital structure. Overall the average SOA rate for BLEV and MLEV are consistent with the findings of Cook and Tang (2010), Flannery and Rangan (2006) Leary and Roberts (2005) and Oztekin and Flannery (2012) studies which consider it as a fast speed of adjustment.

5. CONCLUSION

In this study, the capital structure and adjustment to target capital structure in cross border and cross industry M&A were investigated. The sample consisted of 6,520 M&A deals for the period of 2000 to 2016. The book leverage and market leverage were used in the analysis. The findings of the study support the arguments that in the cross border M&A deals, capital structures are adjusted faster than the non-cross border deals. While the same industry M&A deals and cross industry M&A deals experience almost the same SOA rate for both BLEV and MLEV. The findings of the study also illustrate that the SOA for the BLEV and MLEV for all the four different M&A cases remained almost the same. The study provided evidence that the firms adjust their capital structure toward their pre-M&A level in approximately 3 years.

As this study compared the SOA of cross border and cross industry M&A deals, many avenues for future research remain open in the area of SOA and M&A. For future research, it will be of special interest if the same and cross industry deals could be investigated for cross border M&A deals. This study contributed to the literature of SOA toward target capital in the area of M&A, which has not been explored before.

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FACTORS AFFECTING CAPITAL STRUCTURE CHOICE: NEW EVIDENCE FROM TURKISH NON-FINANCIAL LISTED COMPANIES

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ABSTRACT

Purpose - Factors affecting capital structure choices of Turkish non-financial listed companies are tested in this study. We investigate the relation between firm leverage and firm level variables, expected inflation and GDP growth rates.
Methodology - We used annual data of exchange listed non-financial corporations in addition to expected inflation and GDP growth rates. We applied panel regression models to our panel data set of 292 firms.
Findings - We found four factors, i.e. profitability, growth (MVA/BVA), tangibility and industry median leverage are effective in explaining capital structures of Turkish listed firms. While profitability and growth have signs in line with the prediction of the pecking order theory, signs of tangibility and industry median leverage favor the trade off theory. We also divided our sample into clusters based on firm size and 2000 – 2001 financial crisis and repeated the analysis.
Conclusion- Results of this analysis suggest that trade off theory explains better the financing behavior of large-sized firms. Pecking order theory seems to better account for financing behaviors of Turkish firms before 2002; and trade off theory seems to explain better their capital structure choices after the 2000 – 2001 financial crisis.

Keywords: Trade off theory, pecking order theory, firm leverage, non-financial firms, Turkey.
JEL Classification: C33, G32, G00

1. INTRODUCTION

Factors behind capital structure choices of companies have been investigated intensively since the seminal paper of Modigliani and Miller in 1958. Several theories have been proposed to account for the capital structure decisions of corporations. Trade off and pecking order theories are the most widely cited capital structure theories. Trade off theory argues that firms determine their capital structures at a point where tax shield benefits of additional debt and expected financial distress and bankruptcy costs are in equilibrium. Pecking order theory, which rests upon the asymmetric information hypothesis, asserts that firms prefer internally generated funds over external funds, issue debt first if external funds are necessary, and issue equity only as a last resort. This pecking order arises since issuing equity is viewed by outside investors as a pessimistic signal about the company's value.

These theories have been tested from many aspects in the literature. Relations between leverage and independent variables such as tangibility of assets, uniqueness of assets, marginal tax rates, taxable income, profits, firm size, firm growth, non-debt tax shields, volatility of earnings, industry median leverage, R&D, and advertising expenditures have been investigated in many studies. Although there is fair consensus about the factors affecting capital structure of firms, yet there isn't a single theory that can explain the motivations behind the capital structure decisions of corporations. Myers (2001) attributes this outcome to the conditionality of capital structure theories.

This study aims to contribute to the capital structure literature by utilizing firm level and macroeconomic data within the context of a developing country, Turkey. We investigate the role of firm specific factors and macroeconomic measures on the capital structure of listed non-financial Turkish firms. In other words, we estimate the relation between a firm's debt ratio and (1) firm-specific variables and (2) two macroeconomic measures. Our results are consistent with some elements of both the pecking order theory and the trade off theory of capital structure. Evolution of capital structure theories, literature review and analysis variables are provided in the second section. The third section includes data description, specifies the analysis method and provides analysis results. A fourth section summarizes the conclusions reached in the study.

2. CAPITAL STRUCTURE THEORIES AND ANALYSIS VARIABLES

2.1. Capital Structure Theories

Capital structure choice of firms is one of the most important issues in the corporate finance literature. Before 1958, the traditional approach was the predominant capital structure theory. The traditional approach asserts that there is an optimal capital structure of debt and equity which minimizes weighted average cost of capital and therefore maximizes firm value. This process is described as follows: As debt is a cheaper source, by increasing its weight, it is possible to decrease the weighted average cost of capital. Discounting expected future cash flows to debt and equity holders, by a lower weighted average cost of capital, increases firm value.

In 1958, Franco Modigliani and Merton Miller (hereafter MM) showed quantitatively that a firm's value is independent of its capital structure, in a world where there is no market imperfections like taxes and transaction costs. They showed that a firm's value is not affected by how it was financed; instead a firm's value is determined by the present value of the expected future cash flows that will be generated by its productive assets.

Since other researchers argued that firms pay taxes, MM revised their theory by adding taxes. In their second article, MM proposed that, as interest charges of debt are tax deductible and therefore provide a tax shield, leveraged firms' value must be higher than unleveraged firms' value as much as the present value of all future interest tax shields. In other words, they argued that a leveraged firm's value is equal to an identical unleveraged firm's value plus the present value of all future tax shields provided by interest of debt (Modigliani and Miller, 1963). However, this version of the MM's capital structure theory did not take into account the financial distress and bankruptcy costs caused by the heavy use of debt. Therefore, it was incomplete. These studies of MM constituted the base for the development of the modern capital structure theories, namely trade off and pecking order.

Trade off theory, derived upon the studies of MM, argues that firms determine their capital structures at a point where tax shield benefits from borrowing and costs of financial distress and bankruptcy are in equilibrium. In other words, the optimization of firms' financial structure involves a single period tradeoff between the tax advantage of debt and financial distress and bankruptcy costs (Kraus and Litzenberger, 1973). This standard version of the trade-off theory is referred to as the static trade-off theory.[1] There is also dynamic trade off theory which argues that target leverage is time-varying due to the fact that firm characteristics and market conditions vary over time (Fischer et al., 1989).

The trade off theory predicts moderate indebtedness for tax-paying firms. It predicts that target debt ratios vary from firm to firm. Companies with safe, tangible assets and plenty of taxable income to be shielded should have higher target debt ratios than companies with risky, intangible assets. Unprofitable companies with risky, intangible assets must rely on equity financing (Myers, 2001).

[1]In this paper, trade-off theory refers to the static trade-off theory.

Trade off theory successfully explains many industry differences in capital structure. For example, high-tech growth companies, whose assets are risky and mostly intangible, normally use little debt. Utility companies and retailers can and do borrow heavily because their assets are tangible and relatively safe. On the other hand, trade off theory cannot explain why some of the most successful companies grow with little debt. Although the trade off theory predicts that high profits should mean more debt-servicing capacity and more taxable income to shield, and therefore higher debt ratios, some very successful companies operate with very low debt ratios (Myers, 2001; Brealey et al., 2009).

Pecking order theory is proposed by Myers (1984) and Myers and Majluf (1984) to explain why profitable companies borrow less. Pecking order theory rests upon the asymmetric information hypothesis which argues that managers know more than outside investors about the profitability and prospects of a firm. Thus investors may not be able to assess the true value of a new issue of securities by the firm. They may be especially reluctant to buy newly issued common stocks, because they worry that the new shares will turn out to be overpriced. Since managers know their company's prospects better than outside investors do, they will be tempted to time stock issues when their companies' stocks are overpriced. On the other hand, if managers believe that their companies' stocks are underpriced, they will not issue equity, but will issue debt. As investors know these attitudes of managers, they interpret the announcement of a stock issue as a pessimistic signal about the company's value and reduce the stock price accordingly. Because of these signals sent by common stock and debt issues to financial markets, firms use their internal funds first when they need financing. If internal funds are not adequate, firms issue debt first and issue equity only as a last resort. This pecking order arises since an issue of debt is less likely than an issue of equity to be interpreted by outside investors as a bad signal (Myers, 1984; Myers, 2001).

The pecking order theory explains why the most profitable firms generally borrow less; it is not because they have low target debt ratios – according to pecking order theory they don't have a target debt ratio – but because they don't need outside money. Less profitable firms issue debt because they do not have sufficient internal funds for their capital investments and because debt is first in the pecking order for external financing (Myers, 2001; Brealey et al., 2009).

Many studies have focused on explaining capital structure decisions of corporations since the 1960s. There are plenty of studies in favor of both theories. Causes of these conflicting results may be accounted for as follows: There might be other motivations behind capital structure choices of corporations. For example, some companies prefer high debt ratios in order to discipline managers and not to let them waste free cash flow. Mature companies that do not have profitable investment opportunities may prefer higher debt ratios in order to pass excess cash to investors. On the other hand, growth companies may choose equity financing primarily as they have too much value to lose in case of a bankruptcy (Myers, 2001). Some studies testing trade off and pecking order theories are summarized below.

Bradley et al. (1984) used cross-sectional, firm-specific data of 851 US firms and tested the trade off theory applying regression of debt ratio against three proxy variables, namely volatility of earnings, non-debt tax shields, and advertising and R&D expenses. They found that volatility of firm earnings and the intensity of R&D and advertising expenditures were negatively related to leverage. These results showed that firms with high probability of financial distress stand away from debt which is consistent with the implications of trade off theory. On the other hand, contrary to theory, they also detected a positive strong relation between firm leverage and the amount of non-debt tax shields.

MacKie-Mason (1990) used primary seasoned offerings data of 1,747 US companies and approached the issue from tax shield benefit point of view of debt. He tested whether firms with low marginal tax rates were more likely to issue equity compared to more profitable firms facing full statutory tax rate. He classified firms with tax loss carry-forwards as firms with low marginal tax rates. On the other hand, firms with investment tax credits were described as firms with high marginal tax rates. His results provided strong and robust evidence that the marginal tax rate does affect financing decisions. He proved that firms with high marginal tax rates issue more debt which was consistent with the trade off theory.

Korajczyk and Levy (2003) estimated the relation between firms' debt ratios and firm-specific variables and macroeconomic conditions. They used the fitted values of this relation to estimate firms' target capital structures. They then investigated the relation between security issuances/repurchases, the deviation from target leverage, and both firm-specific and macroeconomic variables. They argue that the relation between firm-specific variables and target leverage is consistent with some elements of both the pecking order theory and the trade off theory of capital structure. They found that larger firms and firms with more tangible assets have higher leverage. On the other hand, they determined that firms with unique assets and firms with large depreciation tax-shields have lower leverage. They also identified that deviations from estimated target leverage explain firms' choice of security issuance. All of these findings are consistent with the trade off theory. However, they also detected a negative

relation between operating income and leverage and a negative relation between the macroeconomic variables and leverage, both of which are consistent with the pecking order theory.

Frank and Goyal (2009) utilized US publicly traded firm data from 1950 to 2003 andidentified six factors which are effective in explaining capital structures of firms. These factors are industry median leverage, tangibility of assets, profits, firm size, market-to-book assets ratio and expected inflation. Five of these factors were found in favor of trade off theory and one of them was in favor of pecking order theory. They argued that their empirical evidence seems consistent with the trade off theory of capital structure.

Shyam-Sunder and Myers (1999) developed a model to test pecking order theory. In their model, they described financing deficit of firms and they linked financing deficits with corporate debt. Then, they tested pecking order theory by utilizing data of 157 U.S. firms that had traded continuously over the period 1971 to 1989. Their results showed that external funding was dominated by debt. Therefore, they concluded that they found strong support for the pecking order theory.

Frank and Goyal (2003) tested pecking order theory on a cross-section of publicly traded US firms over the period 1971-1998. Their results revealed that financing deficits are followed by equity issues more closely than by debt issues. They argued that support for the pecking order theory has been declining because of the increasing number of publicly traded small firms, which do not follow pecking order, in 1980s and 1990s and decreasing support even from large firms for pecking order theory over time.

Tong and Green (2005) tested the pecking order and trade off theories using a cross-section of the largest Chinese listed companies. They set up three models in which trade off and pecking order theories give distinctively different predictions: (1) the determinants of leverage; (2) the relationship between leverage and dividends; and (3) the determinants of corporate investment. They found a significant negative correlation between leverage and profitability in model 1; a significant positive correlation between current leverage and past dividends in model 2, both of which supported the pecking order theory over trade off theory. However, their model 3 was inconclusive. Therefore, they argued that their results provide tentative support for the pecking order theory.

Chen et al. (2013) utilized panel data of publicly-traded Taiwanese firms to test the pecking order and the market timing theories over the period 1990–2005. They indicated that net equity issues track the financing deficit much more closely than net debt issues do. As this result is just opposite of what the pecking order theory argues, their results did not support the pecking order theory.

Gönenç (2003) examined the impact of profitability, asset tangibility, size, and growth opportunities on capital structure decisions of Turkish Industrial firms by including the data of 271 companies listed on the Istanbul Stock Exchange (ISE) for the period 1990 to 1999. His results identified a negative relation between profitability and leverage, which is consistent with the pecking order theory. On the other hand, he detected a positive relation between size, tangibility and leverage and a negative relation between growth opportunities and leverage, all of which are in favor of the trade off theory.

Sayılgan et al. (2006) analyzed the impact of firm specific characteristics on the corporate capital structure decisions of Turkish firms. They included 123 ISE listed manufacturing firms' data from 1993 to 2002. Their results showed that there was a positive relation between size and leverage and a negative relation between growth opportunities, non-debt tax shields and leverage, which are consistent with the trade off theory. On the other hand, their results revealed a negative relation between profitability, tangibility and leverage, which are in favor of the pecking order theory.

Korkmaz et al. (2007) analyzed the factors that affect capital structures of 37 İSE listed and small and medium sized manufacturing sector companies for the period 1997 – 2004. Their results revealed a negative relation between profitability and leverage, a positive relation between business risk, non-debt tax shields and leverage. The negative relation between profitability and leverage and the positive relation between business risk and leverage are consistent with the pecking order theory.

Demirhan (2009) analyzed the factors that are effective in the formation of capital structures of the service sector companies listed on the İSE. She included 20 companies' data for the period 2003 – 2006. Her results demonstrated a negative relation between profitability, growth, non-debt tax shields and leverage; a positive relation between size and leverage, all of which are consistent with the pecking order theory. Her results also revealed a negative relation between tangibility and leverage, which is in favor of trade off theory.

Yıldız et al. (2009) tested the validity of the capital structure theories for İSE listed companies. They utilized data of 138 manufacturing companies for the period 1998 – 2006. Their results showed a negative relation between profitability and leverage and a positive relation between growth and leverage, which are consistent with the pecking order theory. They also found a positive relation between size and leverage, which is in line with the trade off theory.

Gülşen and Ülkütaş (2012) analyzed the capital structure approach taken into account by industrial firms in formation of their capital structures. They used data of 143 corporations included in İSE Small and Medium Sized Enterprises' Industrial Index for the period 1990 to 2005. They detected a negative relation between profitability, size and leverage. Therefore, they concluded that their results were in line with the pecking order theory.

Bayrakdaroğlu et al. (2013) investigated determinants of capital structures of the Turkish listed companies. They included data of 243 ISE listed corporations for the period 2000 – 2009. They found a positive relation between size, tax rate and leverage; a negative relation between non-debt tax shields, gross domestic product (GDP) growth rate and leverage, all of which are consistent with the trade off theory. Their results also revealed a positive relation between growth opportunities and leverage; a negative relation between profitability, tangibility and leverage, all of which are in line with the pecking order theory. They argued that the pecking order theory was more successful in explaining capital structures of the Turkish listed companies than the trade off theory.

Köksal et al. (2013) investigated factors that are effective on capital structures of the Turkish non-financial firms. They utilized a large data set including both public and private companies from 1996 to 2009 which is compiled by Central Bank of the Republic of Turkey (CBRT). Their results showed that there was a negative relation between profitability and leverage, which is in accordance of the pecking order theory. They also detected a positive relation between firm size, tangibility, industry median leverage, and expected inflation and leverage; and a negative relation between business risk, GDP growth rate and leverage; all of which are in favor of the trade off theory. Based on these results, Köksal et al. (2013) concluded that the trade off theory was more successful in explaining capital structure decisions of Turkish non-financial firms than the pecking order theory.

Acaravcı (2014) investigated the determinants of capital structures of Turkish firms. She utilized data of 79 manufacturing sector firms listed on the İSE for the period 1993 to 2010. She detected a positive relation between growth opportunity and leverage. She also found a negative relation between profitability, size, tangibility and leverage, all of which are in favor of the pecking order theory.

Our study has two novelties over previous studies investigating factors affecting capital structures of Turkish firms. First, our study covers the broadest time period (1988 to 2013) among all the capital structure studies conducted on Turkish firms. Second, we included the highest number of firms' data (261) except Gönenç (2003) and Köksal et al. (2013). As Gönenç (2003) documents results from 1990 to 1999 period, our study provides findings from a more up-to-date data with a broader time span over Gönenç (2003). On the other hand, Köksal et al. (2013)'s data set has problems from two aspects: First, to our knowledge, this is the first study that investigates the factors affecting capital structures of firms by utilizing private firm data as well as public firm data. However, Myers (2001) argues that focusing on public, nonfinancial corporations with access to international capital markets is the right place to start for capital structure research. Thus, such a data set may also include data of firms that do not have access to public financial markets and there are doubts about this data set whether it is reflecting financing behaviors of unconstrained firms. Second, CBRT data are collected through questionnaires from both public and private corporations. Private companies are not required to have audited their financial statements. Therefore, reliability of this data set is low compared to published data of listed companies. Thus, since it covers the broadest time span in the literature and draws conclusions from a high number of listed firm data compiled from audited financial statements, our study is more representative of the Turkish non-financial listed corporations' sector than any other study.

2.2. Variables

Profitability: Trade off theory predicts a positive relation between profitability and leverage. As the probability of entering into financial distress is low for profitable firms and they have more taxable income to shield, profitable firms' debt ratio must be higher. Pecking order theory, on the other hand, estimates the reverse. Based on pecking order theory, firms try to finance investments with internal funds first. If internal funds are inadequate, they use debt financing in the second order. Therefore, pecking order theory estimates a negative relation between leverage and profitability and argues that profitable firms will be less leveraged in time because they will have more resources to invest (Titman and Wessels, 1988; De Jong et al., 2007; Frank and Goyal, 2009). Profitability is described as operating income divided by total assets.

Tangibility of assets: Trade off theory estimates a positive relation between tangibility of assets and indebtedness. Tangible assets are easy to collateralize and, relatively speaking, they keep their values even if the firm enters into financial distress. Thus, firms with more tangible assets can borrow easily. Therefore, based on the trade off theory, a positive relation is predicted between tangibility and leverage (Myers, 2001; Myers and Read, 2012). Pecking order theory anticipates the opposite. Tangibility of assets mitigates the informational asymmetry problem and therefore it makes equity issues less costly. Thus, firms with more tangible assets are expected to have lower leverage ratios (Harris and Raviv, 1991; Frank and Goyal, 2009). Tangibility is defined as the ratio of net fixed assets to total assets.

Firm size: Trade off theory predicts a positive relation between firm size and leverage. This is because large firms' assets are more diversified and large firms have better reputation in debt markets. Pecking order theory is interpreted as anticipating a negative relation between firm size and leverage. As large firms have been in operation for longer periods and they are well known, they can issue equity less costly than small firms. In addition, large firms have the opportunity to retain earnings. Therefore, based on pecking order theory, large firms are expected to have less leverage (Tong and Green, 2005; Frank and Goyal, 2009). Logarithm of total assets is taken to represent firm size.

Growth: A high percentage of growth firms' value comes from present value of growth opportunities. In other words, most assets of growth firms are intangible. Therefore, in case of financial distress, growth firms lose much more value than non-growth firms. Thus, trade off theory estimates a negative relation between firm growth and leverage. By contrast, pecking order theory argues that there is a positive relation between firm growth and indebtedness. This is because growth firms need more external financing and borrowing is in the first order among external financing sources. Köksal et al. (2013) and Schoubben and Van Hulle (2004) used percentage change in sales as a proxy for growth. We use market-to-book value of assets ratio (MVA/BVA) and change in logarithm of assets (△LNTA) to represent growth as in Frank and Goyal (2009).

Taxes and non-debt tax shields: Trade off theory assumes that firms will increase their borrowing as their marginal corporate tax rates increase. Some studies use marginal corporate tax rate as an explanatory variable for leverage (Frank and Goyal, 2009). Corporate tax rate is not progressive in Turkey and it is fixed at 20%. Therefore, we cannot use marginal tax rate as an explanatory variable for the Turkish case. Non-debt tax shields such as depreciation, R&D and advertising expenses are also proposed in the literature as substitutes to leverage to decrease tax payments by firms (DeAngelo and Masulis, 1980; Bradley et al., 1984; Titman and Wessels, 1988; Frank and Goyal, 2009). Therefore, trade off theory predicts a negative relation between non-debt tax shields and leverage. On the other hand, since pecking order theory approaches debt financing as an external capital source rather than as a tax shield vehicle, pecking order theory does not estimate any relation between non-debt tax shields and leverage. We included depreciation over total assets as a non-debt tax shield.

Risk: Firms with more volatile operating cash flows are riskier than others. Riskier firms have higher probability of falling into financial distress and their expected financial distress costs are high. Volatile cash flows also decrease the total tax shield benefits to firms. Based on the trade off theory, high risk firms should have less debt. In other words, trade off theory predicts a negative relation between risk and leverage. Pecking order theory assumes that firms with more volatile cash flows need more external capital. Debt is of the first order among external financing sources. Thus, pecking order theory anticipates a positive relation between risk and leverage. Frank and Goyal (2009) defined risk as the variance of annual stock returns. As macroeconomic and political issues are much more effective in stock price fluctuations in Turkey, we think variance of stock returns reflects macroeconomic risks rather than firm specific risks. Therefore, we defined business risk as standard deviation of operating income over total assets over the past three years (including the current year) as in De Jong et al. (2008) and Köksal et al. (2013).

Industry median leverage: It is well known that debt ratios exhibit differences from sector to sector. These industrial differences in leverage may stem from several factors. Firstly, managers may take industry debt ratio as a benchmark and they may even use industry debt ratios as their target debt ratios. Secondly, firms in the same industry face similar economic conditions. In other words, industrial differences in technology, competition, asset types, asymmetric information level and risk may cause firms of the same industry to have similar debt ratios (Frydenberg, 2004: 8). Bradley et al. (1984) found significant differences in capital structures of firms in different sectors. Trade off theory predicts a positive relation between industry median leverage and firm leveragesince firms in the same industry face many common forces. Pecking order theory, on the other hand, anticipates a rather indirect link between industry median leverage and firm leverage since the industry should only matter to the degree that it serves as a proxy for the firm's financing deficit (Frank and Goyal, 2009). We include industry median leverage as an explanatory variable.

Expected inflation: If expected inflation for future periods is higher than the current inflation rate, firms tend to issue more debt because higher expected inflation lowers the real cost of debt. In other words, since higher expected inflation increases future nominal interest rates, the present value of long term debts will be lower to firms. Trade off theory predicts a positive relation between expected inflation and leverage (Frank and Goyal, 2007). On the other hand, pecking order theory doesn't specify any relation between expected inflation and leverage. Expected inflation is taken as an explanatory variable for firm leverage.

Gross Domestic Product (GDP) growth rate: Economic growth positively affects most firms since firms' stock prices go up, expected bankruptcy costs go down, sales and taxable income goes up and cash increases during expansion periods. Collateral values of assets also increase during economic growth episodes. Therefore, according to trade off theory, firms are expected to borrow more during expansion periods because of the increased taxable income to shield and the high collateral value of assets. Thus, trade off theory anticipates a positive relation between GDP growth rate and leverage. By contrast, pecking order theory predicts a negative relation between GDP growth rate and leverage because firms have plenty of internal funds to invest during expansion periods and therefore they don't need external capital (Frank and Goyal, 2009). Real GDP growth rate is included as an explanatory variable.

3. DATA, METHODOLOGY AND RESULTS

3.1. Data and Model Specification

In this study, factors behind capital structure choices of Turkish listed non-financial companies are analyzed. More clearly, we investigate the relation between profitability, tangibility of assets, firm size, growth (MVA/BVA and △LNTA), non-debt tax shields, risk, industry median leverage, expected inflation and gross domestic product (GDP) growth rates and firm leverage. We used annual data of exchange listed non-financial corporations in addition to expected inflation and GDP growth rates. The data set for the selected firms were obtained from Finnet Limited Company, a financial data dissemination firm to both investors and researchers. The firms with missing data are excluded. The data set consists of yearly observations of 261 firms for the period 1988 – 2013. GDP growth rates are taken from World Bank database. CBRT has been disseminating expected inflation data since August 2001. Therefore, expected consumer price index (CPI) annual inflation data are taken from the CBRT data base for the 2001 to 2013 period. We took actual consumer price index inflation as a proxy for the previous years' expected inflation for the period 1988 to 2000. These actual CPI inflation data are taken from the Turkish Statistical Institute (Turkish Statistical Institute Website).

The dependent variable in our study is leverage. We included 3 different versions of leverage, namely short term debt to total assets ratio (STDTA), long term debt to total assets ratio (LTDTA) and total debt to total assets ratio (TDTA). The independent variables that are expected to have a relation with debt ratios are carefully chosen based on the previous literature. The independent variables in our estimation are profitability, tangibility, size, two measures of growth (MVA/BVA and △LNTA), non-debt tax shields, risk, industry median leverage, inflation, and GDP growth rate.

Table 1 provides formulas of dependent and independent variables as well as predictions of trade off and pecking order theories about the direction of association between leverage and independent variables.

3.2. Descriptive Statistics

Descriptive statistics for variables are presented in Table 2. The number of firms included in the analysis is 261 for the period from 1988 to 2013 with an unbalanced data set. The average short-term debt ratio is almost two times the average long-term debt ratio. This attribute shows the negative effect of the high (double digit) inflationary period on long-term borrowing ability of firms that lasted until 2004. The median leverage is below the mean leverage for all three measures of leverage. There is a large cross-sectional difference so that the minimum total debt ratio is 0 while the maximum total debt ratio is 7.24. Minimum and maximum short-term debt ranges are also the same for the total debt range, meaning that the firm with the highest short-term debt hasn't any long term debt. Moreover, the market value to book value of assets ratio has the highest standard deviation.

The correlation results for variables are given in Table 3. Significant correlations at the 5% level were signed in the table. There is a negative and significant correlation between profitability and all measures of leverage, i.e. short-term, long-term and total debt ratios. A negative and significant correlation is found between tangibility and short-term leverage, but a positive and significant correlation is found between tangibility and long-term leverage, which means that firms with more tangible assets can and do borrow on a long-term basis by pledging their tangible assets instead of short-term. There is a positive and significant correlation between size and both long-term and total leverage, which shows that big companies can borrow on long-

term. A negative and significant correlation exists between growth (**Δ**LNTA)and all leverage measures, which indicates that growing companies borrow less. There is a negative and significant correlation between business risk and long-term leverage. A negative and significant relation is found between expected inflation and long-term and total leverage. There is a negative and significant correlation between GDP growth rate and short-term and total leverage. A positive and significant correlation is found between all measures of industry median leverage and all measures of leverage. There is no significant correlation between non-debt tax shield and leverage.

Moreover, there is no significant correlation between market value of assets to book value of assets and leverage.

In connection with discussions in the previous section, we propose an estimation model for leverage as follows, where the selected variables are expected to have a relation with the debt ratio:

$$L_{it} = \alpha_0 + \sum_k \beta_k X_{kit} + \mu_i + u_{it}$$

Where L_{it} is one of the three debt measures (short-term debt = STDTA, long-term debt = LTDTA or total debt = TDTA) of firm i in year t; X is the vector of the leverage factors (profitability, tangibility, size, two measures of growth, non-debt tax shields, risk, inflation, GDP growth rate and industry median leverage); μ_i are the time-invariant unobservable firm-specific effects; and u_{it} is the error term.

Table 1: Variable Definitions and Hypotheses

Debt Ratios	**Definition**	**Pecking Order**	**Trade off**
Short-term Leverage	Short-term Debt / Total Assets (STDTA)	N/A	N/A
Long-term Leverage	Long-term Debt / Total Assets (LTDTA)	N/A	N/A
Total Leverage	Total Debt / Total Assets (TDTA)	N/A	N/A
Explanatory Variables			
Profitability	Net Operating Profit / Total Assets (NOP/TA)	-	+
Tangibility	Net Fixed Assets / Total Assets (NFA/TA)	-	+
Size	Natural Logarithm of Total Assets (LnTA)	-	+
Growth1	Change in Natural Logarithm of Total Assets (△LnTA)	+	-
Growth2	Market Value of Assets / Book Value of Assets (MVA/BVA)	+	-
Non-debt Tax Shields	Depreciation / Total Assets (Dep/TA)	?	-
Risk	Standard Deviation of Net Operating Profit / Total Assets (σNOP/TA)	+	-
Expected Inflation	Annual Consumer Price Index Expected Inflation (ExpInf)	?	+
GDP Growth Rate	Percentage Change in Real GDP (GDPGr)	-	+
Industry Median Short-term Leverage	Industry Median Short-term Debt / Total Assets (IndMedSTDTA)	?	+
Industry Median Long-term Leverage	Industry Median Long-term Debt / Total Assets (IndMedLTDTA)	?	+

Industry Median Total Leverage	Industry Median Total Debt / Total Assets (IndMedTDTA)	?	+

STDTAit is the ratio of short-term debt tototal assets of firm i at time t, profitability is net operating profit over total assets (NOP/TA), tangibility is net fixed assets to total assets (NFA/TA), size is the logarithm of total assets (LNTA), one of the two growth measures is the change in logarithm of total assets (ΔLNTA), the other growth measure is market value of assets over book value of assets (MVA/BVA), depreciation over total assets is taken as non-debt tax shield (Dep/TA), risk is taken as the standard deviation of net operating profit to total assets in the last three years (including current year; σNOP/TA), expected annual CPI inflation is taken as expected inflation (ExpInf), GDP growth rate is the annual percentage change in real GDP of Turkey (GDPGr), and the three industry median leverage measures are the median leverage of short term-debt to total assets, long-term debt to total assets and total debt to total assets (IndMedSTDTA, IndMedLTDTA, IndMedTDTA) for 3 leverage equations, respectively. We estimate the above equations using standard errors that are robust to heteroskedasticity and serial correlation.

Table 2: Descriptive Statistics of Variables in the Study

Variable	Obs	Mean	Std. Dev.	Min	Max
STDTA	4022	0.1424	0.2363	0.0000	7.2370
LTDTA	4022	0.0847	0.1644	0.0000	2.7241
TDTA	4022	0.2271	0.3055	0.0000	7.2370
NOPTA	4022	0.0939	0.1384	-1.0596	0.9096
NFATA	4022	0.3465	0.2064	0.0000	0.9869
LnTA	4022	17.6563	2.6005	9.0058	23.9580
DLnTA	3972	0.3079	0.3516	-1.2455	3.2622
DepTA	4022	0.0457	0.2755	-0.0121	12.0069
SDNOPTA	3513	0.0568	0.0527	0.0004	0.6528
ExpInf	4022	31.9521	32.7631	5.8300	125.5000
GDPGr	4022	4.1771	4.5926	-5.7000	9.4000
MVABVA	4022	2.5989	80.1736	0.0003	5084.7050
IndMedTDTA	4022	0.1700	0.0549	0.0541	0.4210
IndMedSTDTA	4022	0.0909	0.0392	0.0080	0.1762
IndMedLTDTA	4022	0.0235	0.0174	0.0000	0.1119

The panel data estimation is employed in the study to capture the dynamic behavior of the parametersand to provide more efficient estimation and information of the parameters. The ordinary least square method can provide consistent and efficient estimates of α and β. In practice, the advantage of panel data is that they allow us to test some of the assumptions and allow for greater flexibility in modeling differences in behavior across firms (Ho. C. H, 2004). The panel data model includes three different methods: (a) Common constant, (b) Fixed effects, and (c) Random effects. The Common constant method (also called pooled OLS method) of estimation presents results under the principal assumption that there are no differences among the data matrices of the cross sectional dimension (N). In other words, the model estimates a Common constant for all Cross-sections (Common constant for firms). Practically, the Common constant method implies that there are no differences between the estimated cross-sections and it is useful under the hypothesis that the data set is a priori homogeneous. However, this case is quite restrictive and a case of more interest involves the inclusion of Fixed and Random effects in the method of estimation (Asterious, 2006). The Fixed effects method treats the constant as group specific, i.e. it allows for different constants for each group. The Fixed effects, also called the Least Squares Dummy Variables (LSDV) estimators, because it allows for different constants for each group and it includes a dummy variable for each group. The Random effects method is an alternative method of estimation which handles the constants for each section as random parameters rather than fixed. One obvious disadvantage of the Random effects approach is that one needs to make specific assumptions about the distribution of the random component. Also, if the unobserved group-specific effects are correlated with the explanatory variable, then the estimates will

be biased and inconsistent. Thus the use of the Random effects method in the estimation requires a lot of care and must be employed only if it is necessary and meaningful in comparison to the Fixed effects method. Generally in the panel data analysis, the Fixed effects model assumes that each firm differs in its intercept term, whereas the Random effects model assumes that each firm differs in its error term. In this study we apply the Fixed effect method.

Table 3: Correlation of Variables in the Study

	TDTA	STDTA	LTDTA	NOPTA	NFATA	LNTA	ΔLNTA	DepTA	SDNOPTA	ExpInf	GDPGr	MVABVA	IndMed TDTA	IndMed STDTA	IndMed LTDTA
TDTA	1														
STDTA	0.8460*	1													
LTDTA	0.6423*	0.1348*	1												
NOPTA	-0.1549*	-0.0976*	-0.1475*	1											
NFATA	0.0250	-0.0715*	0.1493*	-0.2176*	1										
LNTA	0.0536*	-0.0212	0.1301*	-0.2930*	0.0673*	1									
ΔLNTA	-0.0845*	-0.0638*	-0.0656*	0.4048*	-0.0582*	-0.3554*	1								
DepTA	0.0092	0.0162	-0.0063	-0.0331*	0.0404*	0.0434*	-0.0065	1							
SDNOPTA	0.0398*	0.0667*	-0.0220	0.2894*	-0.1583*	-0.3595*	0.1214*	-0.0174	1						
ExpInf	-0.0477*	-0.0013	-0.0868*	0.4601*	-0.0588*	-0.7105*	0.5608*	-0.0397*	0.2996*	1					
GDPGr	-0.0558*	-0.0692*	-0.0043	-0.0319*	0.0409*	0.0478*	-0.0213	-0.0006	-0.0709*	-0.037*	1				
MVABVA	-0.0101	-0.0076	-0.0079	-0.0077	-0.0286	0.0084	-0.0143	-0.0007	0.1598*	-0.0102	-0.0298	1			
IndMedTDTA	0.1519*	0.1712*	0.0362*	-0.0382*	-0.0147	0.0752*	-0.0722*	0.0312*	-0.0665*	-0.0239	-0.3455*	0.0092	1		
IndMedSTDTA	0.1352*	0.1730*	0.0025	-0.0020	-0.0245	0.0235	0.0007	0.0267	-0.0381*	0.0799*	-0.3913*	0.0035	0.9054*	1	
IndMedLTDTA	0.0583*	0.0303	0.0649*	-0.0552*	-0.0083	0.0121	-0.2934*	-0.0365*	-0.1551*	-0.2308*	-0.0157	0.0122	0.3983*	0.1904*	1

* denote significance at 5 percent level

4. EMPIRICAL RESULTS

We estimate panel data analysis by the Fixed effects method for the selected study period for short-term debt (STDTA), long-term debt (LTDTA) and total debt (TDTA) ratios. The robustness of parameter coefficients are used to explain the relationship between debt ratios and the selected independent variables. The estimation results are given in Table 4. We summarize and interpret these results in light of the theory and the previous findings as follows:

Profitability is negatively and significantly associated with all three leverage ratios at 1 percent level, which shows that firms with more profits borrow less. This result is in line with the empirical evidence found in almost all of the previous studies, such as, among others, Korajczyk and Levy (2003), Tong and Green (2005) and Köksal et al. (2013). One of the growth measures, namely market value to book value of assets (MVA/BVA), has a positive and significant relation with both short-term leverage and total leverage ratios at 1 percent level, which suggests that growing firms had to use more short-term debt in their capital structures especially because of the high inflation in Turkey during the analysis period. This finding is parallel to the results of Yıldız et al. (2009) and Bayrakdaroğlu et al. (2013). These findings on profitability and growth are consistent with the prediction of the pecking order theory.

There is a positive and significant association between industry median leverage and short-term and total leverage measures at the 1 percent level, which means that firms try to approximate their debt ratios to their sector's median leverage. This finding on industry median leverage is consistent with the empirical evidence found in Frank and Goyal (2009) and Köksal et al. (2013). Tangibility has a positive and significant relation with long-term leverage at the 1 percent level and total indebtedness at the 5 percent level. This outcome indicates that firms with more tangible assets can pledge these tangible assets and borrow in long-term rather than short-term. Gönenç (2003), Frank and Goyal (2009) and Köksal et al. (2013) also found a positive association between tangibility and leverage. These results on industry median leverage and tangibility are in favor of the trade off theory.

Our analysis results also revealed that there is no significant relationship between other variables; namely size, growth (ΔLNTA), non-debt tax shields, risk, expected inflation and GDP growth rate, and all three leverage measures.

A robustness check to validate the above results is presented in this part. We divide the firms into three equal clusters by value of total assets and run the fixed effects model for two different groups which contain the smallest and largest firms. Table 5 presents the results of the analysis done for STDTA, LTDTA and TDTA for these small and large-sized firms. As can be seen in Figure 1, short term debts are more than long term debts on average in both groups. But the weight of short term debts in total debts is more in small firms than in large firms.

Results of the analysis for these small and large-sized firm groups are summarized and interpreted below. Firstly, findings of leverage determinants for small firms are provided. Profitability is negatively associated with all three leverage ratios at the 1 percent significance level for small firms, which shows that small firms with more profits borrow less. Small firms' growth (ΔLNTA) is positively associated with long-term debt ratio at the 1 percent significance level, which is an indication of the fact that growing small firms can and do use long-term debt finance. These results on profitability and growth support the pecking order theory.

On the other hand, there is a positive relation between industry median leverage and all three leverage measures at the 1 percent significance level for small firms, which prove that small firms try to approach their indebtedness to their sector's average debt ratio. Tangibility has a positive association with long-term indebtedness at the 1 percent significance level for small firms, i.e. small firms that have more tangible assets can borrow for longer terms. These findings on industry median leverage and tangibility are in accordance with the predictions of the trade off theory.

As a result, one can conclude that small firms in Turkey firstly use their profits for expansion, take into account their sector's indebtedness rate when utilizing debt finance in both short and long maturities, and can borrow on longer terms, if they are high growth firms and have tangible assets.

Secondly, analysis results for variables which have a significant association with leverage measures of large-sized firms are presented and explained below. The coefficient of profitability is negative and significant at the 1 percent level for short-term and total debt ratios and at the 5 percent level for long-term debt ratio for large firms. This outcome proves that large firms with more profits also borrow less. This finding on profitability is in favor of the pecking order theory.

There is a positive and significant relationship between tangibility and long-term and total debt measures at the 1 percent level. This result demonstrates that large firms with tangible assets can and do also borrow on long-term basis by pledging their tangible assets. Size affects all three leverage measures positively and at the 1 percent significance level. This outcome suggests that size is treated as a proxy for safety and therefore large-sized firms can borrow more on both short and long-term basis. Our finding on size is also consistent with the results reached by Gönenç (2003), Sayılgan et al. (2006), Demirhan (2009), Yıldız et al. (2009), Bayrakdaroglu (2013) and Köksal et al. (2013).

Expected inflation affects all leverage measures positively and significantly. This relation is significant at the 1 percent level for long-term and total leverage ratios and at the 5 percent level for short-term leverage ratio. This result indicates that when future inflation is predicted to be high, large firms borrow more on all maturities. Growth (MVA/BVA) negatively and significantly affects short-term debt ratio of large firms at the 5 percent level, which shows that large growth firms decrease their short-term indebtedness in order to decrease risk of losing value in case of financial distress. There is a positive and significant association between industryMedian leverage and short-term and total debt ratios at the 1 percent level. This finding shows that large firms also try to approximate their leverage ratios to their sectors' debt ratios. All these findings on tangibility, size, expected inflation, growth and industry median leverage are in favor of the trade off theory.

Table 4: Determinants of Leverage: Panel Data Estimation results based on Fixed Effects (FE) Models

	STDTA	LTDTA	TDTA
NOP/TA	-0.19***	-0.09***	-0.275***
	(-5.15)	(-3.58)	(-7.40)
NFA/TA	-0.03	0.09***	0.061*
	(0.97)	(4.75)	(2.1)
LNTA	0	0	-0.001
	(-1.14)	(-1.25)	(-0.32)
ΔLNTA	-0.02	0.01	-0.017
	(-1.85)	(-0.77)	(-1.34)
Dep/TA	0.01	0	0.01
	(1.21)	(-0.53)	(0.86)
σNOP/TA	0.11	0	0.11
	(1.4)	(-0.04)	(1.36)
ExpInf	0	0	0
	(1.31)	(0.14)	(1.21)
GDPGr	0	0	-0.001
	(-0.53)	(-0.27)	(-0.70)
MVA/BVA	0.01***	0	0.007***
	(3.32)	(0.94)	(2.68)
IndMed	0.63***	0.1	0.729***
	(6.88)	(1.66)	(7.89)
Cons	0.12	-0.01	0.113
	(1.72)	(-0.14)	(1.61)
	F(10,3503)=13.23 Prob>F=0 R-sqr=0.075 Num Obs = 3512 Num Grps = 239	F(10,3263)=8.1 Prob>F=0 R-sqr=0.069 Num Obs =3512 Num Grps = 239	F(10,3263)=19.01, Prob>F=0, R-sqr=0.055, Num Obs = 3512, Num Grps = 239

** p<0.05, ** p<0.01, *** p<0.001, t-values are in the parenthesis*

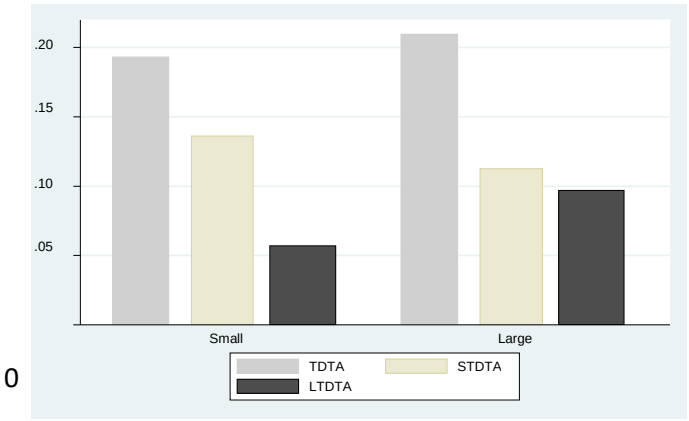
Thus, it can be proposed that large firms use their profits first for investments, borrow more in all maturities if they are relatively large and if they predict inflation to increase, borrow on long-term if they have tangible assets, and try to approximate their especially short-term and total indebtedness to their sector's average debt ratios. In addition to the fact that small firms cannot benefit from their limited size as collateral for borrowing, there are two differences between small and large sized firms: Small growing firms borrow more on long-term and large firms increase their indebtedness in all maturities, if expected inflation is high. Based on these outcomes, we can conclude that the trade off theory explains financing behavior of large-sized firms better than the pecking order theory.

Table 5: Determinants of Leverage: Panel Data Estimation Results based on Fixed Effects (FE) Models for Small and Large Firms

	STDTA		**LTDTA**		**TDTA**	
	small	**large**	**small**	**large**	**small**	**large**
NOP/TA	-2.14***	-0.196***	-0.087***	-0.085*	-.299***	-.281***
	(-4.69)	(-5.71)	(-3.31)	(-2.52)	(-6.52)	(-6.41)
NFA/TA	-0.0738	-0.0282	0.081***	0.131***	0.016	0.102***
	(-1.76)	(-0.99)	(3.39)	(4.66)	(0.37)	(2.81)
LNTA	-0.0043	0.0226***	0.0015	0.0542***	-0.006	0.075***
	(-1.02)	(3.5)	(0.62)	(8.7)	(-1.53)	(8.8)
ΔLNTA	-0.022	0.0099	0.027**	0.011	0.006	0.018
	(-1.27)	(1.13)	(2.70)	(1.21)	(0.33)	(1.58)
Dep/TA	0.0361	-0.175	0.023	-0.068)	0.019	-0.273
	(0.26)	(-1.35)	(0.31)	(-0.53)	(0.13)	(-1.65)
σNOP/TA	0.0549	0.106	-0.068	0.035	0.011	0.135
	(0.59)	(1.26)	(-1.30)	(0.42)	(0.11)	(1.25)
ExpInf	0.0001	0.0010*	0.0000	0.0019***	0	0.003***
	(0.48)	(2.32)	(0.20)	(5.51)	(0.5)	(5.16)
GDPGr	-0.00125	0.0001	0.0004	0.000	-0.001	0
	(-1.21)	(0.23)	(0.89)	(0.05)	(-0.52)	(-0.57)
MVA/BVA	-0.0002	-0.0060*	-0.0002	0.0016	0	-0.004
	(-0.09)	(-2.02)	(-0.16)	(0.56)	(-0.07)	(-1.07)
IndMed	0.442**	0.438**	0.81**	0.372	0.535***	0.399***
	(2.84)	(3.1)	(2.84)	(1.89)	(4.43)	(3.6)
Cons	0.218***	-0.361**	-0.007	-1.07***	0.227***	-1.416***
	(3.24)	(-2.73)	(-0.17)	(-8.23)	(3.32)	(-8.23)
r2	0.069	0.083	0.055	0.119	0.09	0.184
N	1003	1280	1003	1280	1003	1280

** p<0.05, ** p<0.01, *** p<0.001, t-values are in the parenthesis*

Figure 1: Average Leverage Ratios of Small and Large Firms



Turkey had a very severe financial crisis at the end of 2000 and at the beginning of 2001. In order to test whether there is any difference in factors and their signs affecting capital structures of Turkish listed companies, we divided our data set into two sub groups, 1988 to 2001 and 2002 to 2013, and repeated our analysis. Analysis results are given in Table 6. As can be seen in Figure 2, all average debt measures have increased after 2001. However, as long term debts ratio has increased more than short term debts ratio, weight of long term debts has increased in total indebtedness after 2001.

Analysis results about the factors affecting firm leverage before 2002 are told below: There is a negative and significant relation at the 1 percent level between profitability and all three leverage ratios, which shows that firms had been using their internally generated profits first for investments and therefore borrowing less, if profits were high before 2002. We also detected a positive and significant relation between business risk and all three debt ratios at the 1 percent level, which reveals that risky firms had been closing their financing gap with debt capital before 2002. This outcome is consistent with the result of Korkmaz et al. (2007). Growth (△LNTA) affected long-term indebtedness of firms positively and significantly at the 1 percent level, which shows that growing companies financed their funding needs with debt capital before 2002. There is a negative and significant relation between GDP growth rate and short-term leverage at the 5 percent level, which indicates that companies tend to decrease their short-term indebtedness during economic growth periods since they use their internally generated funds or borrow on long-term in good economic prospects. Two studies conducted on Turkish firms recently also found the same association between GDP growth rate and leverage, namely Bayrakdaroğlu et al. (2013) and Köksal et al. (2013). All these findings on profitability, risk, growth, and GDP growth rate are in line with the pecking order theory.

A positive and significant relation at 1 percent level between tangibility and long-term and total debt measures was identified in the analysis. This indicates that firms could have been borrowing on long-term if they had tangible assets before 2002. Lastly, there is a positive and significant association at the 1 percent level between industry median leverage and long-term and total debt ratios. This finding shows that companies had been trying to approximate their long-term debt ratios to their sectors' leverage ratios before 2002. These results on tangibility and industry median leverage are in line with the predictions of the trade off theory. As most of the explanatory variables had sings in accordance with the pecking order theory, one can conclude that firms had been following the pecking order theory in forming their capital structures before 2002 in Turkey.

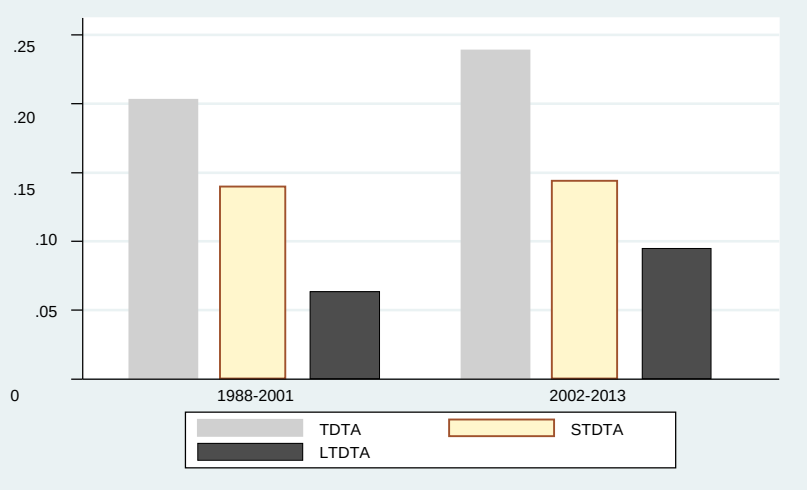
When we look at analysis' results for the factors affecting capital structure choices of firms for the period 2002 – 2013, we can draw the following conclusions: There is a negative and significant relationship at the 1 percent level between profitability and all three leverage ratios, which shows that firms have been still using their internally generated profits first for investments and therefore borrowing less if profits are high. Risk positively and significantly affects long-term debt ratio at the 5 percent level, which indicates that high risk firms borrow more on long-term. There is a positive and significant relation between growth (MVA/BVA) and short-term and total leverage ratios at the 1 percent level, which indicates that growth companies can increase their short-term and total indebtedness in the period after 2001. These findings on profitability, risk and growth supports the pecking order theory.

Table 6: Determinants of Leverage: Panel Data Estimation Results based on Fixed Effects (FE) Models for Two Periods, before 2002 and after 2002

	STDTA		LTDTA		TDTA	
	<=2001	>=2002	<=2001	>=2002	<=2001	>=2002
NOPTA	-0.509***	-0.219***	-0.248***	-0.166***	-0.748***	-0.376***
	(0.04)	(0.06)	(0.03)	(0.03)	(0.05)	(0.05)
NFA/TA	-0.009	0.001	0.211***	0.034	0.209***	0.009
	(0.04)	(0.04)	(0.03)	(0.02)	(0.05)	(0.03)
LNTA	-0.001	0.010	0.004	0.039***	-0.006	0.062***
	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)
△LNTA	-0.024	-0.017	0.035**	-0.004	0.021	-0.032*
	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
Dep/TA	-0.073	0.012	-0.075	-0.002	-0.188	0.009
	(0.11)	(0.01)	(0.08)	(0.01)	(0.15)	(0.01)
σNOP/TA	0.790***	-0.071	0.270***	0.163*	1.089***	0.080
	(0.08)	(0.13)	(0.05)	(0.08)	(0.10)	(0.10)
ExpInf	-0.000	0.004**	0.000	0.004***	0.000	0.008***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDPGr	-0.002*	0.000	-0.001	0.000	-0.002	-0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
MVA/BVA	0.002	0.033***	0.002	-0.003	0.004	0.033***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
IndMed	0.214	1.256***	1.115***	0.723**	0.619***	0.515***
	(0.15)	(0.27)	(0.31)	(0.23)	(0.14)	(0.13)
Cons	0.203***	-0.203	-0.084*	-0.710***	0.137*	-1.119***
	(0.05)	(0.23)	(0.04)	(0.13)	(0.07)	(0.18)
r2	0.24	0.05	0.15	0.04	0.28	0.11
N	1151	2361	1151	2361	1151	2361

** p<0.05, ** p<0.01, *** p<0.001, std errors are in the parenthesis*

Figure 2: Average Leverage Ratios before 2000 and after 2001



We detected a positive and significant relation between size and long-term and total leverage ratios at the 1 percent level, which indicates that large-sized companies are viewed as safer and therefore they can borrow more accordingly. The other growth measure (ΔLNTA) negatively and significantly affects total debt ratio at the 5 percent level. This outcome indicates that firms finance their investments to assets from equity sources and therefore their indebtedness decrease after 2001. There is a positive and significant relation between expected inflation and all three debt ratios at the 1 percent level, which shows that firms have been increasing their indebtedness in all maturities after 2001 if expected inflation is high. This is because high expected inflation decreases present values of future interest payments. Lastly, there is a positive and significant association between industry median leverage and all three debt measures at the 1 percent level, which shows that firms are still trying to approximate their debt ratios of all maturities to their sectors' debt ratios after 2001. These results on size, growth (ΔLNTA), expected inflation and industry median leverage are in accordance with the predictions of the trade off theory. Based on these differing results on factors influencing capital structure choices of firms during the period including 2001 and the period after 2001, we can conclude that capital structure theory that explains capital structure choices of Turkish listed firms has changed. For the 1988 to 2001 period the pecking order theory seems to better account for the capital structure choices of firms. On the other hand, firms seem to follow the trade off theory in forming their capital structures more closely than the pecking order theory for the period 2002 - 2013.

5. CONCLUSION

In this study, we analyze factors affecting capital structure choices of Turkish non-financial listed companies. Aside from most studies conducted in developed countries, we also included short-term financial leverage as a dependent variable because Turkish firms could borrow on short-term during most of the analysis period due to the unstable macroeconomic environment. As well as the analysis based on the whole data set, as a robustness check, we also divided our firms into three clusters based upon assets size and repeated the same analysis for small and large-sized firms. Besides, we split our analysis period into 1988 to 2001 and 2002 to 2013 and applied the same analysis for these two sub periods, in order to determine whether there is any difference in capital structure choices of Turkish firms before and after the 2000 and 2001 crisis.

Result of our general analysis that covered the whole period for all firms revealed that 4 factors, i.e. profitability, growth (MVA/BVA), industry median leverage and tangibility were effective in explaining the capital structure of Turkish firms. Profitability and growth had signs consistent with the prediction of the pecking order theory; on the other hand, industry median leverage and tangibility had signs in favor of the trade off theory. Therefore, this general analysis's result is inconclusive about the capital structure theory that Turkish firms take into account in forming their capital structures.

Analysis results of small firms show that 4 factors, namely profitability, growth (ΔLNTA), tangibility and industry median leverage have significant influence on leverage ratios of small firm. While profitability and growth's signs favor the pecking order theory, signs of tangibility and industry median leverage are in the direction predicted by the trade off theory.

Large-sized firms' regression results indicate that profitability, tangibility, size, expected inflation, growth (MVA/BVA) and industry median leverage have a significant association with indebtedness of large-sized firms. Except for the sign of the profitability, all the remaining 5 variables have signs in accordance with the predictions of the trade off theory. This outcome proves that large-sized firms follow the trade off theory in forming their capital structures.

Our regression results for 1988 to 2001 period show that profitability, risk, growth (△LNTA), GDP growth rate, tangibility and industry median leverage have explanatory power on Turkish firms' leverage ratios. While tangibility and industry median leverage have signs in accordance with the trade off theory, the remaining 4 variables have signs that are the same as the prediction of the pecking order theory. Therefore, the pecking order theory seems to better explain capital structure choices of Turkish listed firms before 2002. Lastly, profitability, risk, growth (MVA/BVA), size, growth (ΔLNTA), expected inflation and industry median leverage are found effective in explaining the capital structures of Turkish listed firms during the period from 2002 to 2013. Profitability, risk and growth (MVA/BVA) had signs in line with the pecking order theory. On the other hand, the remaining 4 variables' signs are in accordance with the trade off theory. This outcome may be an indication of the fact that Turkish listed firms more closely follow the trade off theory in forming their capital structures since 2002.

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BREXIT OPTIONS FROM THE PERSPECTIVE OF ECONOMIC INTEGRATION STAGES

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ABSTRACT

Purpose - This research examines the exit options of the United Kingdom from the European Union and discusses the possible trade relations between the United Kingdom and the European Union after the exit.
Methodology - In this article, the exit options are discussed from the perspective of the economic integration stages. The monetary union stage is evaluated by using least squares method.
Findings - The monetary union would not lead to significant changes in the import and export levels of the United Kingdom. Customs Union is the first best for the United Kingdom as she will have closer trade relations with the European Union, and on the other side, will pursue its own dependent trade policies against the other countries.
Conclusion - From the perspective of economic integration stages, the first best would be the Customs Union. If both sides do not agree on the Customs Union, then the second best will be free trade area, in that the UK and the EU can make trade agreements that cover crucial trade products for both sides.

Keywords: Brexit, single market, economic integration, European Union, customs union.
JEL Codes: F150, F36, F020

1. INTRODUCTION

Britain became a member of the European Union in 1973. After its membership, Britain's problems like the budgetary spending and the single currency started. In 1975, two years after Britain's membership, a referendum was held for remaining in the Union or not, and the British people voted for staying in the Union. The second referendum for Britain's EU membership was held in 2016. This time the referendum result was "exit" from the European Union. Britain notified the European Council of its intention to leave the European Union on March, 29, 2017, and the exit negotiations started. Britain will exit from the Union in March 2019.

Britain is in the single market stage and did not enter the Monetary Union. Some options were argued for the Brexit. The first option was hard exit which foresees an access to the customs union, and the second option is soft Brexit that ensures the access to the single market. The period of exit negotiations was named as Brexit. Brexit is the short expression of Britain's leaving the Union, formed by merging the words Britain and exit. This study aims to analyse Brexit options from the perspective of the economic integration stages; from the loosest stage to the deepest stage like free trade area, customs union, the single market, and monetary union. Possible trade relations between the United Kingdom and the EU after the exit will be discussed. European Union's close economic relations with some of the non-member countries are examined in order to consider the options for

future European Union-Britain trade relations. The constraint of the study is that the free movement of capital and people is not mentioned. The free movement of people was one of the reasons for leaving the European Union because of the immigration and the unemployment benefit that the immigrants receive. The impact of the immigration on the United Kingdom's labour market and the burden of the immigrants on the United Kingdom's economy were not taken into account. This study covers only the free movement of goods, in other words, the trade relations between the UK and the European Union were analysed.

2. LITERATURE REVIEW

Simon Bulmer and Lucia Quaglia (2018) analysed the background of Brexit and discussed the dynamics of the Brexit negotiations in their article. They explained the phases of the negotiations. According to the authors, the United Kingdom's (UK) departure may remove one semi-detached member from the EU but Brexit is but one of several challenges to EU governance and integration that will be under scrutiny from EU scholars over the coming months and years. Thomas Sampson (2017) assessed the options after Brexit and found out that in the long-run Brexit will make the United Kingdom poorer because it will create new borders to trade, foreign direct investment, and immigration. European Union countries are also likely to suffer from reduced trade. John Van Reenen (2016) analysed the long-run economic effects of the United Kingdom's decision to leave the European Union from the perspective of the trade, foreign direct investment, immigration, and regulations. In his article, according to the author Brexit's supposed benefits—such as lower immigration, better regulations, and more trade deals with non-EU countries— would have little effect little or nothing to offset welfare losses like lower trade and foreign investment and lower UK incomes. If there is a "hard Brexit," trade costs will arise from tariff and nontariff barriers. For example, Akses et al. (2016) analysed the exit process of Britain and its impact on political, economic and trade, and examined the impacts of Brexit on the future Turkey-EU relations in their report. According to the authors, Brexit may lead to the disintegration of the European Union and affect the cornerstones like the common currency and the free movement in the Union negatively.

Begg (2016) studied the economics of Brexit and examined why the referendum resulted in the vote to leave and explores what the ramifications are for both Britain and the future of the European Union. The author stated that the Eurozone requires increased integration in order to function effectively. Soytürk (2017) analysed the role of the United Kingdom inside the European Union and examined the political reasons of the referendum, and pointed out the political and economic results of it that will occur in the near future. According to the author, an exit of a big country from the Union means losing the dominance of the European Union. The author stated that the outcomes of the exit will not be satisfactory for both sides. Efe (2017) examined the exit options with references to Norwegian, Swiss and EFTA models by explaining their advantages and disadvantages. The author considers that Britain will continue to be in the Union, but its membership will not lead to a significant problem for security in the European Continent. Konuralp, Adaş (2018) analysed the historical background of this milestone and its causes and they assessed the models regulating the relations between non-member states, in order to discuss a suitable model for the UK in the post-Brexit era. According to the authors, none of the models (Norway, Switzerland, Canada, Customs Union, and WTO) would solve the problems of the UK and emphasized the Brexit process would negatively affect the UK and other EU members in economic and political terms. To sum up, the most of the authors conclude that Brexit will not be a best solution for both sides, because Britain and the European Union will be affected negatively from the exit process. The costs of the exit will arise in Britain as Britain will not benefit from some common policies of the EU. On the other hand, Britain's exit may hit the integration process of the Union.

3. DATA AND METHODOLOGY

This study covers the United Kingdom's problems in the European Union regarding the Common Budget and the Monetary Union, and the Brexit options. These problems are crucial to assess the Brexit options from the perspective of economic integration stages. The European Union's economic relations with some of the non-member countries in the Europe are analysed and the exit options for Britain are assessed through the trade statistics. The monetary union stage is evaluated by using least squares method.

3.1. Britain's Problems in the EU regarding the Common Budget and the Monetary Union

The United Kingdom[1] became a member of the European Union sixteen years after its foundation. European Union was created by six countries in 1957 as the European Economic Community (EEC). After its foundation, the EEC Customs Union was formed in three stages of four years each. The first stage began in 1958 and the intra-EEC tariffs were eliminated from 1969 onwards.

[1] The United Kingdom and Britain are used interchangeably in this study. However, in fact, the full name of the country is "United Kingdom of Great Britain and Northern Ireland".

Common External Tariff was applied by the EEC members. Thus, the EEC became a large market for the firms. During the formation of the Customs Union, the EEC's share in its own trade rose from about 30% to almost 50% (Baldwin and Wyplosz, 2006: 14). The EEC integration diminished the relative competitiveness of non-EEC firms in EEC markets, thereby harming their sales and profits (Baldwin and Wyplosz, 2006: 14). Also, UK industries faced rising discrimination in Europe's growing largest markets (Baldwin and Wyplosz, 2006: 15). For especially economic reasons, United Kingdom decided to apply for EEC membership.

The United Kingdom first applied for EEC membership in 1961 and de Gaulle vetoed the British application stating that the United Kingdom had close relationships with the United States of America. Also, de Gaulle saw the EEC as a counterbalance to American power and did not want British membership undermining this (Lynch, 2012: 64). Another reason for De Gaulle's veto was that, De Gaulle was suspicious for Great Britain to accept a common tariff, for this would involve giving up all Commonwealth preferences (Lynch, 2012: 63). In 1967, the United Kingdom again applied for EEC membership, and De Gaulle rejected the British application second time because of the same reasons, especially because of the ties with the Commonwealth countries and also because of the relations between the United States and the United Kingdom. After De Gaulle's resignation in 1969, the United Kingdom could join the EEC in 1973. EEC membership decision was taken by Edward Heath's government.[2]

Britain had never carried out close economic cooperation with the Community during her membership. Britain's problems with the European Union from the economic side during her membership can be summarised as UK rebate which was about Common Agricultural Policy (CAP) spending and also about being in the monetary union or not. Firstly, she faced with the CAP spending problems in the Community after she joined the EEC. The main problem was that agricultural spending was dominating the budget. Farm spending after the establishment of CAP took 80% or more of the total expenditure making up 92% of the budget in 1970 (Baldwin and Wyplosz, 2006: 59). However, Britain's agricultural sector was small: agricultural share in GDP was 4.3% in 1969. (Redhill Academy: 6).

The UK rebate regarding the CAP spending problem dated back to 1980s. According to the Luxembourg Treaty in 1970, the European Council decided for the introduction of "own resources" system. This system included the financing of the CAP through agricultural levies, customs duties, and VAT (value-added tax) resources. Agricultural levies were import taxes charged from agricultural goods from the third countries. The UK also imported a larger share of its food from non-member nations and import taxes charged on such imports were turned over to the EU budget (Baldwin and Wyplosz, 2006: 63). There was an imbalance between the UK's contribution to the EU budget and the UK's receiving from the share of the EU funding. Shortly, Britain was the net contributor to the budget. At Fontainebleau summit in 1984, Prime Minister Margaret Thatcher demanded excess contribution of UK. The UK rebate implemented in 1985 to correct the imbalance between UK's contribution to the CAP and benefits from the CAP. The EU leaders decided to give the EU two-thirds of its net contribution (Baldwin and Wyplosz, 2006: 63). Each year, the amount of the rebate is determined by a complex calculation, linked to several variables and which has evolved over time to take into account developments in the EU and its financing system (European Parliament, 2016).

Secondly, the UK also decided to stay out of the Euro-area. A single currency plan dated back to 1970s. Werner Plan in 1970 proposed a monetary union which would be established in ten years and a "Snake arrangement" was created. Under this mechanism, Member States' currencies could fluctuate (like a snake) within narrow limits against the dollar (the tunnel) and central banks could buy and sell European currencies, provided that they remained within the fluctuation margin of 2.25% (European Parliament, 2015: 3). The participants of the system were Germany, Denmark, Netherlands, France, Luxembourg, Italy, Norway and the United Kingdom. But the mechanism collapsed because of the member countries' different reactions to the oil shock in 1973. Sterling, the Italian lira and the French franc chose to float separately on their own, Benelux countries, Denmark and some non-EC countries linked with Germany made no progress allowing a divergence of inflation rates (Robson, 1998: 219). The new European Monetary System was established in 1979 and the European Currency Unit (ECU) was the basic element of the system which set an exchange rate towards the ECU for each participating currency (European Parliament, 2015: 3). In 1988, Delors Report proposed that economic and monetary union should be achieved in three stages (European Central Bank): Stage 1 started in 1990 which proposed complete freedom of capital transactions, increased co-operation between central banks, free use of the ECU and improvement of economic convergence. Second stage started in 1994, proposing the establishment of the European Monetary Institute and strengthening of economic convergence. Stage 3 started in 1999 and Euro was introduced.

[2] Edward Heath became Conservative Party leader more than 50 years ago and served as UK prime minister between 1970 and 1974. (BBC, 2017, October 04).

The UK joined the ERM in 1990. With inflation of 10% in UK in the 1980s, Nigel Lawson was able to convince Mrs. Thatcher that the UK would benefit from joining the ERM to help reduce the inflation (Pettinger, 2016). High inflation and deteriorating economic activity were making the Pound less attractive. Therefore, the Pound kept falling to its lower limit in the ERM. Therefore, the government was bound to protect this value of the Pound by increasing interest rates. The UK government increased the interest rates to 15%. The high-interest rates should attract hot money flows. But the market knew these interest rates were unsustainable and couldn't be maintained; the selloff continued and eventually, the government left the ERM. The Pound fell 15%, interest rates were cut, and the economy was able to recover (Pettinger, 2016). After leaving the ERM in 1992, the UK economy recovered. This was due to devaluation, but also interest rates were able to fall significantly (Pettinger, 2016).

Maastricht Treaty was signed in 1991, setting out the criteria and the stages to establish the European Monetary Union. The main objective was price stability. The first country to sign the Treaty was Denmark. But Danes voted against the Treaty. After that speculative attacks started initially targeting Italy (the lira was seriously overvalued by then) and the UK (Baldwin and Wyplosz, 2006: 338). UK and Italy had to leave the ERM (later, Italy turned to the ERM). Currencies of Ireland, Spain and Portugal were devalued.

The Cannes European Council in June 1995 confirmed that the year 1999 would be the starting date for the Economic and Monetary Union and European leaders at the Madrid European Council in December decided to name the new European currency the 'euro' (European Parliament, 2015 March: 4). This mechanism was called 'ERM II'. Protocol (No 25) on certain provisions relating to the United Kingdom of Great Britain and Northern Ireland (1992) specified the provisions of the United Kingdom's opt-out from moving to the third stage of economic and monetary union (European Union, 2006, June 30). United Kingdom did not introduce the euro and is still in the second stage of EMU. The opt-out clause was a condition for the United Kingdom to approve the Treaty as a whole (European Union, 2006, June 30).

3.2. Britain's Intention for Exit

In 1975, two years after Britain joined the EU, Britain held a referendum under Harold Wilson's Labour government. 67% of people voted to remain in the Union and Britain stayed in the Union (The Telegraph, 2016).

On 23 June 2016, a referendum was held about the UK's future in the European Union whether to leave or remain in the Union. Votes for leaving was 51.9% and votes for remain was 48.1% (The Electoral Commission). So, the United Kingdom voted to leave the European Union. There were some reasons for the citizens who vote for leaving. One important reason was UK's contribution to the budget in large amounts but for little in return. Free movement and immigration were the other exit reasons for the British people (Hunt and Wheeler, 2018).

On March 29, 2017, the UK officially notified the European Council of its intention to leave the EU under Article 50 of the Lisbon Treaty. This Article explains the procedures for exit from the Union. The member state does not have to state a reason for leaving. According to Article 50 of the Lisbon Treaty, a member state may decide to withdraw from the Union in accordance with its own constitutional requirements and shall notify the European Council of its intention. That agreement will be negotiated in accordance with Article 218(3) of the of the Treaty on the Functioning of the European Union.

Brexit negotiations started on June 19, 2017. The exit negotiations will shape the future relations with the Union and the UK. According to the Lisbon Treaty, the Union and the United Kingdom will have two years after notification for the deal and both sides can decide to extend this period.

3.3. Brexit Options

This study will examine Brexit options and also will look at the monetary union stage which was never argued during the UK's membership.

The United Kingdom's EU membership did not go further beyond the single market (common market) stage in the European Union. [3]Therefore, UK will, in fact, exit from the common market. Common market is an economic integration model which allows free movement of labour and capital among the member countries and also includes the customs union conditions like application of common external tariff to non-member nations but no tariffs and other trade barriers among member nations.

[3] The European Union has been a successful economic integration model since its foundation. European Union has transformed from customs union into an economic union in time. Firstly, EU formed the customs union in 1968. European Union became a common market at the beginning of 1993. Monetary Union established in 1999 with the introduction of Euro. European Union achieved the status of the economic union also at the end of 1990s with the establishment of supranational organisations like the European Central Bank.

The future economic relationship between the UK and the EU is not precise yet, but the European Union's close economic relations with some of the non-member countries in the Europe can be helpful to shape the future trade relations. Table 1 summarises the connections of the non-member states which had close economic relations with the European Union.

Table 1: European Union's Economic Relation Models with Some Non-Member Countries

	Norway	**Switzerland**	**Turkey**	**Ukraine**	**Liechtenstein**	**Iceland**
Customs tariffs	No	No	No tariffs on industrial goods	No tariffs on agricultural goods and some industrial goods	No	No
Free Trade Agreement	No	No	No	Yes	No	No
Customs Union	No	No	Yes	No	No	No
Single market	Yes	Partial	No	No	Yes	Highly integrated
Budgetary contribution	Yes	Yes	No	No	Yes	Yes

Source: Author

Norway has full access to the single market, being a member of European Economic Area (EEA)[4]. Agriculture and fisheries are not covered by the EEA Agreement. Norway has also its dependent trade policy. Norway does not apply tariffs to the EU imports and vice versa. Also, Norway makes a budgetary contribution to the EU.

Switzerland has a partial access to the EU's single market for services. There is free movement of people between Switzerland and the EU. Switzerland has an independent trade policy. Switzerland's economic and trade relations with the EU are mainly governed through a series of bilateral agreements (European Commission, 2018a). Tariffs on Swiss manufactures are generally low, and in principle, there are no quantitative restrictions, anti-dumping, countervailing or safeguard actions. There are however significant tariffs on a number of agricultural products such as meat or on certain processed agricultural products (European Commission, 2018a). Switzerland pays a financial contribution to economic and social cohesion in the new EU Member States.

Turkey is a candidate country for EU membership. Turkey-EU trade relation is based on Customs Union. Customs Union between EU and Turkey which entered into force on January 01, 1996, comprised of free movement of industrial goods and processed agricultural goods. Turkey has no access to the single market. Customs Union is a looser economic integration model when compared to the single market. Also, Turkey does not make any budgetary contribution to the European Commission.

The EU and Ukraine have applied their Deep and Comprehensive Free Trade Agreement (DCFTA) since 1 January 2016. This agreement ensures free access to their markets for goods and services for both sides based on predictable and enforceable trade rules (European Commission, 2018a).

The EU and the Principality of Liechtenstein are close economic and political partners in the context of the EEA, which Liechtenstein joined in 1995 (European Union External Action, 2016, September 26). Liechtenstein also makes a budgetary contribution to the Commission.

Iceland is also highly integrated to the single market and makes a budgetary contribution to the Commission.

The possible relationship between United Kingdom and the European Union after Brexit period is a discussion subject. These European Union's economic models with non-member countries can give foresight about the future UK's position in the EU. Some options are argued about the future position of the United Kingdom in Europe. The Brexit model will depend on the future closeness of United Kingdom to the Union.

[4] The European Economic Area (EEA) brings together the EU Member States and three of the EFTA States (Iceland, Liechtenstein and Norway). It was established by the EEA Agreement, an international agreement which enables these three EFTA States to participate fully in the Single Market. It covers the four freedoms, i.e. the free movement of goods, capital, services and persons, The EEA Agreement does not cover the following EU policies: common agriculture and fisheries policies (although the EEA Agreement contains provisions on trade in agricultural and fish products); customs union; common trade policy; common foreign and security policy; justice and home affairs (the EEA EFTA States are however part of the Schengen area); direct and indirect taxation; or economic and monetary union. (Source: EFTA. Retrieved from http://www.efta.int/eea/eea-agreement/eea-basic-features).

Table 2: Stages of Economic Integration/Non-Member Countries

Stages of Economic Integration/Member and Non-member countries	**Free Trade Area**	**Customs Union**	**Single Market**	**Monetary Union**
	Ukraine	Turkey	Norway Liechtenstein Iceland (partly) Switzerland (partly)	Member countries in the Euro-Area

Source: Author

Free Trade Area

Free trade area is the loosest form of economic integration. The option "hard exit" would exclude the United Kingdom from the single market which foresees no free movement of labour, capital and even goods. Later the two sides can make arrangements to settle economic and trade relations between each other after the exit. If UK does not participate in the single market or customs union, UK's imports will face with the tariff rates.

European Union is a big market for the EU members and also for non-EU members. Also, for the United Kingdom, EU is the largest trade destination. Animal products and chemicals have great shares in Britain's imports from the European Union accounting for 76% and 74% of its total imports, respectively (Table 3). UK has a negative trade balance against the other member states in all product groups except mineral fuels (Table 3). So, UK is a net importer in intra EU-trade. UK's negative trade balance has an increasing trend and recorded as the highest in 2016.

Table 3: Trade Balance of UK with the EU by Product Group, in million Euro (SITC category)

Product Group	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Food, drinks and tobacco	-14.781	-14.515	-13.815	-15.042	-16.023	-19.017	-19.591	-20.257	-22.990	-21.532
Raw materials	-2.734	-2.160	-1.893	-1.677	-1.548	-1.615	-2.711	-3.635	-4.218	-4.291
Mineral fuels, lubricants and related materials	15.049	17.956	13.282	18.481	21.342	20.153	17.539	18.868	11.633	7.219
Chemicals and related products, n.e.s.	-902	-406	-1.767	-3.517	-4.577	-6.346	-9.392	-13.203	-15.847	-13.909
Other manufactured goods	-13.359	-13.312	-15.003	-16.649	-20.656	-19.120	-21.542	-24.132	-23.778	-24.44
Machinery and transport equipment	-41.592	-35.007	-25.773	-34.617	-33.541	-42.713	-45.649	-53.232	-62.540	-57.743

Source: European Commission (2018b).

In the Union, Germany, Netherlands, Belgium, France, Italy, Spain, Sweden, Finland and Ireland are the biggest trade partners of Britain in the EU. Britain generally exports to Germany, France, Netherlands, and Ireland (Table 4). Britain's most of its export products from the European Union made up of footwear (87%), animal products (74%) and vegetables (73%). UK mainly imports capital-intensive products from EU countries like chemicals, machinery, transport equipment, food and live products.

Table 4: UK Trade in Goods, Top 5 Trading Partner Countries in 2016, Exports

Ranking	Country Description	Value £bn
1	United States including Puerto Rico	47,9
2	Germany	32,3
3	France	19,4
4	Netherlands	19,0
5	Republic of Ireland	16,8

Source: Office for National Statistics (2018, July 16)

Intra EU-trade made up of 44% of total EU trade, while 55% of UK's trade consists of extra EU trade (Eurostat, Comext table DS-057009). Outside the EU, the United States and China are the biggest trade partners (Table 5).

Table 5: UK Trade in Goods, Top 5 Trading Partner Countries in 2016, Imports

Ranking	Country Description	Value £bn
1	Germany	63,4
2	China	39,2
3	United States including Puerto Rico	36,2
4	Netherlands	35
5	France	25

Source: Office for National Statistics (2018, July 16).

Customs Union

Customs Union is being discussed as an exit option by the two sides. Customs Union can be a better option for the UK which would allow the UK to import duty-free goods from the EU and also to enter into its own trade agreements with other countries. But customs union covers only free movement of goods, not services. Customs Union can be a better option for Britain, as a free movement in services is not crucial for Britain. The US remains the single largest market for UK services exports, accounting for £8,570 million, or 22.7% of all UK exports (Table 6, 7). Britain can replace the trade in services from the EU by trade in services from the US:

Table 6: Ten Largest UK Quarterly Trade in Services Import Partner Countries, Quarter 1 (Jan to Mar) 2017 to Quarter 1 2018, Sterling

	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018
United States	4.364	4.899	4.586	4.662	4.212
Germany	1.441	1.404	1.649	1.527	1.488
France	1.196	1.106	1.272	1.261	1.182
Ireland	1.053	1.170	1.390	1.261	1.112
Netherlands	915	927	955	1.246	974
Japan	892	794	897	921	862
India	601	600	535	572	753
Sweden	341	558	600	431	681
Switzerland	650	630	700	727	592
Luxembourg	590	610	593	677	525
Rest of World	6.507	6.405	7.181	7.038	6.527

Source: Office for National Statistics (2018, July 16).

Table 7: Ten Largest UK Quarterly Trade in Services Export Partner Countries, Quarter 1 (Jan to Mar) 2017 to Quarter 1 2018, Sterling

	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018
United States	8.040	8.164	8.489	9.392	8.570
Germany	2.552	2.507	2.742	2.841	2.449
Ireland	2.203	2.274	2.718	3.414	2.344
Netherlands	1.994	2.462	2.698	2.775	2.338
Switzerland	2.065	1.906	1.978	2.449	2.056
France	1.708	1.807	1.865	2.084	1.827
Luxembourg	832	733	819	972	945
Saudi Arabia	1.334	1.524	1.149	1.236	829
Japan	759	880	848	832	781
Spain	725	798	837	753	725
Rest of World	14.658	16.384	15.175	18.830	14.907

Source: Office for National Statistics (2018, July 16).

Single Market

As mentioned before, some possible scenarios for the Brexit come into question. One option is soft Brexit which involves the closest relationship between the two sides. In the case of a soft exit, United Kingdom would be in the single market. It means the free access to the EU's market. However, the UK would no longer be a member of the EU and would not have a seat on the European Council. It would lose its MEPs and its European Commissioner (Sims, 2016, October 03).

The crucial advantage of being in a single market is lower intra-EU trade costs. According to Reenen (2016: 371); in the optimistic soft Brexit scenario, in the 10 years following Brexit, intra-EU trade costs will fall 20 percent faster than in the rest of the world; while in the hard Brexit scenario, intra-EU trade costs will fall 40 percent faster. So, UK would not benefit from reduced costs, on the contrary, would face with tariff and non-tariff barrier costs.

Monetary Union

According to the Optimum Currency Area model of Mundell, a single currency, in other words, a monetary union can stimulate trade between member countries because the trade will not be harmed by exchange rate volatilities. The United Kingdom did not participate in the Monetary Union. Since the Sterling is international reserve money and a strong currency, it is thought that the changes in the exchange rate will be reflected in the trade data. The rise in the Euro/Sterling exchange rate (depreciation of Sterling) can lead to a decrease in the import from the EU and to the increase in the export to the EU.

In order to examine whether exchange rate affects the trade between EU and the UK, import and export models are estimated for the United Kingdom by using the least squares method.

Ho: There is a negative correlation between Euro/Sterling rate and UK's import from the Union

H1: There is no relation between the variables

The data are times series and represent 45 years, from 1973 to 2017 and collected from the Eurostat, the Statistical Office of the European Union. For estimating the UK's import model, UK's GDP, UK's population and euro/sterling rate are selected as explanatory variables. These variables are important for examination for a country's import data. For estimating the UK's export model, variables like Euro/Sterling rate, GDP of the EU, population of EU are added in the model.

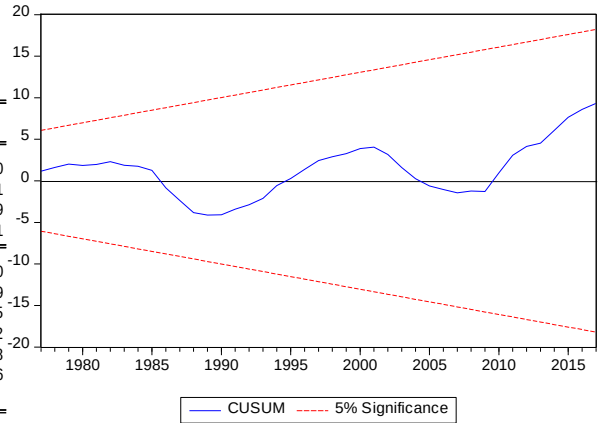
Estimated models are tested for normality, heterosceadasticity, specification error and structural breakpoint by using Durbin Watson d, Durbin h, Jarque bera, Heterosceadasticity White, Ramsey Reset and Cusum Square (CUSUMSQ) tests. The coefficients of the estimated parameters in the regression models are found significant. R-Squared is close to 1, this shows a good fit of the model. At the 5% significance level, Prob(F-statistic) is significant. Specification of the estimated model is checked by CUSUM test. The CUSUM statistic is plotted with 5% significance confidence bounds in the import model. However, there is structural breakpoint after 2013 as seen in the CUSUMSQ graph of the export model.

GDP and population of the UK have a positive correlation with import level. But the population of EU has an inverse relation with the export level. Euro/Sterling rate has a negative correlation with the export level. But in the export model, the exchange rate may have a small effect because the invoicing currency in the EU is mainly in Euro.

Dependent Variable: LNUKIMEU
Method: Least Squares
Date: 09/21/18 Time: 20:35
Sample (adjusted): 1973 2017
Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNUKGDP	1.098628	0.036495	30.10330	0.0000
LNUKPOP	1.171503	0.629931	1.859732	0.0701
EURO_ECU__STERLING_AVE_	0.880291	0.246539	3.570591	0.0009
C	-26.81583	10.57706	-2.535281	0.0151

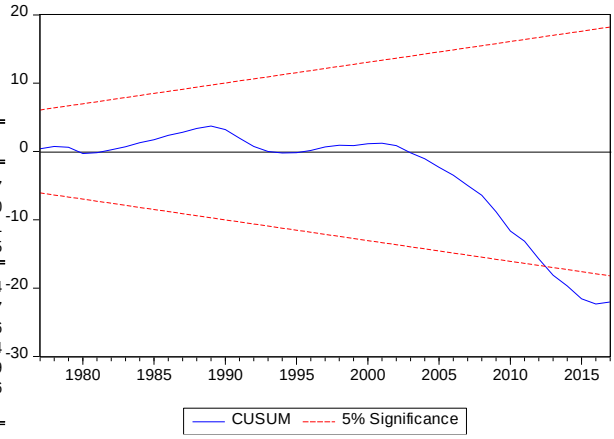
R-squared	0.990116	Mean dependent var	25.22010
Adjusted R-squared	0.989393	S.D. dependent var	1.053439
S.E. of regression	0.108495	Akaike info criterion	-1.519545
Sum squared resid	0.482615	Schwarz criterion	-1.358952
Log likelihood	38.18976	Hannan-Quinn criter.	-1.459678
F-statistic	1369.051	Durbin-Watson stat	0.651656
Prob(F-statistic)	0.000000		



Dependent Variable: LNUKEXEU
Method: Least Squares
Date: 09/21/18 Time: 20:40
Sample (adjusted): 1973 2017
Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEUPOP	-6.789162	2.773037	-2.448277	0.0187
LNEUGDP	1.675540	0.134323	12.47394	0.0000
EURO ECU STERLING AVE	-1.534613	0.355419	-4.317761	0.0001
C	112.4677	51.71923	2.174582	0.0355

R-squared	0.977341	Mean dependent var	25.28224
Adjusted R-squared	0.975682	S.D. dependent var	0.944447
S.E. of regression	0.147278	Akaike info criterion	-0.908306
Sum squared resid	0.889320	Schwarz criterion	-0.747714
Log likelihood	24.43688	Hannan-Quinn criter.	-0.848439
F-statistic	589.4652	Durbin-Watson stat	0.524036
Prob(F-statistic)	0.000000		



The import model is:

lnim= -26.81 + 1.09lnukgdp + 1.17lnukpop + 0.88 euro/sterling rate

Ceteris paribus, the 1% rise in the euro/sterling rate causes an increase of 0,88% Britain's import from the EU.

The export model is:

lnex= 112.46 – 6.78lneupop + 1.67lneugdp – 1.53* Euro/sterling rate

Ceteris paribus, the 1% rise in the euro/sterling rate causes a decrease in Britain's export by 1,53%.

Hypothesis of whether the exchange rate affects the trade level between the EU and the UK is not accepted. The rise in the exchange rate was expected to reduce imports from Europe, and increase exports, while different results were achieved. H1 is accepted. The effect of the exchange rate in the models was insignificant. Therefore, since the change in the exchange rates did not affect the UK's trade, the entry of Britain in the monetary union would not lead to significant changes.

4. FINDINGS AND DISCUSSIONS

According to the Draft Withdrawal Agreement Brexit, a single customs territory between the Union and the United Kingdom shall be established ("the single customs territory") until the future relationship becomes applicable. Accordingly, Northern Ireland is in the same customs territory as Great Britain. (European Commission, 2018c: 310). Customs Union is the best option for the UK in that the UK will have closer trade relations with the EU and on the other side, will have its own foreign trade policy.

According to the European Parliament (European Commission, 2018c: 24), in the case of hard Brexit, UK would be responsible of its own trade policy in the WTO and this may reduce its bargaining position in the WTO rounds. However, the member countries in WTO form groups according to their interests and positions. The United Kingdom will probably on the developed countries side with the United States and the European Union and can defence its own proposals. So, this may not reduce its bargaining position in the WTO rounds.

5. CONCLUSION

The negotiations of Brexit came almost to an end. However, the future relationship is not precise yet. Two options were discussed: hard exit and soft exit. In the case of hard Brexit, the UK will be in the customs union. In contrast to hard Brexit, soft Brexit ensures the access to the single market. As immigration was one of the arguments in the exit campaigns, the single market option may not be acceptable by the United Kingdom. From the perspective of economic integration stages, the first best would be the Customs Union which foresees the free movement of goods. The UK would be responsible of its own trade policy against the other countries. If both sides do not agree on the Customs Union, then the second best will be free trade area, because the UK and the EU can make trade agreements that cover certain products which are traded mostly. For the other products, the UK can replace EU's imports by cheaper imports from third countries. The future UK-EU relationship will depend also on the UK's relations with the United States. As the United States is the most important trade partner of the UK, the EU-UK relations can move to a looser form of economic integration stage like free trade area in time, if US-UK trade relations deepen even more. This would show that de Gaulle was right in his concerns over UK's EU membership when he vetoed the UK's application because of the UK-US close trade relations. On the other hand, it is possible that the EU changes its trade policy towards the US in the future. So, the Customs Union which foresees closer relations than the free trade area is the best choice for the United Kingdom.

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