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STOCK OPTION RETURNS AND STOCK ANOMALIES: CROSS MARKET EFFICIENCY AND THE COST OF HEDGING VALUE VS GROWTH FIRMS STOCK RETURNS

Mick Swartz[1]

[1]Finance and Business Economics, Marshall School of Business, University of Southern California, CA.
Mick.swartz@marshall.usc.edu.

KEYWORDS	ABSTRACT
Stock Anomalies, Value Investing, Option Returns, Hedging	The empirical literature on stock returns shows overwhelming evidence of stock anomalies related to value investing. This paper studies the relative performance of stock options of value and growth stocks. This yields insight into different strategies in attempting to hedge some of these types of stocks.Monthly option returns are examined from 1995 to 2004. The returns of calls and puts are analyzed with a corresponding discussion of other strategies directly linked to these results. In particular, evidence is found that the option returns on some growth stocks and the option returns on some value stocks outperform the average option return for puts deep out of the money. For puts deep in the money, buying puts for the most extreme decile of value stocks is significantly less expensive than other deciles. For value stocks deep out of the money call options had significantly higher returns (20%) than growth stocks(negative option returns). For both puts and calls across the value and growth deciles, writing options had higher returns than buying options. Strategies with profitable returns over the decade included bear spreads using calls on value stocks and bull spreads on value stocks and growth stocks (but not the highest decile for growth). A third strategy that was profitable for the decade included buying deep out of the money puts for deciles 2, 3 (growth) and 10 (value). The relative cost of hedging stocks in the options markets does depend on value vs. growth characteristics.

1. INTRODUCTION

The finance literature has searched exhaustively for factors relating to abnormal performance relative to existing models. The Fama-French model using beta, size and value expressed as a M/B ratio is one commonly used standard for investment performance. The value and size anomalies show significant abnormal returns for companies displaying those characteristics. The option markets, therefore, should reflect such behavior.

In this study, we examine the option returns to different types of stocks on a monthly basis to determine if option returns display different characteristics depending on whether the stock is a value stock or a growth stock, as defined by Fama-French. In addition, we study the size anomaly and rank firms based on market capitalization to determine if there are significant differences in

the option returns. These results will help portfolio managers determine the relative costs of hedging portfolios depending on the characteristics of the underlying assets.

If the option returns are significantly different, then the relative costs of hedging will differ. If option returns are not different, then the cross market efficiency is resolved and the issue of whether the option market has correctly priced the volatility of the stock return is answered. Given the asymmetric distribution of the anomalies and of stock option returns, it seems that inter-market or cross market efficiency is an important issue for both the stock market and the options markets.

The basic questions addressed in this paper include: Are stock anomalies priced in the options markets? Are there differences in the option returns of growth stocks versus value stocks? Are the costs of hedging stock returns different for value versus growth stocks.

The paper will proceed in section 2 with a literature review. In section 3 the data and methodology are discussed. Section 4 examines the empirical results and section 5 summarizes the paper.

2. LITERATURE REVIEW

The empirical literature in finance has studied many anomalies in a variety of ways in an attempt to gain insight into the factors that affect stock returns. From Basu (1981) and Reinganum (1982) documenting a size effect to Fama-French (1993,1994, 2005) documenting a value premium, finance has been fascinated with stock puzzles or anomalies. Stock market anomalies pose an interesting problem for options markets since the original asset (stocks) is often considered mispriced. How does a derivative of a "mispriced" asset behave? Other anomalies that have been documented include the momentum effect by Carhart(1997) .The January anomaly with many tax implications is another well studied anomaly. Mutual fund persistence and studies on winners and losers have, also, been popular. The literature for these anomalies has created a great deal of knowledge regarding stock returns and will continue to do so in the future. This study examines the option returns surrounding these events. In particular, the value anomaly is examined to identify option return characteristics for these firms. De Bondt and Thaler (1985,1987) examine market overreactions to firm characteristics. Schwert (2003) discusses market anomalies and the puzzles in finance. The conclusionfrom all of these papers indicates that stock anomalies exist and are persistent.This implication has tremendous implications for the options markets on stocks with these characteristics. This paper will concentrate on the impact of hedging stocks that are regarded as value stocks and growth stocks according to the Fama-French model.

3. METHODOLOGY AND DATA

The stock option returns from 1995 to 2004 are examined on a daily and monthly basis from Optionmetrics (IVY Database). Daily stock returns and the risk free rate are obtained from CRSP. The Compustat database is used to classify firms on a monthly basis into value or growth deciles. CRSP and Compustat data are used to sort firms into size deciles each month. Stock returns are sorted based on Fama-French deciles of M/B and size each month. The portfolios are then examined based on option returns for 5 different exercise prices each month. The five exercise prices include at the money, one price in the money, two prices in the money, one price out of the money and two prices out of the money. The option returns examined are one month or the closest option with at least one month left until expiration. Option prices and returns are individually accumulated and averaged for a portfolio. Each portfolio (decile) has roughly 270-300 individual stock returns and option returns each month. The daily observations per month are approximately 20 per security. Holding period returns are examined on a daily and monthly basis. Results are accumulated on a monthly basis to interpret and relate to existing stock return research. The

options studied have one month to two months until expiration. The formulations follow the Fama-French model and decile formation procedures for Market to Book ratios and Size (market cap) every month. The options data is applied to the monthly stock portfolio for value deciles each month.

The Fama-French Model indicates that beta, size (measured by market capitalization) and the market to book ratio are factors affecting the return on a stock. Formally the model is:

Rj = Rf + Bj*(Rm-Rf) + Bj2*Size + Bj3*M/B ,

whereRi is the expected return on stock j and beta j is the beta for stock j that is measured by Covariance of j with the market return. Bj. Bj2 and Bj3 are coefficients in a regression. Size is measured by the market capitalization of a firm. M/B represents the market to book ratio of firm j and typically is considered a value stock if M/B is less than 1.5 or 2. Rm represents the return on the stock market index, typically the S&P 500 index is used. Rf is the risk free return and is the return on the US Treasury Bill.

4. EMPIRICAL RESULTS

4.1. Empirical Results for the Call Option Market

Table 1 indicates in column 3 (Option2O) that for call options two strike prices out of the money, value stocks outperformed growth stocks. The options on deep out of the money value stocks had positive monthly returns and the corresponding options on growth stocks had negative returns, on average for this decade. Deciles 9 and 10 (value stocks) had returns of 7.7% and 15.7% average monthly returns during this decade. While deciles 1,2 and 3 (growth stocks) had average monthly returns of -7.2%, -5.1% and -3.4%, respectively. This category had some returns with positive returns over this time period.This is significant and demonstrates that the type of stock being hedged will affect the cost of the hedging. Out of the money options are less expensive in terms of capital layout and are a viable tool for hedging tail risk and typical portfolio variation. This may be a very cost effective approach for portfolio managers to consider dividing the portfolio into high hedging cost and low hedging cost portions.

Table 1: Call Option Market Monthly Returns

Monthly returns from 1995-2004 for each Decileare ranked by value characteristics.

Decile	Stock Return	Option2O Return	Option 1O Return	Option AT Return	Option 1I Return	Option 2I Return
1	-.004	-.072*	-.105*	-.334*	-.371*	-.547*
2	-.001	-.051*	-.135*	-.366*	-.418*	-.583*
3	.004	-.034**	-.099*	-.333*	-.371*	-.626*
4	.005	-.004	-.083*	-.338*	-.419*	-.602*
5	.009	.048*	-.064*	-.316*	-.376*	-.667*
6	.010	.009	-.053*	-.328*	-.390*	-.633*
7	.009	.025	-.049*	-.307*	-.420*	-.707*
8	.011	.018	-.047*	-.311*	-.457*	-.674*
9	.010	.077*	-.028	-.338*	-.412*	-.670*
10	.005	.153*	-.050*	-.332*	-.442*	-.712*

Decile 10 is Value and Decile 1 is Growth. There are approximately 270 – 300 firms per day for 20 days per month. *Significant at a one percent level. **Significant at a 5 percent level.

Table 1 demonstrates that viable alternatives do exist that are useful for hedging stocks in the option markets. Strategies that use call options to hedge such as butterfly spreads, bull spreads and bear spreads may be conducted using out of the money call options.

Option1O represents the monthly option return 1 strike price out of the money. Column 4 indicates that call options one strike price out of the money (Option1O) were significantly more expensive for growth stocks than value stocks during this decade. The average return on these options for deciles 1, 2 and 3 were -10.5%, -13.5% and -9.9%, respectively. The option returns for deciles 9 and 10 were -2.8% and -5%. The difference in returns between value and growth deciles is significant.Column 5 results show that buying call options at the money during this decade was expensive for all deciles. Average costs or returns were between -30% to -37% per month.

Columns 6 (Option1I) and 7 (Option2I) have similar results for with returns approximately -40% for most deciles in Table four (in the money calls) and -60% for Table five (deep in the money calls). This is consistent with the previous literature given that these are short term options (approximately one month until expiration). Any strategy that requires buying call options that were at the money, in the money or deep in the money (2 strike prices in) were, on average, expensive as a hedging tool.Columns 6 and 7 indicate that using in the money options is expensive in the call option market. A return of a negative 40 % is a difficult return to justify as a hedging tool. While the value of the portfolio may be protected, the cost of the insurance is extremely expensive using in the money call options.

4.2 Empirical Results for the Put Options Market

Table 2 and column 3 results indicate that many deciles had positive returns for deep in the money puts. This decade included the tech boom and subsequent bust. It appears the strategy of buying deep in the money puts was profitable over this decade for many deciles.This research divides data differently and defines one month as between one and two month intervals. The finding is relatively new because the time period is rounded up and not down as in previous studies. The time period includes daily data that differentiates option returns over 4-6 weeks depending on the expiration date of the option contract. This small difference in calculating the option return shows many options have very different uses for portfolio hedging. These are new results in the literature. Option2O represents a put option that is two strike prices out of the money. Option1O is one strike price out of the money. OptionAT represents put options at the money. Option1I lists the returns for put options that are one strike price in the money. Option2I represents options that are two strike prices in the money.

Table 2: Put Option Monthly Returns

Monthly Returns from 1995-2004 for each Decile are ranked by value characteristics.

Decile	Stock Return	Option2O Return	Option 1O Return	Option AT Return	Option 1I Return	Option 2I Return
1	.003	.036	-.123*	-.326*	-.257*	-.280*
2	.004	.264*	-.014	-.323*	-.243*	-.191*
3	.010	.315*	-.101*	-.366*	-.256*	-.251*
4	.011	.086*	-.141*	-.387*	-.257*	-.258*
5	.017	.056*	-.109*	-.411*	-.355*	-.441*
6	.018	.405*	-.075*	-.424*	-.378*	-.546*
7	.017	.086*	-.120*	-.401*	-.391*	-.469*
8	.021	.062*	-.121*	-.398*	-.431*	-.574*
9	.020	.026	-.110*	-.374*	-.476*	-.043
10	.024	.338*	-.002*	-.197*	-.378*	-.119*

Decile 10 is Value and Decile 1 is Growth. There are approximately 270 – 300 firms per day for 20 days per month. *Significant at a one percent level. **Significant at a 5 percent level.

Column 4 results show negative 7% to -14% for most deciles, however, not for deciles 2 (growth) or 10 (deep value). These deciles had option returns that were not significantly different from zero. The cost of hedging using these deciles was different during this decade. One trend in the tables is the difference between deciles one and two in terms of option returns. The results in column 4 indicate that using these puts to hedge would be a viable long term strategy. The options are not cheap, however, the returns could potentially be justified as portfolio insurance for temporary market conditions.

Column 5 shows at the money put options and the average monthly returns for the deciles ranged from -19.7% (decile 10 deep value) to -42.4%. The growth stock option returns (deciles 1,2 and 3) were in the -32% range. Decile 10 was the least negative with a return a negative 19.7 percent.Columns 3, 4and 5 are important because as a hedging tool they are the most obvious choices for a portfolio manager. Using at the money options is more efficient and more indicative of current market positions that most investors would rely on as a hedging tool, however, as can be seen with the empirical results at the money options are significantly more expensive than out of the money options. The returns from many tables indicate that across deciles there are major differences and that strike price selection is key to the success of a hedging strategy. A slight change in the type of strike price could result in an unsuccessful outcome for an investor. Options that are out of the money or at the money are much better choices for hedging based on the expense or return of each type of option. This is demonstrated in the next table. Column 6 indicates that using In-The-Money puts (one strike price in) results in option returns from -24% to -47% , on average per month. This cost could cause significant drag to a stock portfolio if used frequently. The expense for this type of option is contrasted with the last table to get large differences in expenses for hedging. A portfolio manager using the options in column 6 would find a large cost for hedging his/her portfolio. While there is a difference between value and growth stocks, in terms of hedging costs, both types are expensive with the selection of this strike price. As a result, the choice of strike price and the choice of type of security (value versus growth) is important in terms of the final expense and returns to the portfolio.

These options are expensive as a hedging tool, since the returns average a negative 24% to a negative 47%. In the money options are not an efficient tool for most investors to hedge a stock or a portfolio with on any consistent basis. Column 7 has option returns ranging from -4% to -54%. Deciles 9 and 10 have option returns of -4.3% and -11.9%. Deciles 1, 2 and 3 have option returns of -28%, -19.1% and -25.1%, respectively. Deciles five thru eight have the most negative returns.

The large negative returns are prominent in most academic research concerning short term options. This paper confirms this result and indicates that hedging can be very expensive, particularly if an investor uses at the money or in the money options. The returns in this table range from a negative 4% to a negative 54%, this is very expensive insurance for hedging.

5. CONCLUSION

For the decade 1995-2004, the empirical evidence indicates that buying call options is expensive for calls at the money or in the money one strike price. The monthly option returns are negative (30%-60%) for almost all deciles for call options at the money or in the money one or two strike prices. There are significant differences between growth stocks and value stocks using call options that are out of the money one strike price. The value deciles have negative option monthly returns of 3-5% and the growth deciles have negative option monthly returns of 8-13.5%. Evidence is found that the option returns on some growth stocks and the option returns on some value stocks outperform the average option return for puts deep out of the money. For puts deep in the money, buying puts for the most extreme decile of value stocks is significantly less expensive than other deciles. For value stocks deep out of the money call options had significantly higher returns (20%) than growth stocks(negative option returns). For both puts and calls across the value and growth deciles, writing options had higher than buying options. Strategies with profitable returns over the decade included bear spreads using calls on value stocks and bull spreads on value stocks and growth stocks (but not the highest decile for growth). A third strategy that was profitable for the decade included buying deep out of the money puts for deciles 2, 3 (growth) and 10 (value).

Future Research

Future research will break down specific strategies, include options with longer expiration dates, break down empirical results by years, business cycles, interest rate cycles, inflation and currency changes. A breakdown of the options return data before and after the tech boom and bust will be analyzed. The size effect is, also, being examined.

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ABSORPTIVE CAPACITY AND TECHNOLOGY SPILLOVERS: A CASE FROM TURKEY

Basak Dalgic

Hacettepe University, Department of Public Finance, Beytepe Campus 06800 Cankaya/Ankara.
E-mail: basakcakar@hacettepe.edu.tr.

KEYWORDS	ABSTRACT
Technology spillover, absorptive capacity, threshold regression analysis, Turkish manufacturing industry.	Due to the increase of technological capacity by reverse engineering, learning by doing and imitation effects, the interaction of production units with each other will lead productivity increases through exchanging and utilizing new and more variety of intermediate and capital goods. Departing from the assumption that technology spillovers which emerge as externalities resulting from R&D investments that take place through the inputs of intermediate and capital goods, this study examines the domestic technology spillovers in Turkish manufacturing industry within the framework of absorptive capacity. Considering that the relation between technology spillovers and absorptive capacity may not be linear, threshold regression techniques are applied to manufacturing industry data over the period 1992-2001. The results of the analyses show the existence of domestic technology spillovers through imports in Turkish Manufacturing Industry. The main result of threshold regression analyses is that the efficiency of spillovers are differentiated with respect to the industry specific absorptive capacities.

1. INTRODUCTION

Technology is a type of product generated as a result of industrial R&D activities and embodied in capital goods, intermediate goods and thus in final goods. However, technology differs from other products because the marginal cost of using technology can be ignored by the other economic units which have not contributed to its production (Grossman ve Helpman, 1997). The non-rivalness and non-excludability characteristics of R&D capital enables the transfer of the benefits of technology to economic units with relatively low performance. Ideas are circulated from one firm to another and from one industry to another together with input-output relations. This concept which economists call as "technology/R&D spillover" constitutes the initial motivation of this study. Spillovers might be realized by reverse engineering of a product developed by one firm being used by other firms or by the use of a product or service being used by other firms in their production processes as an input as well as through direct patent and license procurement or mobility of human capital among firms.

Grossman and Helpman (1991) and Rivera-Batiz and Romer (1991) approach R&D spillovers within international trade framework. Particularly, due to the increase of technological capacity by learning by doing and imitation effects, the interaction of developing countries with outside world will lead economic growth together with productivity increases through observing and utilizing new and more variety of intermediate and capital goods. Thus trade of intermediate and capital goods between domestic and foreign sectors play an essential role in transferring foreign technologies to domestic economy and spillover among the sectors in the domestic economy.

Instead of the spillovers realized through international linkages which has an extensive coverage in the literature, this study attempts to explain the existence and efficiency of technology spillovers realized as a result of the input-output relations emerging in Turkish manufacturing industry itself with a special focus on absorptive capacity. Particularly the study aims to answer the question "does the efficiency of domestic technology spillovers between industries differ according to their respective absorptive capacities?". In this respect the existence of technology spillovers and their efficiency is investigated by taking a series of factors which are thought to affect the absorption of technology into consideration. These factors which are assumed to affect absorptive capacity consist of factors which reflect the human capital, the own R&D efforts and the final goods market structure of the industries.

Hansen's (1999) threshold regression techniques are applied to the panel of 22 manufacturing sectors at 2-digit level classified under ISIC Rev.3 over the period 1992-2001 in this study. Alternative threshold regression models are used to estimate the effects related to technological knowledge spillovers considered for different sectors with different absorptive capacities. The rest of the study is as follows: In the next section a brief summary of the theoretical and empirical literature on technology spillovers is presented. The third section introduces the data and the methodology applied in the empirical investigation. In the fourth section empirical results and implications are discussed. Section five concludes.

2.LITERATURE REVIEW

When Robert Solow (1957) first introduced technology as a major component of economic growth he assumed that technological development was equally accessible to all producers. In Solow's model technology was designed as an exogenous variable out of the production function. Solow (1956) displayed the capital accumulation process financed by total savings as the source of a transitional growth process. During this process capital-labor ratio will increase and in time this increase will cause a decline in the marginal product of capital.

Modern growth theories which emerge as endogenous growth models leaves the neoclassical assumption that marginal product of capital converges to zero (Jones and Manuelli, 2005:19). The determining characteristic of endogenous growth theory is the fact that growth emerges as a result of the increase in technological information and human capital stock during the internal processes. R&D based endogenous growth models, in which firms do not have an active role in the production of technological knowledge and this knowledge emerges as a by-product of economic activity, clearly separate the physical capital stock and technological knowledge stock from each other (Romer,1990; Grossman and Helpman, 1991; Rivera-Batiz and Romer, 1991; Aghion and Howitt, 1992; Jones, 1995). In these models while capital stock increase with savings, technological knowledge stock grows as a result of R&D activities based on the optimization incentives of economic units. Expanding the boundaries of technological knowledge R&D is not a direct factor of production and it enables firms to produce different and better quality products by introducing new ideas and new designs.

R&D based endogenous growth models shows that knowledge stock increases as a result of new 'ideas' generated through technology oriented R&D investments. Excluding decreasing returns and exogenous technology assumptions these models put forward an endogenous mechanism that is utilized for long term productivity increases and by this way they outperform Neoclassical growth theory. While Romer (1990) was building the endogenous growth theory he was inspired by Schumpeter's (1942) and Abramovitz's (1956) studies which emphasized innovation and technological change as the driving force of economic growth. According to this theory which put the Schumpeterian concepts of innovation, creative destruction and entrepreneurship onto the

agenda once again, technological progress is realized together with some external impacts. These external impacts are spillover effects which also have a positive impact on the third economic units. Accordingly, the following assumptions have been made about technology as a starting point of R&D based endogenous growth models: (i) Technology is partly or sometimes completely a public good. In other words there is non-rivalness and non-excludability in the use of technology. (ii) As a result of technological improvements spillovers emerge as positive externalities and the degree of these spillovers is important. (iii) Technology spillovers create increasing returns to scale conditions (Kibritçioğlu, 1998:9).

The fact that absorption and internalization of knowledge available in frontier technologies is an important factor in dissemination of external technologies have an important place in the technology spillover literature. The full extent of these factors is usually referred to as the absorptive capacity. It is possible to define the absorptive capacity as the capacity determining a country's, industry's or firm's speed in the adaptation of new technological knowledge or their limits in which they can use this knowledge (Cohen and Levinthal, 1990; Evenson and Westphal, 1995; Keller, 2002).

There are two factors which are often associated with the idea of absorptive capacity defined as a type of capability that is required by a firm, industry or country in order to absorb an external technology successfully. One of them is human capital and the other one is internal R&D efforts. Theoretical and empirical literature which studies human capital as a determinant of absorptive capacity within the framework of technology spillovers, emphasizes that human capital develops the ability of learning, absorbing and using new technologies which emerge as a result of R&D activities and thus facilitates spillovers (Nelson and Phelps, 1966). According to Cohen and Levinthal (1986), the own R&D efforts of firms is very important for understanding both direct technological trends and innovations and the ones embodied in intermediate and capital goods. They claim that in order to adopt and use external technologies production units should also execute their own R&D investments. Here the concept of absorptive capacity is shaped by the idea that R&D efforts are reflected to learning, reproduction and usage of external technologies rather than making own innovations.

Market structure is another significant factor which is associated with the absorptive capacity of economic units in terms of diffusion of new technologies. Considering the fact that innovation based growth models include R&D spillovers; the fact that processes of creating and adopting technological innovations are two distinct stages of technological improvement indicates that the arguments on the relation of innovation and market structure can easily apply to the arguments on adoption and absorption of external technology. According to the Schumpeterian approach, technology spillover between firms operating in markets dominated by imperfect competition conditions will be easier. A counter opinion to this approach, with solid empirical and theoretical bases, states that the need for adoption of new technologies in competitive markets is much stronger than monopolistic markets and hence there is a positive correlation between level of competition and technology spillover (Dorfman, 1987; Rosenberg, 1972). For example, Parente and Prescott (1999) especially regard monopoly rights to be one of the major obstacles in the absorption of exogenous technologies. In another discussion about absorptive capacity related to market structure and technology spillovers, it has been argued that higher competitive pressure is associated with imperfect appropriability and in turn, with stronger spillovers. (Kamien and Schwartz, 1982).

The empirical testing of the theoretical framework of technology spillovers begins with Coe and Helpman (1995). The studies of Coe and Helpman (1995) to be followed by Keller (1998), Lichtenberg and van Pottelsberghe de la Potterie (1998) and Xu and Wang (1999) are the most cited in terms of those shaping the literature of technology spillovers. The studies related to the relevant studies have mostly been carried out on country level and are particularly based on Grossman and Helpman's (1991) and Rivera-Batiz and Romer's (1991) models which use the concepts of foreign trade, accumulation of technological knowledge and endogenous growth together. In these models technological knowledge is modeled within a Cobb-Douglas type production function or its extension as a separate variable from conventional factor inputs. In the empirical studies made in this framework, generally the relationship between accumulated domestic and/or foreign R&D expenditures and total factor productivity is investigated. The next step has been to understand the efficiency of technology spillovers by focusing particularly on the international linkages such as foreign direct investments and foreign trade and by investigating the magnitude of spillovers within the scope of absorptive capacity (Apergis, Economidou and Filippidis 2008; Crespo, Foster and Scharler, 2004; Henry, Kneller and Milner, 2009; Lopez Pueyo, Visus and Sanau 2008; Schiff, Wang and Olarreaga, 2002; Teixeria and Fortuna, 2010), While most of the empirical studies on technology/R&D spillovers specific to Turkey focus on technology spillovers resulting from foreign direct investments or foreign trade (Alıcı and Ucal, 2003; Aslanoğlu, 2000; Lenger and Taymaz, 2006; Yılmaz and Özler, 2004); to our knowledge, there is no study dealing with domestic spillovers within the context of absorptive capacity.

3. METHODOLOGY AND DATA

In this study, domestic technology spillovers among the Turkish manufacturing sectors are studied within the absorptive capacity framework on the basis of the assumption that technology/R&D spillovers emerging as externalities which originate from R&D investments take place by means of intermediate and capital goods used as input by manufacturing sectors. In this study, threshold regression techniques are applied to a structural model obtained from a Cobb Douglas type production function; thus the efficiency of technology spillovers is allowed to differ between regimes which are determined in accordance with absorptive capacity variables. This analysis methodology enable us to determine the critical values endogenously in the estimation process instead of imposing exogenous threshold values of the factors treated in relation with absorptive capacity,

Within this framework, a Hicks-neutral production function with constant returns to scale: process shall be considered:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha} \tag{1}$$

Where Y_t is total production, whereas K_t denotes physical capital stock and L_t represents labor.

Similar to Coe and Helpman (1995), let technology level depend on domestic and foreign R&D variables:

$$logA_t = \gamma_0 + \gamma_1 logRD_t^d + \gamma_2 logRD_t^f \tag{2}$$

RD_t^d and RD_t^f represent foreign and domestic R&D variables respectively. In tis case while y_t shows production to labor and, k_t shows capital to labor ratios, if equation (2) is substituted into equation (1) the structural model (3) is obtained:

$$logy_t = \gamma_0 + \alpha logk_t + \gamma_1 logRD_t^d + \gamma_2 logRD_t^f \tag{3}$$

Again similar to Coe and Helpman (1995) and many other works in the literature, domestic and foreign R&D variables that will be used in the estimation of this equation comprise of weighted domestic and foreign R&D stocks, and they represent technology/R&D spillover variables[1]. Positive and statistically significant coefficients related to weighted R&D stocks will indicate the existence of technology spillovers. A point which makes the difference in this single stage estimation process is that the effect of R&D stocks will be defined non-linearly.

$$lny_{it} = \mu_i + \alpha lnk_{it} + \gamma_1(q_{it})lnRD_{it}^d + \gamma_2 lnRD_{it}^f + + e_{it}, e_{it} \sim iid(0,\sigma^2) \quad (4)$$

According to our structural model of estimation defined by equation (4), where $\{1 \leq i \leq n, 1 \leq t \leq T\}$; it is assumed that the parameter γ_2 which determines the international technology spillovers can vary depending on a series of variables (q_{it})specific to each sector. In order to better elaborate on the estimation methodology, the relation between domestic technology spillover and industrial output is defined with a double threshold regression model where several variables which are thought to be the determinants of absorptive capacities in sectors are used as threshold variables (q_{it}):

$$lny_{it}\mu_i + \alpha lnk_{it} + \beta_1 lnRD_{it}^d I(q_{it} \leq \lambda_1) + \beta_2 lnRD_{it}^d I(\lambda_1 < q_{it} \leq \lambda_2) + \beta_3 lnRD_{it}^d I(\lambda_2 < q_{it}) + \gamma_2 lnRD_{it}^f + e_{it}(5)$$

Accordingly, the slope parameters $(\beta_1, \beta_2, \beta_3)$which determine technology spillover on domestic R&D stock, may vary between regimes determined in relation to threshold parameters of absorptive capacity. Parameters (α, γ_2), which belong to additional control variables in the model, are constant between these regimes and do not affect the distribution of thresholds (Hansen, 1999; p.357). While I(.) is the indicator function of threshold values, (λ_1, λ_2) are the threshold parameters to be estimated. Therefore, impact of R&D spillovers is determined by β_1 for the observations with $q_{it} \leq \lambda_1$, β_2 for the observations with $\lambda_1 < q_{it} \leq \lambda_2$ and, β_3 for observations with $\lambda_2 < q_{it}$. In other words, the spillover effect of imported technology might vary depending on threshold variables.

The threshold parameters (λ_1, λ_2), used in double threshold model specification are determined endogenously during the estimation process of the model and threshold variables (q_{it}) are selected

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[1]In this respect, domestic (foreign) R&D spillover variable belonging to sector *i* at time *t*, reflecting intra-sector spillovers together with inter-sectoral ones which are based on input-output relations; comprise of weighted sum of own domestic (foreign) R&D stock of sector *i* together with domestic (foreign) R&D stock of other sectors: $RD_{it}^{d-f} = RD\_own_{it}^{d-f} + RD\_others_{it}^{d-f} = RD\_own_{it}^{d-f} + \sum_{j=1}^{I} w_{ij} RD\_own_{jt}^{d-f}$.

In this specification, foreign R&D variables are formed by foreign R&D stocks weighted by imports. In this regard, $RD_{it}^f = \sum_k (\frac{M_{jkt}}{Y_{jt} + \sum M_{jkt} - \sum X_{jkt}}) RD_{jkt} + \sum_j [w_{ij} \sum_k (\frac{M_{jkt}}{Y_{jt} + \sum M_{jkt} - \sum X_{jt}}) RD_{jkt}]$; while *k* shows Turkey's foreign trade partners and, *i* and *j* are sector indices. M_{jkt}, indicates goods imported from country *k* and classified in sector *j*; Y_{jt}, indicates the total domestic production in sector *j*; and X_{jkt} indicates the volume of exports from sector *j* to country *k*. While RD_{jkt}, represents R&D stock in country *k* in sector *j*; foreign R&D stocks entering domestic sector *i* from other sectors are corrected with input-output coefficients w_{ij}. Perpetual inventory methodology is utilized in calculating the domestic and foreign R&D stocks ($RD\_own_{it}^d$ and RD_{jkt}).

based on factors assumed in the related literature to have effect on the absorptive capacity of a sector. These factors reflect human capital specific to sectors together with each sector's own R&D efforts and structure of the market for final goods. Other control variables used in the structural estimation model are introduced in *Table 1* together with threshold variables used to represent the absorptive capacities specific to industries.

Table 1: Definitions of the Variables

Variable	Definition	Measurement
y_{it}	Output-Labor ratio	Value added / Total hours worked
k_{it}	Capital-labor ratio	Capital stock / Total hours worked
Rd_{it}^{d}	Domestic R&D stock	Weighted sum of cumulative domestic R&D expenditures
Rd_{it}^{f}	Foreign R&D stock	Weighted sum of cumulative foreign R&D expenditures.
TP_{it}	Threshold variable-Technical workers intensity	High technical workers+Administrative workers/ Total number of workers
RI_{it}	Threshold variable- R&D intensity	Total internal R&D expenditures /Sales from production
HH_{it}	Threshold variable- Herfindahl-Hirschman Index	Sum of squared market shares determined by sales revenue

For this study, data of 22 manufacturing sector in Turkey at 2-digit level classified under ISIC Rev.3 over the period 1992-2001 was collected from Turkish Statistics Institute (TurkStat). The data used for establishing production, labor, domestic R&D stocks and threshold variables are obtained from the *Annual Manufacturing Industry Surveys* which are made for the enterprises with 10 or more employees by TurkStat. . Input-Output tables that are used for computing the input-output coefficients was obtained from TurkStat. Capital stock data for sectors was obtained from Taymaz, Voyvoda and Yılmaz (2008). The data related to calculating the R&D stocks of foreign trade partners[2] are obtained from "*OECD ANBERD ed. 9 Rev. 3*" (OECD Industry and Service Statistics-Structural Analysis (STAN) Databases-R&D Expenditure in Industry) database and bileteral import and export volumes have also been obtained from TurkStat.

Estimations made by utilizing Hansen's (1996, 1999) threshold regression techniques are performed in three stages. First, a single threshold regression model is defined, in the second stage, the statistical significance of the obtained threshold parameter is tested. In order to determine the *p-value* of this test, bootstrapping techniques proposed by Hansen (1996, 1999) are performed. If the existence of a threshold effect is determined in the second stage of single threshold estimation,

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[2]Australia, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Israel, Italy, Japan, South Korea, Holland, New Zealand, Norway, Russia, Singapore, Sweden, United Kingdom, United States of America.

the second threshold effect is also tested and if this effect is confirmed, the double threshold model is estimated. [3].

4. EMPIRICAL RESULTS

Prior to progressing with threshold regression analysis, a basic model is estimated under the assumption that threshold effects do not exist :

Basic Model:

$$lny_{it} = \mu_i + \alpha lnk_{it} + \gamma_1 lnRD_{it}^d + \gamma_2 lnRD_{it}^f + e_{it} \, , \, e_{it} \sim iid(0, \sigma^2)$$

Table 2: Coefficient Estimations: Basic Model

Variable	Coefficient	OLS-SE	White SE
k_{it}	0.3214***	0.0620	0.0855
RD_{it}^d	0.0191**	0.0075	0.0089
RD_{it}^f	0.0163	0.0086	0.0097

***,**,* represent statistical significance at 1%, %5, and 10% level respectively

The estimated coefficients of simple model coefficients are presented in *Table 2*. The signs of the coefficients are in accordance with our expectations. Coefficient of Capital-work force ratio is statistically highly significant. The coefficient of the domestic R&D variable which includes the impact of intra-sectoral spillovers together with the inter-sectoral spillovers is positive and statistically significant at 0.05 level. This indicates the existence of domestic technology spillover in the manufacturing industry. The coefficient related to foreign technology spillover has also a positive value in accordance with expectations, however, it is not statistically significant within the conventional statistical boundaries.

Model A: Human Capital-Technical Workers Intensity as the Threshold Variable

$$lny_{it} = \mu_i + \alpha lnk_{it} + \gamma_1 lnRD_{it}^f + \beta_1 lnRD_{it}^d I(TP_{it} \leq \lambda_1) + \beta_2 lnRD_{it}^d I(\lambda_1 < TP_{it}) + e_{it}$$

Model A established under the assumption that the relationship between the domestic R&D stock[4] and average labor productivity may not be linear is estimated in order to determine whether human capital changes the efficiency of domestic technology spillovers.

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[3]The threshold model can easily be expanded according to more than two threshold parameters. However, as a result of the low number of observations this was not preferred.

[4] R&D stock variables are generated as to include the embodied technology in intermediate and investment goods including both intra- and inter-sectoral technology spillovers (see footnote 1)

Table 3: Tests for the threshold effects: Technical workers intensity

Single Threshold	
F_1	*32.92***
p-value	*0.02*
(%10, %5, %1 critical values)	*(22.91, 27.14, 42.50)*
Double Threshold	
F_2	*16.80*
p-value	*0.23*
(%10, %5, %1 critical values)	*(19.90, 23.45, 37.79)*

Note: *F-statistics and p-values are obtained by 300 times repetition of the bootstrapping procedure*. ***, ** and * represent statistical significancy at %1, %5 and %10 levels respectively.

*Table 3 s*hows the Likelihood-ratio (LR) test results carried out to test the statistical significance of the estimated threshold values. Accordingly, for the single threshold effect, *F*test statistics is significant at 5% with a *bootstrapping p-value* of 0.02. A second threshold effect is not detected in the model. The threshold level of 0.3315 estimated at 71. Quantile verifies that the regression relation is not linear. Moreover the confidence interval which is constituted by exploiting the likelihood ratio test statistics regarding the threshold parameter minimizes the uncertainty about location of it (*Table 5*). Regression slope coefficients together with OLS standard errors and White-corrected standard errors are presented in *Table 4*. The estimated threshold value divides the observations into two regimes and the efficiency of the domestic R&D spillover above the threshold level rise significantly. Accordingly, the industrial structure of human capital changes the efficiency of domestic technology spillovers and industries above a specific threshold are able to benefit from the externalities by domestic R&D investments more than those which remain below the threshold.

Table 4: Coefficient Estimations: Single Threshold Model – Technical Workers Intensity

Variable	Coefficient	OLS-SE	White-SE
k_{it}	0.3599***	0.0724	0.0995
RD_{it}^f	0.0166	0.0092	0.0108
$RD_{it}^d I(TP_{it} \leq 0.3315)$	0.0169*	0.0082	0.0095
$RD_{it}^d I(\, 0.3315 < TP_{it}\,)$	0.0218**	0.0097	0.0109

***, ** and * represent statistical significance at %1, %5 and %10 levels respectively

Table 5: Threshold Estimations: Technical Workers Intensity

	Estimation	95% Confidence Interval
λ_1	0.3315**	[0.331586, 0.337375]

***, ** and * represent statistical significance at %1, %5 and %10 levels respectively

In conclusion, the estimation results for Model A in which technical workers intensity is used as a threshold variable show that human capital embodied in labor force enhance the absorptive capacities of manufacturing industries and this human capital component change the efficiency of domestic technology spillovers. These results pertaining to the human capital factor are consistent with other studies in the literature which emphasize the importance of human capital in the

absorption of external technologies (Coe, Helpman, Hoffmaister, 1997; Wang, 2005; Schiff and Wang, 2010; Teixeira and Fortuna, 2010) .

Model B: Internal R&D Efforts-R&D Intensity as the Threshold Variable

$$\ln y_{it} = \mu_i + \alpha \ln k_{it} + \gamma_1 \ln RD_{it}^f + \beta_1 \ln RD_{it}^d I(RI_{it} \leq \lambda_1) + \beta_2 \ln RD_{it}^d I(\lambda_1 < RI_{it})$$
$$+ e_{it} \; e_{it} \sim iid(0, \sigma^2)$$

When R&D intensity variable is applied to the structural model as a threshold variable, which is defined as the R&D expenditures to sales ratio, a single statistically significant threshold can be estimated. *Table 6* shows the *Likelihood-ratio (LR)* test results for single and double threshold effects. The results show that while test statistics for single threshold with a *bootstrapping p-value* of 0.00 is significant at 1% level, the second threshold effect with a *p-value* of 0.20 is not statistically significant within conventional boundaries. According to this finding there is a breaking point in terms of the efficiency of domestic technology spillovers for Turkish manufacturing industry sectors, depending on their own R&D efforts. Since the scope of benefiting from exogenous technologies includes learning by doing as well, it is quite meaningful that a threshold value in terms of sectors' own R&D efforts i.e. investing in their human capital and absorptive capacities is found for the manufacturing industry of a developing country [5] In *Table 8* the asymptotic confidence interval of the threshold parameter regarding R&D intensity variable can be seen. There is no room for uncertainty regarding the location of the threshold value estimated in this confidence interval.

Table 6:Tests for the threshold effects: R&D intensity

Single Threshold		
F_1		*50.41***
p-value	*0.00*	
(%10, %5, %1 critical values)		*(17.19, 22.67, 36.10)*
Double Threshold		
F_2		*11.81*
p-value	*0.20*	
(%10, %5, %1 critical values)		*(15.85, 17.76, 23.96)*

Note: *F-statistics and p-values are obtained by 300 times repetition of the bootstrapping procedure*. ***, ** and * represent statistical significancy at %1, %5 and %10 levels respectively.

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Table 7: Coefficient Estimations: Single Threshold Model – R&D Intensity

Variable	Coefficient	OLS-SE	White SE
k_{it}	0.3364***	0.0696	0.0914
RD_{it}^f	0.0166	0.0093	0.0105
$RD_{it}^d I(RI_{it} \leq 0.0012)$	-0.0058	0.0124	0.0139
$RD_{it}^d I(0.0012 < RI_{it})$	0.0214**	0.0096	0.0108

***, ** and * represent statistical significance at %1, %5 and %10 levels respectively

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[5]See. Griffith, Redding and Van Reenen (2000); Eicher and Kim (1999).

Table 8: Threshold Estimations: R&D Intensity

	Estimation	**95% Confidence Interval**
λ_1	0.0012**	[0.0012, 0.0012]

***, ** and * represent statistical significance at %1, %5 and %10 levels respectively.

In Model B where capital-labor ratio and foreign R&D stock is used as control variables the regimes generated by the threshold parameter differentiate the slope parameters regarding domestic R&D stock (see *Table 7*). Accordingly, the negative and insignificant coefficient in the relavent regime below the threshold value for R&D intensity indicates that domestic technology spillover is non-existent. The relevant coefficient over the threshold turns to be positive and is found statistically significant. This strong threshold effect supports the view that for developing countries the usage of external technologies; in other words taking advantage of external R&D activities is dependent on the own R&D efforts of the firms and industries themselves (Cohen and Levinthal, 1989; Eicher and Kim, 1998; Kinoshita, 2000). Accordingly, industries which exceed a certain threshold in R&D intensity are able to take the advantage of external technologies.

Model C: Market Structure-Herfindahl Hirschman Index as the Threshold Variable

$$lny_{it} = \mu_i + \alpha lnk_{it} + \gamma_1 lnRD_{it}^f + \beta_1 lnRD_{it}^d I(HH_{it} \leq \lambda_1) + \beta_2 lnRD_{it}^d I(\lambda_1 < HH_{it})$$
$$+ e_{it} \ e_{it} \sim iid(0, \sigma^2)$$

Tablo 9: Tests for the threshold effects: Herfindahl-Hirschman Index

Single Threshold		
F_1		49.19***
p-value		0.04
(%10, %5, %1 critical values)		(28.13, 37.23, 45.91)
Double Threshold		
F_2		15.80
p-value	0.176	
(%10, %5, %1 critical values)		(18.76, 21.10, 27.88)

Note: *F-statistics and p-values are obtained by 300 times repetition of the bootstrapping procedure.* ***, ** and * represent statistical significancy at %1, %5 and %10 levels respectively.

Following Model A and *Model B, Model C* was estimated in order to determine whether the structure of the final goods market changes the efficiency of domestic technology spillovers within the assumption that the relation between domestic R&D stock and average labor productivity may not be linear. When Herfindahl-Hirschman index, which represents structure of final goods market in which manufacturing sectors operate, is used as the threshold variable in the structural model, a single statistically significant threshold parameter can be estimated. *Table 9* displays the Likelihood Ratio test results for single and double threshold effects. The results show that while test statistics for the single threshold with a *bootstrapping p-value* of 0.04 is statistically significant, the second threshold effect with a *bootstrapping p-value* of 0.17 is not statistically significant. Based on this finding of the existence of a single threshold, analyses are continued with the single threshold model specification. In this respect, there exists a breaking point for domestic technology spillovers for Turkish manufacturing industry sectors depending on concentration ratio of the markets they operate in. This threshold level of Herfindahl-Hircschman index which is estimated as 0.3286, divides the observations into two different regimes.

Table 10:Coefficient Estimations: Single Threshold Model – Herfindahl-Hircshman Index

Variable	Coefficient	OLS-SE	White-SE
k_{it}	0.3406***	0.0711	0.1082
RD_{it}^f	0.0179	0.0094	0.0116
$RD_{it}^d I(HH_{it} \leq 0.3286)$	0.0198**	0.0083	0.0097
$RD_{it}^d I(0.3286 < HH_{it})$	0.0161	0.0089	0.0108

***, ** and * represent statistical significance at 1%, %5, and 10% levels respectively.

Table 11: Coefficient Estimations: Herfindahl-Hircshman Index

	Estimation	95% Confidence Interval
λ_1	0.1286***	[0.308902, 0.349670]

***, ** and * represent statistical significance at 1%, %5, and 10% levels respectively.

While the coefficient of the domestic R&D variable found to be positive and statistically significant above the threshold regarding market concentration the relevant coefficient becomes smaller and loses its significance. Accordingly, the efficiency of domestic technology spillovers changes among industries depending upon the level of market concentration. In other words, the market structure affects the absorptive capacities of industries and changes the distribution of externalities incurred from domestic R&D activities. For this reason, in contrast with the Schumpeterian approach, and parallel with the view which argues that the absorption of exogenous technologies in markets with high concentration ratios is more difficult (Dorfman, 1987, Parente and Prescott, 1999; Roy and Sikdar, 2003; Mcgahan and Silverman, 2006), the efficiency of technology spillovers increase below a threshold level of Herfindahl-Hircshman index. Accordingly, it can be argued that there is an adverse relation between the relevant market structure indicator and absorptive capacity. In other words, more competitive industries can benefit more from technology spillovers.

5. CONCLUSION

In R&D based endogenous growth theory, R&D is not a direct production factor and expands the limits of technological knowledge. Technological knowledge accumulation is generated by all technical innovations emerged as a result of R&D activities. In the R&D type growth modeling pioneered by Romer (1990) learning by doing and replicating are also implicit assumptions in addition to innovation. When innovations which arise as a result of R&D activities enter production processes, technological knowledge will spill over between economic units by Arrow's learning by doing and replication impacts as a byproduct. These impacts which develop in accordance with the non-rivalness and non-excludability characteristics of technology are called spillover effects by Romer (1990) and are revealed in the form of positive externalities.

The capability of production units to apply existing technologies is also dependent on the success of their adaptability to technology development processes (Keller, 2002). This adaptation provides economic units the opportunity to study exogenous advanced technologies, define them, adapt them, use and diffuse them. These concepts which are defined as absorptive capacity entirely are essential in explaining the differences in countries' benefiting from technology spillovers.

In this study the literature on technology spillovers is utilized together with the discussions on absorptive capacity. In this work, based on the assumption that technology/R&D spillovers which emerge as externalities resulting from R&D investments take place through intermediate and capital goods which are used as inputs by manufacturing industry sectors; technology spillovers of 22 Turkish manufacturing sectors classified under ISIC Rev.3 were examined within the scope of absorptive capacity over the period 1992-2001.

In this scope, existence and efficiency of technology spillovers are studied considering several factors thought to have effect on absorption of technology. These factors assumed to affect absorptive capacity are human capital together with each sector's own R&D efforts and structure of the final goods market. Hansen's (1999) threshold regression techniques are applied on a structural model obtained from a Cobb-Douglas type production function by which way the efficiency of technology spillovers is allowed to vary between regimes determined in relation with the absorptive capacity variables.

Above all, the results of the analyses proves the presence of technological knowledge spillovers in the Turkish manufacturing industry. Results of the estimation of threshold regression models defined for different absorptive capacity indicators indicate that using linear models in analysing technology spillovers may produce biased results. For example, it is evident that the efficiency of technology spillover varies above and below a critical value for human capital. The results show that human capital factor increases the absorptive capacity of sectors. Results of estimations for the structural model where R&D intensities specific to sectors are defined as threshold variables show that technology spillovers are less efficient below a critical value about internal R&D efforts of sectors, and are much more efficient above this critical value. Therefore industries that can exceed a certain threshold level can benefit from external R&D activities. Similarly, estimation results indicate that, for sectors in the Turkish manufacturing industry, there is a certain breaking point for domestic technology spillovers depending on the product market concentration ratios. When the Herfindahl-Hirschman index which is an important indicator of the market structure is used as the threshold variable, the threshold effect varies the slope coefficient for domestic R&D variable. While the aforementioned coefficient is positive and statistically significant below the estimated threshold, it is insignificant above the threshold. For this reason more competitive industries can benefit more from technology spillovers.

In conclusion, in order for the Turkish manufacturing industry sectors to benefit from external R&D investments, in is essential that they invest in their own absorptive capacities. In this regard, increasing the share of R&D expenditures in industrial sectors is vastly important for Turkey, as a developing country behind the technological frontier, in order to take its place among countries with strong competitive power. Similarly it has been concluded that reducing the oligopolistic structure in the Turkish manufacturing industry and increasing the conditions of competition can increase the potential of industries taking advantage of theexternalities of R&D activities.

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HERD BEHAVIOR IN BIST: AN APPLICATION ON INDIVIDUAL STOCK INVESTORS

Suleyman Iç[1], M. Burak Kahyaoglu[2]

[1] Ondokuz Mayıs University, Faculty of Economics and Administrative Sciences, suleyman.ic@omu.edu.tr.
[2] Ondokuz Mayıs University, Faculty of Economics and Administrative Sciences, burak.kahyaoglu@omu.edu.tr.

KEYWORDS	ABSTRACT
Herd behaviour, behavioural finance, decision making under uncertainty.	The aim of this study is to examine the presence of herd behavior in BIST during the term of 2009-2011. For the first time, data of real investors are employed in testing the presence of herd behavior. Secondary data obtained from the point of surveys carried out in previous works or profits of stocks are used. In line with the objectives of the study, the relations between transaction volume of 100 domestic individual stock investor making transactions during the term of 04.01.2009-31.12.2011 and BIST's whole transaction volume are investigated. In the second part of the study, the relations between the transaction volume of individual investors and transaction volumes of domestic and foreign investors are investigated. Subsequently, the differences in terms of the level of indicating herd behavior according to socio-economic and demographic factors of the investors are investigated. As a result of Univariate and Multivariate Regression Analyses, findings pertaining to the presence of herd behavior in terms of individual investors in BİST are obtained. Furthermore, it has been seen that a set of socio-economic and demographic factors are influential upon the level of indicating herd behavior.

1. INTRODUCTION

When we consider that system is processed with 'information', as a result of advancements made in communication as a reform and integration of the infrastructure of the communication to financial system, the speed of reactions to the information which is newly submitted is expressed within a few seconds. Even security sale – purchase software can succeed in reducing the speed of these reactions to below the seconds. When we consider from this aspect, the efficiency of financial markets should have increased when compared to the period in which Fama has developed the theory. However, what appears is that the process of making decision about new investment not only accelerates the information flow but also has increased the information load required to be evaluated 'rationally' by the investors equally. In this dynamic environment, it is frequently argued that decisions of 'others' contain more important information when compared to the past in terms of investors who have fallen in a great pool of information. As a matter of fact, the example which is basically the example for the operation of stock exchange given by Keynes is not even in the phase of crawling when compared to the conditions of our days where communication technology is dominant. Keynes (2008:140) has identified professional investment as 'activating intelligence to estimate what the average opinion is'. This definition implicitly denies the concept of market efficiency and expresses that the shortest (effortless) way to reach to the aim (capital profit) is to estimate the decisions of others. In today's modern financial markets,

even investors don't need to make this estimation. It is because the opinions of others about marketable securities are concretized in prices simultaneously.

Leaving the subjective evaluation pertaining to the any status of an individual aside, behaving in line with the ideas of majority is defined as 'herd behavior'. Being defined as the revision of opinions with the effect of group involved in decision-making of a person irrationally, herd behavior causes prices of stocks to be separated from the basic values and increases volatility in financial markets. The fact that the prior prediction of our today's 'capital profit' and that 'rapid transaction' has a key importance has increased the flow of the capital among the financial assets and made it to have potentiality to destroy the effects of herd behavior. Finally, the reflections of 'what is made by the majority is true' have been seen in 2008 Global Financial Crisis in the most painful way.

The aim of this research is to investigate the effects of 'Herd Behavior' on the 100 domestic individual stock investors who made transactions on BIST during the term of 2009-2011 and the extent to which the socio-economic and demographical characteristics affect the herd behavior of the investors. Defining the differences of groups with different demographic and socio-economic characteristics in terms of investment behavior is quite important for understanding the operation of financial markets. For this purpose, the relations between transaction volume of individual investors and the BIST transaction volume and the transaction volumes of domestic and foreign investors are investigated in the research where data derived from the real purchase – sale information belonging to 100 domestic individual investors is used. As a result of the Univariate and Multivariate Regression Analyses, findings are obtained to indicate that domestic individual investors, particularly, foreign investors are affected from the transaction volume.

1. Herd Behavior and Herd Behavior Theories in Financial Markets

In financial literature, herd behavior is defined as 'the simultaneous co-transaction by a group of investors in the same direction in relation to the same assets' (Döm, 2003:135). Dewenow and Welch (1996) define herd behavior as 'correlated behavior models between the individuals'. An issue which is important in terms of financial markets is the set of dynamics which causes action in unison rather than causing the investors to act together. Bikhchandani and Sharma (2000) argue that simultaneous and similar behaviors of the investors seeking profit maximization having the same set of information shouldn't be surprising. This situation which can be also defined as herd behavior oriented with basic information occurs as a result of actions of investors who make similar decisions on the basis of new information supplied to the market and causes the prices to approach up to the real values. At this point, investors make their subjective evaluations about the investments and ignore the ideas of other investors about the investment instrument. Herd behavior which is accepted to be important for financial markets and to destroy the market is the real herd behavior which has occurred as a result of making decisions in line with the opinions of other rather than their own evaluations. During the process of decision-making, this situation in which the opinions of others are internalized and the opinions of leaders of herd are priced are argued to cause the prices of stock quotations to be separated from their basic values and make the financial system fragile by increasing the volatility. In the study carried out by Choe, Kho and Stulz (1999) on Korean capital market, herd behavior is reported to increase the market risk and fragility. Similarly, Park and Sabourian (2006) have expressed that investors are influenced by the decisions of other investors and involved in herd behavior, as a result of which learning process of market is influenced and market risk is increased.

Herd behavior in financial markets is explained within two basic approaches, namely rational herd behavior and irrational herd behavior.

1.1. Rational Herd Behavior

Decamps and Lovo (2002) state that the pre-requisite for qualifying an investment decision as herd behavior is that an investor changes its investment decision in line with the decisions of other investors. According to Altay (2008), the fact that other investors' decisions dominate the personal decisions, as a result of which herd behavior is exhibited, cannot be essentially qualified as irrational behavior. On the other hand, according to Bikhchandani and Sharma (2000), general reasons driving one investor to change the decision irrationally after observing the other investors are as the following: Anxiety that information level of other investors about the profits of the investments is higher (particularly, in cases where they think differently from other investors). Employment and pricing policies of money managers make it rational to have similar investment decisions. Individuals have internal choice for indicating compliance. According to Bikhchandani, Hirshleifer, Welch (1998), the efforts to analyze the alternatives and to make their own decisions is more time-consuming and costly than relying on information of other people.

There are 3 types of irrational herd behavior in theory. These are Information-Based Herd Behavior and Cascades, Reputation-Based Herding and Compensation-Based Herding

1.1.1. Information-Based Herd Behavior: Information Cascades

This theory explains herd behavior over informational effects. When considering within this concept, the extent to what today's communication facilities have reached and the efforts of financial system to use such facilities in the most advanced way make this theory even more important. In the pioneering work, Banerjee (1992) has stated that investors imitate other investors rather than making use of their information and this situation can be characterized as herd behavior. Informational cascades argue that the individuals reach the information pertaining to the status by observing the decisions of their predecessors. In the model of informational cascades, informational cascade is formed in a way in which the previous actions of other investors are internalized in terms of each investor and become parameters for decisions and upon the domination of previous actions of others over their own opinions. According to Alevyet. al. (2003:2), whether the previous transactions are in compliant with the personal opinions or not is regarded in informational cascades, everybody imitates the decisions of their predecessors and the information commencing this cascade in the beginning is perceived to be optimal information. This concept is defined as social learning or observation-based learning (Bikhchandani and Sharma, 2000; Bikhchandani, Hirshleifer and Welch, 1998). Peterson (2012:311) argues that investors take the price movements as the basis for choosing their directions considering that price movements reflect the decisions and actions of the better-informed investors and this situation creates information cascades. The importance of informational cascades from the perspective of financial markets is to question whether the positions obtained by those starting the first transactions are correct or not. In our today's financial markets, 'speed' is one of the most important performance indicators and the potentiality of converting correct decisions into cascades is higher as a result of acting with this reflex when considering that failure of decision-making has a severe alternative cost.

The model accepted to be pioneering in measurement of informational cascades is the LSV measurement developed by Lakonishok, Shleifer and Vishny'nin (1992). This model is based on the similar directional transactions made by sub-groups of market participators. The study has shown that money managers don't significantly exhibit herd behavior. Grinblatt, Titman and Wermers (1995) have determined very little herd behavior in the paradigms of the studies where they used LSV measurement. The second most important methodology developed for determining the herd behavior is the model developed by Christie and Huang (1995) based on the cross-

sectional deviations of share profits. They couldn't encounter with a remarkable herd behavior in their studies where they have searched the existence of herd behavior in capital markets of the United Stated of America. In their studies where the model of Christie and Huang (1995) is used by Chang, Cheng and Khorona (2000) and where whether the fund managers in America, Hong Kong, Japan, South Korea and Taiwan exhibit herd behavior or not is researched, herd behavior is determined only in South Korea and Taiwan. Altay in his research on herd behavior in BIST (2008) has applied test methodology based on examining the cross-sectional variables of the share profit rates and reached to the evidence about the existence of herd behavior for the period of 02.01.1997-29.02.2008. Demirer, Gubo and Kutan (2007) have examined the movements of market profits in Africa, Asia, East-West Central Europe, Middle Asia and Latin America according to S&P 500 index, MSCI world index and petrol prices. No evidence on herd behavior could be found in any markets excluding Asia and Middle East. In the research where the method based on methodology based on cross-sectional variation is applied to BIST by Doğukanlı and Ergün (2011), no evidence could be found in relation to the existence of herd behavior. Kayalıdere (2012) found out that the effect of herd behavior is seen during the term of 1997-2004, yet this effect weakens in the period of 2005 – 2012 according to his research on the existence of herd behavior effect in BIST by using two different models developed by Christie and Huang (1995) as well as Chang, Cheng and Khorana during the terms of 1997-2012, July.

1.1.2. Reputation-based Herding

The concept of reputation-based herding developed by Scharfstein and Stein (1990), Trueman (1994), Zweibel (1995), Prendergast and Stole (1996) and Graham (1999) derives from the anxieties of fund managers pertaining to their respective performances among them. Fund managers purchase similar positions for the purposes of directing the opinions of others about their capacities and of not falling short of performances of other fund managers (Dassiou, 1999). In other words, fund managers leave their analytic capacities aside for the purposes of avoiding lower performance than the others and fail to have higher performance than the average performance. Altay (2008) expresses that the first information group used for investment decisions due to uncertainties of fund managers in their assessment capacities and in obtaining information about the asset prices changes according to the characteristics of the investor who makes the first investment. As a result of this approach, personal information is put aside, and herding occurs by imitating the decisions of the first investor (Bikhchandi and Sharma, 2001: 291-292). According to Scharfstein and Stein (1990), even if the managers become subject to bad results because of herding, they will have valid excuses for being tempted by the majority and their reputation will not decrease. Furthermore, the position of a manager who loses money while everybody is making profit will be discussed. When considering on this base, it may be argued that herding is accepted to be a rational behavior from the point of view of fund managers.

1.1.3. Compensation-based Herding

Compensation-based herding is created upon the basis of policy of compensating the fund managers. According to this, in cases where the compensation of a fund manager is determined according to relative performance of other fund managers, herding will develop (Borensztein and Galos (2000). In other words, herding will occur when compensation of a fund manager becomes a function of performances of other fund managers (Altay, 2008:32). Bulow, Geankoplos and Klemperer (1985) in their study indicate that follow-up of fund managers each other will give birth to a result which increases the benefits of both the sides if funds managers have strategically supplementary role for each other. Under these conditions, the decisions of others from the perspective of a fund manager become one of the parameters evaluated in the process of investment decision-making and the risk for low compensation decreases as a result of follow-up

of one another by the managers. On the contrary, if the fund managers compete with each other, herding may not occur (Brunnermeier, 2001:148 and Bikhchandi and Sharma, 2001: 292-293). Managers who reject their own specific information but follow other fund managers will cause their assets to be mispriced (Çoban, 2009:36).

1.2. Irrational Herd Behavior

While rational herd behavior results from the informational grounds, irrational herd behavior is associated with the social pressure and fashion. The point which differentiates irrational herd behavior from rational herd behavior is their failure to reveal their information although they have certain information and their tendency to comply with the decision of group (Döm, 2003). The compliance herein is defined as the change in opinions and behaviors of an individual as a result of real or assumed pressure due to a group or individual (Aronson, 1992). In 1952, the participators are divided into group of 8-10 persons in the experiment designed by social psychologist Solomon Asch for the purposes of investigating the extent to which social pressure affects the risk perception of a person and a subject is placed in each group. Group members other than the subjects are kept under the control of the researcher and the subjects are not aware of being tested. Each participator in group is requested to look at the diagram put in front of them and tell which line among the vertical three lines on the right part of the diagram resembles most to the line on the left of the diagram (the answer was explicitly 1st line). Asch has wanted the group members outside the subject to give wrong answers in 12 trials among 18 trials and 37 persons of 50 persons who have participated in this experiment have expressed the same opinion with the majority at least once. As a result of these trials, Asch has concluded that people comply with the majority due to two reasons, namely, the desire to be loved / accepted in the group and tendency to believe that the group knows better than themselves (Asch, 1951). In relation to this matter, Döm (2003:147) argues that an individual becomes exposed to trouble when his opinion is in conflict with the information of the group but complies with the decision of group due to the anxiety that group member would believe him to be incapable and due to fear of being outcast from the group.

2. EFFECT OF HERD PSYCHOLOGY: AN APPLICATION ON BIST INDIVIDUAL SHARE INVESTORS

2.1. Objective of the Study and Hypotheses Suggested

The objective of the study is to investigate the effect of 'Herd Behavior' on 100 domestic individual investor who made transactions in BIST in the term of 2009-2011 and to examine the effects of socio-economic and demographical characteristics on the level of being affected by the herd behavior. Besides, when the efficiency of foreign investors in BIST is taken into consideration, it is known that domestic individual investors follow the transactions of foreigner investors closely. For this reason, within the scope of this study, relations between the BIST transaction volume and transaction volume of individual investors are examined. In the subsequent phase of the analysis, the relations between transaction volume of foreigner investors and the domestic investors and the transaction volumes of individual investors are examined.

H_1= There is positive relation between the BIST transaction volume and domestic individual investors.

H_2= There is relation between the gender and the level of being affected by herd behavior.

H_3= There is relation between the age and the level of being affected by herd behavior.

H_4= There is relation between the marital status and the level of being affected by herd behavior.

H_5= There is relation between the income level and the level of being affected by herd behavior

H_6= There is relation between the educational level and the level of being affected by herd behavior.

H_7= There is relation between the profession and the level of being affected by herd behavior.

H_8= There is positive relation between transaction volume of foreigner investor and transaction volume of domestic individual investors.

2.2. Research Methods and Data

For the purposes of testing the hypotheses provided below, Univariate and Multivariate Regression Analyses are carried out. In the research, real data pertaining to stock purchase-sale transactions made by 100 individual investors in BIST between January 4, 2009 and December 31, 2011 is employed. Because the herd behavior is to be investigated in the study, using real data is particularly chosen.

Data supplied from an intermediary institution of a bank has the contents of gender, age, profession, marital status, educational level and monthly income of an investor as well as the dates and time, price, day, amount and session pertaining to purchase-sale transactions of stocks. Random sampling is used for determining the investors whose data will be included in study. The investors whose data is used within the scope of the work reside in different parts of Turkey. Frequency and percentage distribution pertaining to the sampling of the work is provided in Table 1. When we examine the frequency and percentage distributions of the sample, we see that these are consistent with the findings of Ede (2007), Döm (2003) and Doğukanlı and Önal (2000), in other words, the sample of the study represents the investors of BIST strongly.

Table 1. Sample Frequency and Percentage Distributions

| Age	Frequency	%	Gender	Frequency	%
18-25	1	0,01	Male	16	0,16
26-39	27	0,27	Female	84	0,84
40-55	55	0,55	Total	100	100
55-	17	0,17	**Marital Status**	**Frequency**	**%**
Total	100	100	Married	73	0,73
Education	**Frequency**	**%**	Single	15	0,15
Primary School	9	0,09	Not-known	12	0,12
High School	21	0,21	Total	100	100
University	43	0,43	**Profession**	**Frequency**	**%**
Post-graduate	3	0,03	Unemployed	2	0,02
Not-known	24	0,24	Worker	5	0,05
Total	100	100	Civil servant	7	0,07
Monthly income level	**Frequency**	**%**	Self-employed	16	0,16
0-999 TL	28	0,28	Expert	47	0,47
1.000 TL-2.499 TL	30	0,3	Housewife	3	0,03
2.500 TL-3999 TL	26	0,26	Retired	20	0,20
4.000 TL-	14	0,14	Total	100	100
Total	100	100			

On the basis of information belonging to purchase – sale transactions of stocks obtained from the mediating institution within the scope of the research, transaction volume data of the sampling is calculated on monthly basis and derived. The reason why the data is arranged on monthly basis is

that the transaction volume of foreign investors in BIST is arranged on monthly basis. By adding the monthly transaction volume belonging to 100 domestic individual investors included in the sampling, monthly volume series belonging to sampling for 2009-2011 period (for 36-months) is formed. BIST monthly transaction volume of that period and monthly transaction volume of foreign investors are obtained from the database.

2.3. Findings and Discussion

For the purposes of defining the effects of BIST transaction volume on the transaction volume of individual investors, Univariate Regression Analysis is conducted. Then, data set is filtered according to gender, age, marital status, monthly income status, educational level and professional groups and 13 different kinds of data set are obtained and by repeating Univariate Regression analysis, the effects of socio-economic and demographic factors are researched.

Graphics 1.Monthly % Change in Transaction Volume (Sampling – BIST)
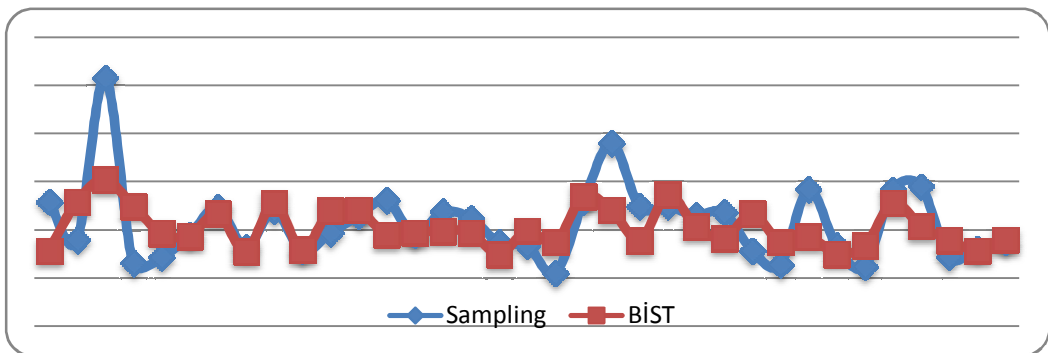
The relations between the transaction volume pertaining to sample and transaction volume of BIST are indicated in graphics no 1. As seen from the graphics, it may be argued that there is positive relation between the transaction volume of BIST and transaction volume of individual investors. Results of basic model and regression analyses created for the purposes of determining the effect of BIST transaction volume on the transaction volume of individual investors are provided below:

$$TVind = \alpha + \beta_1 TVBist + \epsilon$$

TVind   = Transaction Volume of Individual Investors

$TVISE$ = Transaction Volume of BIST

ϵ = Error Term

It is seen in Table 2 that all the models apart from 4 models (3,4, 12 and 14) are significant (Column 7) and BIST transaction volume as an independent variable from these models explain the change on the transaction volume of individual investor which is a depending variable at the ratios ranging from 44 percent to 14 percent of such change (Column 5). When we look at the contributions made by the independent variable to models, it is seen that TVBist variable makes contributions to the model in all the models (column no 8.1). It is seen that there is positive relation between the BIST transaction volume and the transaction volume of individual investors in all the models created. In other words, as it is expected, as the BIST transaction volume

decreases, transaction volume of individual investors decreases. These results may be interpreted to be strong indicators about the validity of herd behavior in BIST; and consequently, H_1 hypothesis is accepted.

Table 2.The Effect of BIST Transaction Volume on the Transaction Volume of Individual Investors

When we examine in terms of socio-economic and demographic groups, we see that male investors (Sig. 0.001; R_2. 0.36) exhibit more tendency to herd behavior, whereas the female

Mod. No (1)	Model Explanation (2) $TVind = \alpha + \beta_1 TVBist + \varepsilon$	F(3)	R(4)	R^2 (5)	Adj R^2(6)	Sig. (7)	TVBIST (8)	
							Beta1 (8.1)	Sig. (8.2)
1	Full Sampling	24.883	0.65	0.42	0.40	0.000	0.650	0.000
2	Male	19.743	0.60	0.36	0.34	0.000	0.606	0.000
3	Female	0.254	0.08	0.00	0.00	0.617	0.086	0.617
4	Group of 18-40 Age	2.673	0.27	0.07	0.04	0.111	0.270	0.111
5	Group of 41 Age and Above	27.340	0.66	0.44	0.42	0.000	0.668	0.000
6	Married	11.282	0.49	0.24	0.22	0.002	0.499	0.002
7	Single	14.751	0.55	0.30	0.28	0.001	0.550	0.001
8	Income group of 0-2.499 TL	14.745	0.55	0.30	0.28	0.001	0.550	0.001
9	Income group of over 2.500 TL	20.772	0.61	0.37	0.36	0.000	0.615	0.000
10	Graduate of Secondary / high school	5.640	0.37	0.14	0.11	0.023	0.377	0.023
11	Graduates / Post-graduates	9.949	0.47	0.22	0.20	0.003	0.476	0.003
12	Group of Expert Profession	1.867	0.22	0.05	0.02	0.181	0.228	0.181
13	Self-employed persons, workers and civil servants	22.697	0.63	0.40	0.38	0.000	0.633	0.000
14	Retired Persons and Housewives	0.496	0.12	0.01	-0.01	0.486	0.120	0.486

investors don't exhibit herd behavior (Sig. 0.617; R^2. 0.00). Female investors can make investment decisions independently from the transaction volume in BIST. As a result of the fact that risk perception of male is lower than that of women, their investment horizons are shorter than the horizons of females. In addition to this, when we consider the sensitivity of BIST particularly to the external markets, the tendency of herd behavior of males can be understood more clearly. On the other hand, it may be said that female investors who have higher perception of risk and longer investment horizon want to focus on long term results instead of following the short-term trend of BIST. According to this conclusion, H_2 hypothesis is accepted. When we deal with the issue in terms of age groups, it may be argued that the change in the transaction volume of individual investors between the ages of 18-40 may not be explained by the change in BIST transaction volume (Sig. 0.111; R^2. 0.07), yet the individuals involved in the group of 41 and older people tend to show herd behavior (Sig. 0.000; R^2. 0.44) and H_3 hypothesis is accepted. Generally speaking, when we assume that the youth act with the motivation of individualization and proving themselves at higher rates, the reason why the investors in the group of 18-40 move independently from the herd can be explained.

When we look from the perspective of marital status, it is argued that single investors (Sig. 0.001; R_2. 0.30) exhibit tendency to herd behavior more than married investors and H_4 hypothesis is accepted. When we look at from the perspective of level of monthly income, as the income

increases, the tendency of herd behavior increases and according to this, H_5 hypothesis is accepted. When it is examined in terms of educational level, the investors at the level of university and post-university levels (Sig. 0.003; R^2. 0.22) tend to exhibit herd behavior at higher rates when compared to the investors of graduates from secondary or high schools (Sig. 0.023; R^2. 0.14) and according to this, H_6 hypothesis is accepted. In the same way, the results appear to be more meaningful when explaining why the risk perception of single investors than the married persons, risk perception of investors in the group of high income than group of lower income and risk perceptions of the group with higher educational level than the group with lower educational lever is lower. When we consider that lower risk perception causes short-term investment horizon, following the herd in terms of individual investors in BIST will be perceived to be rational behavior. Finally, when we look at from the perspective of professional groups, it is seen that the change in the transaction volume of expert profession group and housewives and the retired persons may not be explained by the change in volume transaction in BIST, yet 66% of change in transaction volume of self-employed persons, workers and civil servants is explained by the change in the transaction volume of BIST. Architects, chemists, bankers, academicians and lawyers and etc. are evaluated as 'expert' profession within the scope of working. When it is assumed that the self-reliance of the investors included in this profession group on their self-analyses is higher, their tendency not to exhibit herd behavior is accepted normal.

When the results are evaluated generally, we may argue that the findings reflect the relations assumed to be available in literature between the risk perception and demographic and socio-economic factors. As expressed in the literature, willingness of the investors to take risk may change in time depending on the demographic, social and economic conditions such as age, gender, income level and educational level. Demographic and socioeconomic elements form the basic behavior patterns in certain phases of their lives and their point of views. As indicated by the researches made, such behavior patterns are influential on the attitude of an individual towards the individual. Accordingly, it is expressed that financial risk perception of women is higher that the males and these researches support this opinion (Grable and Lytton 1998; Jianakoplos and Bernasek 1998; Hawley and Fuji 1993; Doğukanlı and Önal 2000; Grable and Joo 2000; Döm 2003; Küçüksille 2004; Emektar 2007; Ceyhan 2008). Furthermore, it is argued that financial risk perception increases as the age increases (Hawley and Fuji 1993, Bajtelsmith 1999 and Ceyhan 2008) and that financial risk perception decreases as the income increases (Küçüksille 2004, Grable and Joo 2004, Saraç and Kahyaoğlu 2011). When we look at from the perspective of profession groups, Grable and Lytton (1999) finds that high financial risk tolerance is related to the status of working in a professional job. On the other hand, Küçüksille (2004) has found out that the group which tends to make high-risk investment is the group of retired persons and those who work in financial sector and those who accept the high-risk investments are students, self-employed professions, housewives and workers. When we look from the perspective of educational level, it is argued that financial risk perception decreases as the educational level increases (Küçüksille 2004; Grable and Lytton 1998; Bajtelsmith 1999). Finally, when we look from the perspective of marital status, although generally single persons are accepted to obtain more risks than responsibilities they have, different resolutions shall be accepted (Grable and Joo 2004, Ceyhan 2008, Yao and Hanna 2005, Küçüksille 2004). When it is assumed that investment horizon in BIST is short-term, the weighted aim to obtain capital profit directs the investment decisions and when shallowness of the market is considered and as a result, the opinion of individual investments that acting separately from the 'herd' carries a 'risk' is dominant, the findings of study become meaningful.

Multivariate Regression Analysis is made for the purposes of determining whether transaction volume of foreign investors or volume transactions of foreign investors are important from the perspective of the individual investors in the second part of the study. When we consider the efficiency of foreigner investors in BIST, revealing this difference is considerably important for correct interpretation of markets. The relations between the transaction volume pertaining to sample and transaction volume of foreigner and domestic investors are indicated in graphics no 2. In addition, basic model created within this scope and the results of regression analyses are provided below:

$$TVind = \alpha + \beta_1 TVF + \beta_2 TVD + \epsilon$$

TVind   = Transaction Volume of Individual Inverstors

TVF   = Transaction Volume of Foreigner Inverstors

TVD   = Transaction Volume of Domestic Inverstors

ϵ = Error Term

It is seen in Table 3 that all the models apart from 2 models (17 and 24) are significant (Column 7) and transaction volume of domestic investors and transaction volume of foreigner investors as the independent variables explain the change on the transaction volume of individual investor which is a depending variable at the ratios ranging from 58 percent to 17 percent of this change (Column 5). When we look at the contributions made by the independent variable to models, it is seen that TVF variable makes contributions to the model in all the models excluding models 17 and 24 (column no 9.2). Furthermore, whether there is multi-directional connection among the related models is examined by Variance Inflation Factor (VIF) and the results are indicated on columns no 8.3 and 9.3. In cases where the variance inflation factor is larger than 5, the level of multi-directional connection is accepted to be significant. It is seen that variance inflation factor in all the models is 2,5 and it may be argued that there is not multi-directional connection among the independent variables in these models.

Graphics 2. Monthly % Change in Transaction Volume (Sample – Domestic Investor – Foreign Investor)
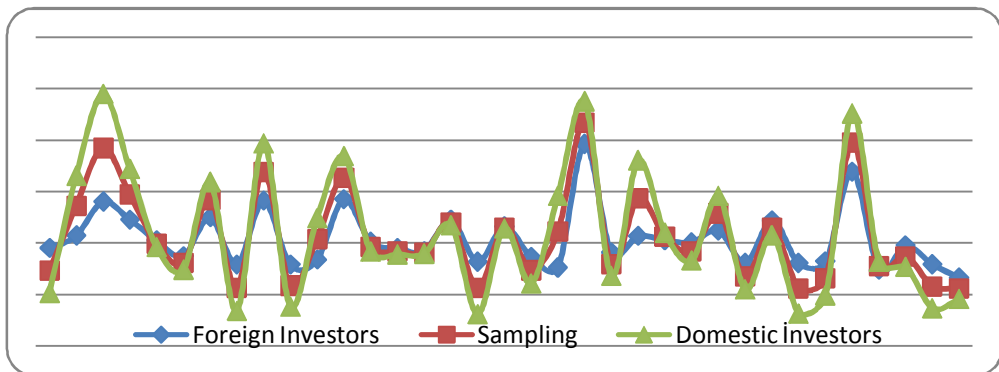
Table 3. Effects of Transaction Volumes of Domestic and Foreigner Investors on Transaction Volume of Individual Investors

Mod. No (1)	Model Explanation (2)	F(3)	R (4)	R^2 (5)	Adj R^2 (6)	Sig. (7)	TVF(8)			TVD (9)		
							Beta (8.1)	Sig. (8.2)	VIF (8.3)	Beta (9.1)	Sig. (9.2)	VIF (9.3)
					(Basic Model) $TVind = \alpha + \beta_1 TVF + \beta_2 TVD + \varepsilon$							
15	Full Sampling	19.879	0.73	0.54	0.51	0.00	0.55	0.00	2,5	0.21	0.25	2,5
16	Male	12.901	0.66	0.43	0.40	0.00	0.42	0.04	2,5	0.27	0.18	2,5
17	Female	0.546	0.17	0.3	-0.2	0.58	0.24	0.36	2,5	-0.10	0.69	2,5
18	Group of 18-40 Age	5.832	0.51	0.26	0.21	0.00	0.68	0.00	2,5	-0.26	0.27	2,5
19	Group of 41 Age and Above	18.755	0.72	0.53	0.50	0.00	0.46	0.01	2,5	0.30	0.11	2,5
20	Married	5.845	0.51	0.26	0.21	0.00	0.17	0.46	2,5	0.36	0.13	2,5
21	Single	16.246	0.70	0.49	0.46	0.00	0.69	0.00	2,5	0.01	0.96	2,5
22	Income group of 0-2.499 TL	13.246	0.66	0.44	0.41	0.00	0.59	0.00	2,5	0.08	0.67	2,5
23	Income group of over 2.500 TL	13.858	0.67	0.45	0.42	0.00	0.44	0.03	2,5	0.27	0.18	2,5
24	Graduate of Secondary / high school	3.024	0.39	0.15	0.10	0.06	-0.17	0.48	2,5	0.51	0.05	2,5
25	Graduates / Post-graduates	11.788	0.64	0.41	0.38	0.00	0.69	0.00	2,5	-0.06	0.77	2,5
26	Group of Expert Profession	5.351	0.49	0.24	0.19	0.01	0.69	0.00	2,5	-0.31	0.20	2,5
27	Self-employed persons, workers and civil servants	23.132	0.76	0.58	0.55	0.00	0.67	0.00	2,5	0.10	0.55	2,5
28	Retired Persons and Housewives	3.599	0.42	0.17	0.12	0.03	-0.64	0.01	2,5	0.61	0.01	2,5

In all the models created excluding model 28, it is seen that there is positive relation between transaction volume of foreign investors and of individual investors. In other words, as expected, as the transaction volume of foreigner investors increases, the transaction volume of individual investors increases, whereas as the transaction volume of foreign investors decreases, the transaction volume of individual investors decreases. These conclusions may be interpreted that foreigner investors are accepted as factor in terms of domestic individual investors and at the same time, foreigner investors lead the herd and have capacity to direct BIST. According to these results, H8 hypothesis is accepted.

When we examine in terms of gender (models 16 and 17), we see that male persons are not sensitive to volume transactions of domestic investors, yet they are significantly influenced from the transaction volume of foreign investors. On the other hand, female investors follow neither domestic nor foreign investors. In the evaluation made according to age groups, transaction volume of domestic investors fails to explain the change in transaction volume of the sample, yet foreigner investors are influential. Besides, we may argue that as the age increases, their tendency to follow the foreign investor increases.

When we examine in terms of marital status, it is seen that change in the transaction volume of domestic investors fails to explain the change in the transaction volume of both the groups. On the other hand, it is seen that the change in transaction volume of foreign investors explain the change in the transaction volume of single investors two times more than that of the married persons. When we look in term of income groups, a great difference is remarkable between the groups of higher and lower income. From the perspective of both the parties, the change in the transaction volume of domestic investors creates importance, whereas transaction volume of foreigner investors should be followed carefully.

When examined in terms of educational level, it may be argued that graduates of secondary school and higher school don't exhibit the tendency to herd behavior, whereas those of graduate and post-graduate significantly follow the foreign investors. Finally, when we discuss in terms of professional groups, it may be argued that those included in the expert professional group may not be influenced from the domestic investors, may follow foreign investors, whereas self-employed persons, workers and civil servants are significantly influenced from the foreigners. Within the scope of our sample, the only group that follows the domestic investors is the group of retired persons and housewives. In addition, negative relation is determined between transaction volume of this group and that of foreign investors.

3. CONCLUSION

Within the scope of this work, on the basis of real data belonging to 100 individual stock investors who made transactions between the dates of 04.01.2009 – 31.12.2011 the symptoms of herd behavior in BIST are attempted to be determined by moving from the transaction volumes of the investors. Within the scope of the study, the effects of socio-economic and demographic factors on herd behavior are also examined. The differences of sub-groups of different investors in exhibiting herd behavior are essential in terms of interpreting the capital markets correctly. The findings of the study are as follows.While male investors exhibit symptoms of herd behavior at higher rates, transaction volumes of female investors are independent from the transaction volume of other investors. The transaction volume of young investors may not be affected from the transaction volume of other investors, whereas the older investors are, the more they become sensitive to the transaction volume of other investors. Single investors exhibit herd behavior at higher rates when compared to married investors. As the income increases, the tendency to exhibit herd behavior increases. As the level of education increases, the tendency to exhibit herd behavior increases. Self-employed persons exhibit herd behavior at higher rates when compared to workers and civil servants. Whereas the positions obtained by the domestic investors are ignored from the point of view BİST domestic individual share investors, the positions of foreign investors are closely observed and followed.

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NO NEED TO CHOOSE: ETFS EXCESS RETURN VERSUS RISK ADJUSTED EXCESS RETURN

Sharon Garyn-Tal[1]

[1a]The Economics and Management Department, The Max Stern Yezreel Valley Academic College, Israel.
sharon.tal.garyn@gmail.com.

ABSTRACT

In this paper,Exchange Traded Funds (ETFs) performance estimated via excess return is compared with their performance estimated via risk adjusted excess return, both are measured relative to the underlying index performance. The analysis of88 ETFs in 2000-2012implies that there is a wide agreement between these two measures of ETFs performance. Previous research suggests that 1-R^2, as extracted from the regression of the ETFs return on their underlying index return,is a significant predictor of ETFs' risk adjusted excess return. The analysis results suggest that 1-R^2 also successfully identifies ETFs that achieve positive excess returns.

1. INTRODUCTION

The literature of mutual funds performance shows that fund's selectivity or active management positively affects fund's performance (Daniel, Grinblatt, Titman and Wermers, 1997, Brands, Brown and Gallagher, 2005, Kacperczyk, Sialm and Zheng, 2005, Kacperczyk and Seru, 2007, Cremers and Petajisto, 2009, Cremers, Ferreira, Matos and Starks, 2011, Ferson and Mo, 2012, and Amihud and Goyenko, 2012).Recent studies of hedge fund performance also find that fund's selectivity predicts better fund performance (see Titman and Tiu,2011, and Sun, Wang and Zheng, 2012).

Mutual funds and hedge fundsrequire, by definition, active investment management.On the other hand, another style of management associated withExchange Traded Funds (ETFs)is passive investment management.ETFs are funds that track indexes and are traded on stock exchanges. They have been around since the early 1980s, but it is only in recent years that they entered the mainstream.The main difference between ETFs and other types of funds is that ETFs do not try to outperform their corresponding index, but simply replicate its performance.

Active management is required even in passive investment management: though the stated objective of ETFs is to hit their benchmarks, previous research suggests that the tracking error in index fund performance is unavoidable (Frino and Gallagher, 2001, Elton, Gruber, Comer and Li, 2002, Blume and Edelen, 2004, Frino, Gallagher and Oetomo, 2005). Thus, the secondary objective of index managers is minimizing this divergence in performance from the underlying benchmark index. Ackert and Tian (2008) show that active trading leads to lower mispricing. Wong and Shum (2010) conclude that active portfolio management plays an important role in ETFs. Amihud and Goyenko (2012) propose to measure a mutual fund's selectivity by 1-R^2,

estimated by regressing the fund's returns on the returns of a benchmark model.[1]Garyn-Tal (2013) does the same for ETFs and finds that the low R-square funds have better performance.

The role of active management is also recognized by ETFs issuers. ProSharesdiscusses in its Prospectus, October 1, 2011, its ETFs investment objective: "The Fund does not seek to achieve its stated investment objective over a period of time greater than a single day." Among other Direxion's ETFs, Direxion Daily Mid Cap Bear 3x Shares (MWN) also discusses in its 2012 prospectus its investment objective: "The Fund … does not seek to achieve its stated investment objective over a period of time greater than one day." iShares S&P 500 Index Fund (IVV) states in its 2012 prospectus that its investment objective is: "… the Fund does not try to "beat" the index it tracks and does not seek temporary defensive positions when markets decline or appear overvalued. Indexing may eliminate the chance that the Fund will substantially outperform the Underlying Index but also may reduce some of the risks of active management…" However, it is also states inits prospectus that the fund might deviate from its indexing strategy: "The Fund generally invests at least 90% of its assets in the securities of the Underlying Index and in depositary receipts representing securities in the Underlying Index. The Fund may invest the remainder of its assets in certain futures, options and swap contracts, cash and cash equivalents, including money market funds advised by BFA or its affiliates, as well as in securities not included in the Underlying Index, but which BFA believes will help the Fund track the Underlying Index."

An interesting question is whether ETFs performance should be measured based on their excess return or based on their risk adjusted excess return, both are measured relative to their underlying index performance. The risk adjusted excess return performance measure takes into consideration and accounts for an ETF's risk via itslevel of exposure to its underlying index. The underlying assumption of the excess return performance measure is the expectation that the ETF's purpose is to hit the index it follows or at least not to underperform it, regardless of the ETF's risk or exposure to that index.

In this paper,an ETF's alpha is assessed based on 1) excess return, and based on 2) risk adjusted excess return,both are measured relative to theETF's underlying index performance. Then, these two measures of ETFs performance are analyzed and compared.

The data comprises 88 ETFs that follow main Russell and S&P indexes: Russell 3000, Russell 3000 Growth, Russell 3000 Value, Russell 1000, Russell 1000 Growth, Russell 1000 Value, Russell 2000, Russell 2000 Growth, Russell 2000 Value, Russell Midcap, Russell Midcap Growth, Russell Midcap Value, S&P 500, S&P 500 Growth, S&P 500 Value, S&P 400, S&P 400 Growth, S&P 400 Value, S&P 600, S&P 600 Growth, S&P 600 Value, S&P 1500. The sample period is 01/2000-03/2012.

First, the degree of consent between the ETFs excess returns and risk adjusted excess returns is documented, by examining whether positive (negative) excess returns also imply positive (negative) risk adjusted excess returns, and vice versa. The results imply that there is a wide

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[1]Recent studies of hedge fund performance also use R^2 as a measure of fund strategy (see Titman and Tiu,2011, and Sun, Wang and Zheng, 2012).

agreement between these two performance measures - the excess return and the risk adjusted excess return - and that the extent of agreement is high. In addition, the correlations between the excess returns and the risk adjusted excess returns are assessed: these correlations vary between 0.39 and 0.97.

Rompotis (2011) concludes that the return superiority of ETFs strongly persists at the short-term level and that the performance of ETFs can be predictable. In this paper, the performance persistence implied by the ETFs excess return as well asthe performance persistence implied by the ETFs risk adjusted excess return are examined. The analysis results suggest that there is performance persistence, as implied by thecorrelations between the alphas and the out-of-sample alphas: these correlations vary between -0.622 to 0.406. On the other hand, this persistence does not outline an investment strategy in ETFs that earns a significant positive (risk-adjusted) excess return:ETFs that earn negative excess return (or risk adjusted excess return) in an evaluation period tend to earn a negative (risk adjusted) excess return in the following performance period as well.But, on the contrary, there is nosuch strong consistency between positive alphasacross periods.

In a recent paper, following Amihud and Goyenko (2012) and Ferson and Mo (2012),Garyn-Tal (2013)sortsETFs by the factor model R-square and finds that the low R-square funds have better performance.In this paper, the data is divided into deciles based on 1-R^2as extracted from the regression of the ETFs return on their underlying index return in an evaluation period. Then,the out of sample risk adjusted excess returns, as extracted from the following performance period's regression of the ETFs return on their underlying index return, are examined. In addition, the percentage of ETFs that earn positive excess return in that following performance period is also examined. The results suggest that 1-$R^2$is not only a significant predictor of ETFs' risk adjusted excess return (as previous research suggests), but it also successfully identifies ETFs that achieve positive excess returns: all the ETFs that earn positive excess return in the performance period are concentrated in the preceding evaluation period's highest 1-R^2decile,while all other ETFs included in lower deciles do not manage to beat their underlying index(based on the excess return performance measure). The results are consistent across 2000-2012 as well as across the sub-periods examined in this paper.

2. DATA

Monthly return data on 88 ETFs that follow main Russell and S&P indexes are collected: Russell 3000, Russell 3000 Growth, Russell 3000 Value, Russell 1000, Russell 1000 Growth, Russell 1000 Value, Russell 2000, Russell 2000 Growth, Russell 2000 Value, Russell Midcap, Russell Midcap Growth, Russell Midcap Value, S&P 500, S&P 500 Growth, S&P 500 Value, S&P 400, S&P 400 Growth, S&P 400 Value, S&P 600, S&P 600 Growth, S&P 600 Value, S&P 1500. The sample period is 01/2000-03/2012, though there are three ETFs that existed before 2000. The monthly return data is from http://finance.yahoo.com/. The S&P indexes monthly returns are taken from Standard and Poor indices web site: https://www.sp-indexdata.com/. The Russell indexes monthly returns are taken from Russell web site: http://www.russell.com/Indexes/. The risk free rateis estimated by the one-month Treasury bill rates,and is extracted from French web site:

http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html.

Data characteristics are reported in the appendix. There are 88 ETFs: 4 ETFs follow Russell 3000, 1 ETF follows Russell 3000 Growth, 1 ETF follows Russell 3000 Value, 4 ETFs follow Russell 1000, 4 ETFs follow Russell 1000 Growth, 4 ETFs follow Russell 1000 Value, 3 ETFs follow

Russell Midcap, 3 ETFs follow Russell Midcap Growth, 3 ETFs follow Russell Midcap Value, 9 ETFs follow Russell 2000, 4 ETFs follow Russell 2000 Growth, 4 ETFs follow Russell 2000 Value, 10 ETFs follow S&P 500, 3 ETFs follow S&P 500 Growth, 3 ETFs follow S&P 500 Value, 9 ETFs follow S&P 400, 3 ETFs follow S&P 400 Growth, 3 ETFs follow S&P 400 Value, 6 ETFs follow S&P 600, 3 ETFs follow S&P 600 Growth, 3 ETFs follow S&P 600 Value, and 1 ETF follows S&P 1500. Out of the 88 ETFs, 66 have a long position with respect to their underlying index – 50 are leveraged X1, 10 are leveraged X2 and 6 are leveraged X3. The remaining 22 ETFs have a short position with respect to their underlying index – 4 are leveraged –X1, 12 are leveraged -X2 and 6 are leverage -X3.

3. METHODOLOGY

An ETF's alpha is assessed based on 1) excess return, and based on 2) risk adjusted excess return, both are measured relative to the ETF's underlying index performance.

To assess the ETF excess return, the average monthly underlying index adjusted return is subtracted from the average monthly ETF return. To calculate the average monthly ETF return, the ETF returns are first calculated from the monthly total-return closing prices, and then the average over the monthly ETF total returns is taken. To calculate the average monthly underlying index adjusted return, the index returns are first calculated from the monthly total-return closing prices or values, and then the average over the monthly index total returns is taken. Next, the average monthly index total return is multiplied by the direction and leverage the ETF seeks to achieve (X3, X2, X1, -X1, -X2, -X3).

To assess the ETF risk adjusted excess return, a regression of the ETF monthly excess (of the risk free rate, $R_{f,t}$) return on their underlying index monthly excess (of the risk free rate,$R_{f,t}$) return is run, and the intercept of that regression is extracted. The regression equation for an ETF i is:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,1} * (R_{Index,t} - R_{f,t}) + \varepsilon_{i,t}. \tag{1}$$

All available ETFs with more than 15 return observations in a period are considered.

4. RESULTS

First, the degree of consent between the ETFs excess returns and their risk adjusted excess returns are examined. Table 1examines whether positive (negative) excess returns also implypositive (negative) risk adjusted excess returns, and vice versa.

Each ETF is classified by its excess return as either a good ETF (positiveexcess return) or a poor ETF (negative excess return). Then, each ETF is classified again by its risk adjusted excess return as either a good ETF (positive risk adjusted excess return) or a poor ETF (negative risk adjusted excess return). Then, the ETFs classifications are compared by dividing the ETFs observations into four groups: 1) ETFs that earn positive excess return as well as positive risk adjusted excess return, 2) ETFs that earn negative excess return as well as negative risk adjusted excess return, 3) ETFs that earn positive excess return and negative risk adjusted excess return, and 4) ETFs that earn negative excess return and positive risk adjusted excess return. The results are reported for 2000-2012, and also for foursub-periods: 2000-2007, 2000-2004, 2005-2007, and 2008-2012.

Table 1: Positive versus Negative Alphas

	Observations	Risk Adjusted Excess Return >0 Excess Return>0	Risk Adjusted Excess Return <0 Excess Return<0	Risk Adjusted Excess Return >0 Excess Return<0	Risk Adjusted Excess Return <0 Excess Return>0
2000-2012	88	5	71	7	5
2000-2007	36	4	27	1	4
2000-2004	27	5	21	1	0
2005-2007	36	4	27	1	4
2008-2012	88	8	69	7	4

The results imply thatthere is a wide agreement between the excess return and the risk adjusted excess return performance measures and thatthe extent of agreement is high. In 2000-2012, positive (negative) excess returns also imply positive (negative) risk adjusted excess returns, and vice versa, for 86% of the 88 ETFs observations.The 2000-2007, 2000-2004, 2005-2007, and 2008-2012 analysis yieldssimilar results: positive (negative) excess returns also imply positive (negative) risk adjusted excess returns, and vice versa, for 86% of the 36 ETFs observations in 2000-2007, for 96% of the 27 ETFs observations in 2000-2004, for 86% of the 36 ETFs observations in 2005-2007, and for 88% of the 88 ETFs observations in 2008-2012.

The correlations between the excess returns and the risk adjusted excess returns are also examined. Table 2 reports the correlations for 2000-2012, 2000-2007, 2000-2004, 2005-2007, and 2008-2012. These correlations vary between 0.39 and 0.97.

Table 2: Correlations between the Alphas

	Correlation (Risk Adjusted Excess Return, Excess Return) (P-value)
2000-2012	0.9618 (<.0001)
2000-2007	0.4235 0.010
2000-2004	0.9276 (<.0001)
2005-2007	0.3870 0.020
2008-2012	0.9725 (<.0001)

Next, the performance persistence implied by the ETFs excess returns and risk adjusted excess returns is examined. Table 3 reports the performance consistency across several evaluation and performance periods. For each of these two performance measures (alphas) - excess return and risk adjusted excess return - the ETFs observations are divided into four groups: 1) ETFs that earn positive alpha in the evaluation period as well as positive alpha in the following performance period, 2) ETFs that earn positive alpha in the evaluation period and negative alpha in the following performance period, 3) ETFs that earn negative alpha in the evaluation period and positive alpha in the following performance period, and 4) ETFs that earn negative alpha in the evaluation period as well as negativealpha in the following performance period. Panel A reports

the number of observations in each of the four groups for an evaluation period: 2000-2007 and a performance period: 2008-2012. Panel B reports the number of observations in each of the four groups for an evaluation period: 2000-2004 and a performance period: 2005-2007. Panel C reports the number of observations in each of the four groups for an evaluation period: 2005-2007 and a performance period: 2008-2012.

Table 3: Alphas Consistency

			Evaluation period	
Panel A - Evaluation Period: 2000-2007, Performance Period: 2008-2012			Positive Alpha	Negative Alpha
Performance Period	Risk Adjusted Excess Return	Positive Alpha	3	4
		Negative Alpha	2	27
	Excess Return	Positive Alpha	3	2
		Negative Alpha	5	26
			Evaluation period	
Panel B - Evaluation Period: 2000-2004, Performance Period: 2005-2007			Positive Alpha	Negative Alpha
Performance Period	Risk Adjusted Excess Return	Positive Alpha	2	1
		Negative Alpha	4	20
	Excess Return	Positive Alpha	1	1
		Negative Alpha	4	21
			Evaluation period	
Panel C - Evaluation Period: 2005-2007, Performance Period: 2008-2012			Positive Alpha	Negative Alpha
Performance Period	Risk Adjusted Excess Return	Positive Alpha	4	3
		Negative Alpha	1	28
	Excess Return	Positive Alpha	4	1
		Negative Alpha	4	27

The results reported in panel A imply that the extent of persistence is disappointing for both the excess return as well as the risk adjusted excess return performance measures. 93%-96% (87%-95%) of the ETFs that earn a negative (risk adjusted) excess return in the evaluation period also earn a negative (risk adjusted) excess return in the following performance period. However, among the ETFs that earn positive (risk adjusted) excess return in the evaluation period, only 20%-50% (33%-80%) of those ETFs also earn positive (risk adjusted) excess return in the following performance period.

The second methodology applied to examine the performance persistence implied by the excess return and by the risk adjusted excess return is via the correlations between each of these alphas in the evaluation period with the out of sample alphas in the following performance period. Table 4 reports the results for: 1) an evaluation period: 2000-2007 and a performance period: 2008-2012, 2) an evaluation period: 2000-2004 and a performance period: 2005-2007, and 3) an evaluation period: 2005-2007 and a performance period: 2008-2012.

Table 4: Correlations between the Alphas and Out-of-Sample Alphas

		Risk Adjusted Excess Return	Excess Return
Evaluation Period: 2000-2007 Performance Period: 2008-2012	Coefficient	0.351	-0.487
	P-value	0.036	0.003
Evaluation Period: 2000-2004 Performance Period: 2005-2007	Coefficient	-0.483	-0.622
	P-value	0.011	0.001
Evaluation Period: 2005-2007 Performance Period: 2008-2012	Coefficient	0.406	-0.461
	P-value	0.014	0.005

The correlations between the risk adjusted excess returns and out-of-sample risk adjusted excess returns vary between -0.483 to 0.406. Thus, the risk adjusted excess returns imply both performance persistence as well as performance reversion. The correlations between the excess returns and out-of-sample excess returns are more consistent and vary between -0.461 to -0.622. Thus, the excess returns imply that there exists wide performance reversion.

Next, the data is divided into deciles based on 1 minus R-square as extracted from the regression of the ETFs return on their underlying index return (equation [1]) in the evaluation period. Decile 0 includes the highest 1 minus R-square ETFs. Table 5 reports, for each decile, the following performance period's average risk adjusted excess return and 1 minus R-square as extracted from the following performance period's regression of the ETFs return on their underlying index return (equation [1]). Table 5 also reports, for each decile, the percentage of ETFs that earn positive excess return in that following performance period. Panel A divides the data into 5 deciles for an evaluation period: 2000-2007 and a performance period: 2008-2012. Panel B divides the data into 5 deciles for an evaluation period: 2000-2004 and a performance period: 2005-2007. Panel C divides the data into 5 deciles for an evaluation period: 2005-2007 and a performance period: 2008-2012.

Table 5: Out-of-Sample Alphas

	Period 1: 2000-2007	Period 2: 2008-2012		
Panel A - Evaluation Period: 2000-2007, Performance Period: 2008-2012				
Decile	1-R-Squared	1-R-Squared	Risk Adjusted Excess Return	%[Excess Return>0]
0	0.216	0.158	0.018%	71%
1	0.011	0.018	-0.229%	0%
2	0.008	0.008	-0.208%	0%
3	0.006	0.001	-0.023%	0%
4	0.005	0.001	-0.015%	0%
Panel B - Evaluation Period: 2000-2004, Performance Period: 2005-2007				
	Period 1: 2000-2004	Period 2: 2005-2007		
Decile	1-R-Squared	1-R-Squared	Risk Adjusted Excess Return	%[Excess Return>0]
0	0.101	0.068	-0.002%	40%
1	0.009	0.007	-0.025%	0%
2	0.007	0.008	-0.049%	0%
3	0.005	0.010	-0.050%	0%
4	0.003	0.012	-0.060%	0%
Panel C - Evaluation Period: 2005-2007, Performance Period: 2008-2012				
	Period 1: 2005-2007	Period 2: 2008-2012		
Decile	1-R-Squared	1-R-Squared	Risk Adjusted Excess Return	%[Excess Return>0]
0	0.195	0.158	0.018%	71%
1	0.014	0.015	-0.126%	0%
2	0.011	0.004	-0.111%	0%
3	0.008	0.009	-0.236%	0%
4	0.005	0.002	-0.017%	0%

Amihud and Goyenko (2012), Ferson and Mo (2012), and Garyn-Tal (2012) sort funds by the factor model R-square and find that the low R-square funds have better performance. The results in table 5suggest that 1-$R^2$is not only a significant predictor of ETFsrisk adjusted excess returns, but it also successfully identifies ETFs that achieve positive excess returns. As reported in panel A, the average monthly risk adjusted excess return in the 2008-2012 performance period is 0.018% for decile 0 (decile 0 includes the highest 1 minus R-squared ETFs. The R-squares are calculated at the 2000-2007 preceding evaluation period). On the other hand, the average monthly alpha is -0.229% for decile 1, -0.208% for decile 2, -0.023% for decile3, and -0.015% for decile4that includes the lowest 1 minus R-square ETFs. Moreover, all the ETFs that earn positive excess return in the performance period are concentrated in the preceding evaluation period's highest 1-R^2decile, decile 0: 71% of the ETFs included in decile 0 earn positive excess return in that following performance period. On the other hand, the ETFs included in deciles 1, 2, 3 and 4 do not manage to beat their underlying index based on the excess return performance measure.These results are also consistent across the sub-periods examined in panels B and C.

5. CONCLUSIONS

Researchers show that selectivity or active management positively affects mutual funds performance, hedge funds performance, and ETFs performance. An interesting question is whether ETFs performance should be measured based on the ETFs excess return or based on the ETFs risk adjusted excess return, bothare measured relative to the underlying index performance. The risk adjusted excess return performance measure takes into consideration and accounts for an ETF's risk via its level of exposure to its underlying index. The underlying assumption of the excess return performance measure is the expectation that the ETF's purpose is to hit the index it follows, or at least not to underperform it, regardless of the ETF's risk or exposure to that index.

In this paper,an ETF's alpha is assessed based on 1) excess return, and based on 2) risk adjusted excess return, both are measured relative to the ETF's underlying index performance. Then,these two measures of ETFs performance are analyzed and compared using monthly return data on 88 ETFs in 2000-2012.

The analysis results suggest that there is a wide agreement between the ETFs excess return and risk adjusted excess return and that the extent of agreement is high. The correlations between the excess returns and the risk adjusted excess returns vary between 0.39 and 0.97.In addition, there is persistence in ETFs performance, though this persistence does not outline an investment strategy in ETFs that earns a significant positive (risk-adjusted) excess return.

Following Amihud and Goyenko (2012) and Garyn-Tal (2013), the data is divided into deciles based on 1 minus R-square as extracted from the evaluation period's regression of the ETFs return on their underlying index return. Then, the out of sample risk adjusted excess returns, as extracted from the following performance period's regression of the ETFs return on their underlying index return, is examined. In addition, the percentage of ETFs that earn positive excess return in that following performance period is also assessed. The results suggest that $1-R^2$is not only a significant predictor of ETFs' risk adjusted excess return (as previous research suggests), but it also successfully identifies ETFs that achieve positive excess returns: all the ETFs that earn positive excess return in that performance period are concentrated in the preceding evaluation period's highest $1-R^2$ decile. On the other hand, all other ETFs included in lower deciles do not manage to beat their underlying index in that following performance period (based on the excess return performance measure). These results are consistent across 2000-2012 as well as across the sub-periods examined in this paper.

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Appendix

The following tablereports the characteristics of the data used in this paper. The data comprises88 ETFs that follow main Russell and S&P indexes: Russell 3000, Russell 3000 Growth, Russell 3000 Value, Russell 1000, Russell 1000 Growth, Russell 1000 Value, Russell 2000, Russell 2000 Growth, Russell 2000 Value, Russell Midcap, Russell Midcap Growth, Russell Midcap Value, S&P 500, S&P 500 Growth, S&P 500 Value, S&P 400, S&P 400 Growth, S&P 400 Value, S&P 600, S&P 600 Growth, S&P 600 Value, S&P 1500. The sample period is 01/2000-03/2012.

The table specifies, for each ETF, the ETF's symbol, the ETF's name, the inception date and it describes the benchmark that the ETF seeks to follow.

Symbol	Fund Name	Benchmark Details	Inception Date
IWB	iShares Russell 1000 Index Fund	Russell 1000	5/15/2000
VONE	Vanguard Russell 1000	Russell 1000	9/20/2010
IWF	iShares Russell 1000 Growth Index Fund	Russell 1000 Growth	5/22/2000
VONG	Vanguard Russell 1000 Growth	Russell 1000 Growth	9/30/2003
SFK	ProSharesUltraShort Russell1000 Growth	Russell 1000 Growth Short (-X2)	2/20/2007
UKF	ProShares Ultra Russell1000 Growth	Russell 1000 Growth X2	2/20/2007
BGZ	Direxion Daily Large Cap Bear 3x Shares	Russell 1000 Short (-X3)	11/5/2008
IWD	iShares Russell1000 Value	Russell 1000 Value	5/2/2000
UVG	ProShares Ultra Russell1000 Value	Russell 1000 Value	2/20/2007
VONV	Vanguard Russell 1000 Value	Russell 1000 Value	9/30/2003
SJF	ProSharesUltraShort Russell1000 Value	Russell 1000 Value Short (-X2)	2/20/2007
BGU	Direxion Large Cap Bull 3x	Russell 1000 X3	11/5/2008
IWM	iShares Russell 2000 Index Fund	Russell 2000	5/22/2000
VTWO	Vanguard Russell 2000	Russell 2000	9/20/2010
IWO	iShares Russell 2000 Growth Index	Russell 2000 Growth	7/24/2000
VTWG	Vanguard Russell 2000 Growth	Russell 2000 Growth	9/30/2003
SKK	ProSharesUltraShort Russell 2000 Growth Index	Russell 2000 Growth Short (-X2)	2/20/2007
UKK	ProShares Ultra Russell2000 Growth	Russell 2000 Growth X2	2/20/2007
RWM	ProShares Short Russell2000	Russell 2000 Short	1/23/2007
TWM	ProSharesUltraShort Russell 2000	Russell 2000 Short (-X2)	1/23/2007
SRTY	ProSharesUltraPro Short Russell2000	Russell 2000 Short (-X3)	2/9/2010
TZA	Direxion Daily Small Cap Bear 3X Shares	Russell 2000 Short (-X3)	11/5/2008
IWN	iShares Russell 2000 Value Index	Russell 2000 Value	7/24/2000
VTWV	Vanguard Russell 2000 Value	Russell 2000 Value	9/20/2010
SJH	ProSharesUltraShort Russell2000 Value	Russell 2000 Value Short (-X2)	2/20/2007
UVT	ProShares Ultra Russell2000 Value	Russell 2000 Value X2	1/23/2007
UWM	ProShares Ultra Russell 2000	Russell 2000 X2	1/23/2007
TNA	Direxion Small Cap Bull 3x	Russell 2000 X3	11/5/2008
URTY	ProSharesUltraPro Russell2000	Russell 2000 x3	2/9/2010
IWV	Shares Russell 3000 Index	Russell 3000	5/22/2000

Symbol	Fund Name	Benchmark Details	Inception Date
VTHR	Vanguard Russell 3000 Index ETF	Russell 3000	9/20/2010
UWC	ProShares Ultra Russell3000	Russell 3000 (X2)	6/30/2009
TWQ	ProSharesUltraShort Russell3000	Russell 3000 Short (-X2)	6/30/2009
IWZ	iShares Russell 3000 Growth Index	Russell 3000 Growth	7/24/2000
IWW	iShares Russell 3000 Value Index	Russell 3000 Value	7/24/2000
IWR	iShares Russell Midcap Index Fund	Russell Midcap	7/17/2001
IWP	iShares Russell Midcap Growth Index Fund	Russell Midcap Growth	7/17/2001
UKW	ProShares Ultra Russell MidCap Growth	Russell Midcap Growth	2/20/2007
SDK	ProSharesUltraShort Russell MidCap Growth	Russell Midcap Growth Short (-X2)	2/20/2007
MWN	Direxion Daily Mid Cap Bear 3x Shares	Russell Midcap Short (-X3)	1/8/2009
IWS	iShares Russell Midcap Value Index Fund	Russell Midcap Value	7/17/2001
SJL	ProSharesUltraShort Russell MidCap Value	Russell Midcap Value Short (-X2)	2/20/2007
UVU	ProShares Ultra Russell MidCap Value	Russell Midcap Value X2	2/20/2007
MWJ	Direxion Daily Mid Cap Bull 3x Shares	Russell Midcap X3	1/8/2009
IVV	iShares S&P 500 Index Fund	S&P 500	5/15/2000
SPY	SPDRs S&P500	S&P 500	1/22/1993
VOO	Vanguard S&P 500	S&P 500	9/7/2010
IVW	iShares S&P 500 Growth Index	S&P 500 Growth	5/22/2000
SPYG	SPDR S&P 500 Growth ETF	S&P 500 Growth	1/22/1993
VOOG	Vanguard S&P 500 Growth Index ETF	S&P 500 Growth	9/7/2010
SH	ProShares Short S&P500	S&P 500 Short	6/19/2006
RSW	Guggenheim Inverse 2x S&P 500	S&P 500 Short (-X2)	11/5/2007
SDS	ProSharesUltraShort S&P 500	S&P 500 Short (-X2)	7/11/2006
SPXU	ProSharesUltraPro Short S&P500	S&P 500 Short (-X3)	6/23/2009
IVE	iShares S&P 500 Value Index	S&P 500 Value	5/22/2000
SPYV	SPDR S&P 500 Value ETF	S&P 500 Value	9/25/2000
VOOV	Vanguard S&P 500 Value Index ETF	S&P 500 Value	9/7/2010
RSU	Guggenheim 2x S&P 500	S&P 500 X2	11/5/2007
SSO	ProShares Ultra S&P 500	S&P 500 X2	6/19/2006
UPRO	ProSharesUltraPro S&P500	S&P 500 X3	6/23/2009
ISI	iShares S&P 1500 Index	S&P Composite 1500	1/20/2004
IJH	iShares S&P MidCap 400 Index	S&P Mid-Cap 400	5/22/2000
IVOO	Vanguard S&P Mid-Cap 400 Index ETF	S&P Mid-Cap 400	9/7/2010

Symbol	Fund Name	Benchmark Details	Inception Date
MDY	SPDR S&P MidCap 400	S&P Mid-Cap 400	5/4/1995
RWK	RevenueShares Mid Cap	S&P Mid-Cap 400	2/22/2008
SMDD	ProSharesUltraPro Short MidCap400	S&P Mid-Cap 400 (-X3)	2/9/2010
MYY	ProShares Short S&P MidCap 400	S&P Mid-Cap 400 Short	6/19/2006
MZZ	UltraShortMidCap 400 ProShares	S&P Mid-Cap 400 Short (-X2)	7/11/2006
MVV	ProShares Ultra MidCap400	S&P Mid-Cap 400 X2	6/19/2006
UMDD	ProSharesUltraPro MidCap400	S&P Mid-Cap 400 X3	2/9/2010
IJK	iShares S&P MidCap 400 Growth Index	S&P Mid-Cap 400 Growth	7/24/2000
IVOG	Vanguard S&P Mid-Cap 400 Growth Idx ETF	S&P Mid-Cap 400 Growth	9/7/2010
MDYG	SPDR S&P 400 Mid Cap Growth ETF	S&P Mid-Cap 400 Growth	11/8/2005
IJJ	iShares S&P MidCap 400 Value Index	S&P Mid-Cap 400 Value	7/24/2000
IVOV	Vanguard S&P Mid-Cap 400 Value Index ETF	S&P Mid-Cap 400 Value	9/7/2010
MDYV	SPDR S&P 400 Mid Cap Value ETF	S&P Mid-Cap 400 Value	11/8/2005
IJR	iShares S&P SmallCap 600 Index	S&P Small-Cap 600	5/22/2000
SLY	SPDR S&P 600 Small Cap ETF	S&P Small-Cap 600	11/8/2005
VIOO	Vanguard S&P Small-Cap 600 Index ETF	S&P Small-Cap 600	9/7/2010
SAA	ProShares Ultra SmallCap600	S&P Small-Cap 600 (X2)	1/23/2007
SBB	ProShares Short SmallCap600	S&P Small-Cap 600 Short	1/23/2007
SDD	ProSharesUltraShort SmallCap600	S&P Small-Cap 600 Short (-X2)	1/23/2007
IJT	iShares S&P SmallCap 600 Growth Index	S&P Small-Cap 600 Growth	7/24/2000
SLYG	SPDR S&P 600 Small Cap Growth ETF	S&P Small-Cap 600 Growth	9/25/2000
VIOG	Vanguard S&P Small-Cap 600 Gr Idx ETF	S&P Small-Cap 600 Growth	9/7/2010
IJS	iShares S&P SmallCap 600 Value Index	S&P Small-Cap 600 Value	7/24/2000
SLYV	SPDR S&P 600 Small Cap Value ETF	S&P Small-Cap 600 Value	9/25/2000
VIOV	Vanguard S&P Small-Cap 600 Value Idx ETF	S&P Small-Cap 600 Value	9/7/2010

COMBINING ANALYTICAL HIERARCHY PROCESS AND TOPSIS APPROACHES FOR SUPPLIER SELECTION IN A CABLE COMPANY

Emrah Onder[1], Sundus Dag[2]

[1]School of Business, Department of Quantitative Methods, Istanbul University, Turkey, emrah@istanbul.edu.tr.
[2]*School of Business, Department of Production, Istanbul University, Turkey.*

ABSTRACT

In the competitive business environment of the 21st century, organizations must reply quickly and precisely to customer demands. The choice of suppliers and their performance assessment are becoming major challenges that face supply chain managers or directors. Evaluating suppliers and selecting one of them are complicated tasks due to the fact that various criteria or objectives must be considered in the decision making process. Also in many real world cases the criteria are not equally important for the purchase managers. In this study, we proposed a supplier selection analysis model considering both Analytic Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method. Subjective and objective opinions of purchase managers/experts turn into quantitative form with AHP. TOPSIS technique is used for calculating the supplier's ratings.

The aim of this paper is to determine the appropriate supplier providing the most customer satisfaction for the criteria identified in the supply chain. In this paper, data taken from a well-known cable manufacturing company in Turkey is used to illustrate the supplier selection procedure. Due to the fact that main raw material used in all cables, the company strongly focuses on supply of the Electrolytic Copper Cathode. The company detects eight different criteria for procurement of the Electrolytic Copper Cathode. These are origin, quality, availability, cost, delivery requirements, cost of conveyance, reliability of supplier and quality certificates. There are four firms providing the Electrolytic Copper Cathode for the company.

1. INTRODUCTION

In recent years, firms have been focused their attention on supply chain functions. Supplier selection is one of the most important functions in supply chain management due to the fact that it affects the quality of last product and total performance of the company. Also, it provides companies with opportunities to reduce cost. The supplier selection process requires evaluating various criteria and different supplier features. This process can be considered as a multi-criteria decision making problem (MCDM) that includes both quantitative and qualitative factors. Therefore, firms should take in the consideration all the criteria impact the production process when evaluating the suppliers.

Fundamentally, there are two types of supplier selection. In the first type, one supplier can provide all of the buyer requirements which is called single sourcing. The buyer makes one decision in this type; which supplier is the best. In the other type, one supplier cannot provide total needs of the buyer. In this case, buyer has to divide order quantities among several suppliers. This type of supplier selection is called as multiple sourcing. The buyer should answer two types of questions in multiple sourcing: which supplier is the best and how much should I purchase from every supplier (Shahroudi and Rouydel, 2012). In this study, single sourcing is used.

Decision method in supplier selection is usually consisting of four steps. First step is problem definition, second step is formulation of criteria, third step is pre-qualification and the last step is final selection. Decision process and activities in steps are shown in Figure 1.

Figure 1: Supplier Selection Process
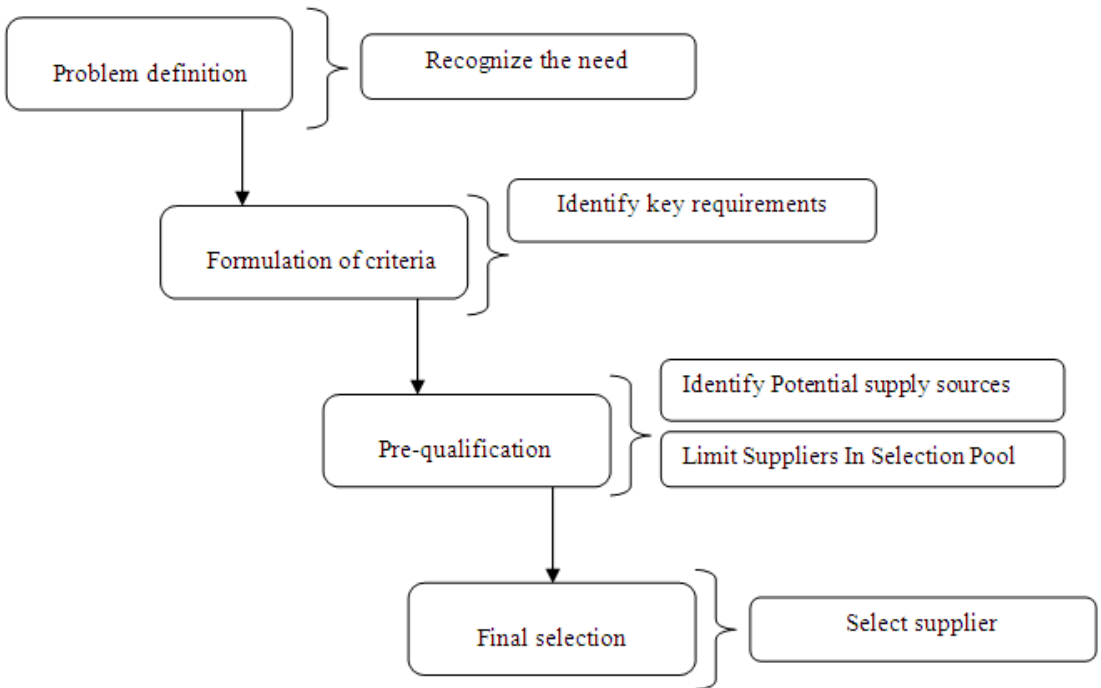
The first step, "Problem Definition", concerns decision makings which should identify the strategy of purchases e.g. the duration of new selection. There are two activities in the second step: identifying the key criteria and determining the sourcing strategy. Pre-qualification, the third step is the process of identifying potential supply source and gathering a limited pool of suppliers. The last step in the supplier selection process is final selection. In this step, firstly selection method is determined and then, best supplier is selected. While qualitative tools are used in the first two steps, quantitative tools are used in last two steps.

The aim of this paper is to determine the appropriate supplier providing the most customer satisfaction for the criteria identified in the supply chain. In this paper, data taken from a well-known cable manufacturing company in Turkey is used to illustrate the supplier selection

procedure. We proposed a supplier selection analysis model considering both AHP and TOPSIS method. Subjective and objective opinions of purchase managers/experts turn into quantitative form with Analytic Hierarchy Process. Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) technique is used for calculating the supplier's ratings.

The study is composed of seven sections. The second section provides an overview of existing methods and studies. The third section shows the structure of the problem in the cable company. The next section describes the proposed approach and gives information about AHP and TOPSIS. In section five, an empirical study is illustrated in the cable production industry. Results of the study are presented in section six. Finally, concluding remarks and discussions follow.

Multi-criteria decision making technique called AHP is applied to determine the relative weights of the evaluation criteria. AHP approach achieves pairwise comparisons among factors or criteria in order to prioritize them using the eigenvalue calculation. AHP model was represented in a questionnaire to survey experts' opinions. The relative weight of each factor in the model was calculated.

2. LITERATURE REVIEW

Decision making for supplier selection is complex process due to the fact that various criteria must be considered in this process. Researchers have been focus on the analysis of selection criteria and supplier performance measurement since 1960s. Dickson (1966) studied the importance of supplier evaluation and selection criteriafor purchasing managers and offered 23 supplier criteria that managers consider in such an evaluation, including quality, delivery, price, performance history and others. Weber, Current, and Benton (1991) suggested a number of selection criteria to measure supplier performance, such as price, delivery, quality, productive capability, location, technical capability, management organization, reputation, industry position, financial stability, performance history, and maintainability. Mazurak, Rao, and Scotton (1985) applied a linear weighting model that includes quality, delivery, net price and financial position as selection criteria. Ellram (1990) proposes three principal criteria: 1) financial statement of the supplier 2) organizational culture of the supplier 3) technological state of the supplier. Barbarosoglu and Yazgac (1997) determined three different primary criteria:1) the performance of the supplier, 2) the technical capabilities and financial situation of the supplier, and 3) the quality system of the supplier.

Various methods have been suggested for supplier selection problem. All the methods can be classified in four different categories: MCDM is the first category which contains Analytic Hierarchy Process (AHP), Analytical Network Process (ANP) and TOPSIS methods. Yahya and Kingsman (1999) used Saaty'sAHP method to identify priority in selecting suppliers. The researchers applied vendor rating in supplier selection and in deciding how to distribute business, as well as in determining where development effort is applied. Chan (2003) developed an interactive selection model with AHP to facilitate decision makers in selecting suppliers. Liu and Hai (2005) studied on supplier selection problem by combining a collaborative purchasing program and a new approach, based on the use of Saaty's (1980) AHP method. Chan et al. (2007) suggested an AHP-based decision making approach to solve the supplier selection problem. All suppliers were evaluated based on 14 criteria. Hou and Su (2007) developed an AHP-based decision support system for the supplier selection problem in a mass customization environment. Sarkis and Talluri (2002) appliedANP method to appraise and select the best supplier with regard

to organizational factors and strategic performance metrics, which consist of seven evaluating criteria.Bayazit (2006) proposed an ANP model to evaluate supplier selection process as a framework for managers. Gencer and Gurpınar (2007) proposed an ANP based model for an electronic company for supplier evaluation and selection with respect to various assessment criteria. Jadidi et al. (2010) asserted aTOPSIS based model for multi criteria supplier selection problem. Vimal et al. (2012) used TOPSIS method to develop a useful approach for a manufacturing company for selecting the convenient supplier.

The second category is mathematical programming methods. Data envelopment analysis (DEA) and linear programming methods can be included in this category. Talluri and Sarkis (2002) applied DEA to measure the performance of suppliers. Garfamy (2006) suggested a DEA model to evaluate the overall performances of suppliers based on total cost of ownership. Wu et al. (2007) presented a so-called augmented imprecise DEA for supplier selection. Talluri and Narasimhan (2003) improved a max-min method basedon linearprogramming to maximize and minimize the performance of a supplier against the best target measures set by the buyer. Ng(2008) developed a weighted linear programming method for the supplier selection problem, with an objective of maximizing the supplier score.

Artificial Intelligence methods, third category, contain Genetic algorithm, artificial neural network (ANN) and data mining methods. Ding et al. (2005) presented a GA based optimization methodology for supplier selection. The presented method provided possible configurations of the potential suppliers, including transportation modes. LiaoandRittscher (2007) formulated a multi-objective programming model for supplierevaluating under probabilistic demand circumstances. The GA is employed to solve the supplierselection and supply quantity allocation in this study. Wei et al. (1997) suggested an artificial neural network model for the supplier selection.In this study, the performance history, quality history, geography and price of a supplier were selected as determinant factors effecting the supplier selection. Lee and Ou-Yang (2009) offered aneural network-based model to forecast supplier's bid price in order to shorten the lead time in supplierselection.

The last category is integrated approaches. There are so many studies about integrated methods for supplier selection problem in the literature. Some studies are provided below. Guang et al. (2010) proposed an approach for the supplier selection problem in nuclear power plant supply chain systems utilizing AHP and improved technique for order preference by similarity to ideal solution (TOPSIS). Shahroudi et al. (2011) suggested an integrated model for supplier's selection and order allocation in an automotive company. The research was performed in two sections. In first section, they used AHP-TOPSIS in order to select the best suppliers. In the second section, multi-objective linear programming model were used for order allocation to every selected suppliers in first section. Fazlollahtabar et al. (2011) proposed an integrated approach of AHP-TOPSIS, and multi-objective nonlinear programming to consider both tangible and intangible factors in choosing the best suppliers. The priorities are calculated for each supplier by use of AHP. TOPSIS is applied to rank the suppliers. Xu and Lin (2010) two-phase data mining methodology for strategic supplier selection. In-depth combined pattern mining is considered first to find the first-level or direct strategic suppliers. Then extend the whole supplier network, with the help of value network, graph theory and evaluation criteria, the strategic supplier network satisfied the needs of supply network is generated. After that, by using strategic supplier network, companies can select the most suitable suppliers.Bhutia and Phipon (2012) developed a methodology to evaluate suppliers in supply chain cycle based on AHP and TOPSIS. They have calculated the weights for each criterion based on AHPand then inputted these weights to the TOPSIS method to rank suppliers.

Demirtas and Ustun (2008) developed an integrated ANP andmulti-objective mixed integer linear programming approach to selectthe best set of suppliers, and to determine the optimal orderallocation.Shahroudi and Rouydel (2012) proposed an integrated approach of ANP- TOPSIS in choosing the best suppliers and defined the optimum quantities order among selected suppliers by using Multi-Objective Linear Programming. Kahraman et al. (2003) applied a fuzzy AHP to select the best supplier in a Turkish white good manufacturing company. Chan and Kumar (2007) also used fuzzy AHP for supplier selection as the case with Kahraman et al. (2003). In the approach, triangular fuzzy numbers and fuzzy synthetic extent analysis method were used to represent decision makers' comparison judgment and decide the final priority of different criteria.

Ramanathan (2007) suggested that DEA could be used to evaluate the performance of suppliers using both quantitative and qualitative information obtained from the total cost of ownership and AHP. Sevkli et al. (2007) applied an integrated AHP–DEA approach for supplier selection. AHP was used for the local weights and DEA was used to calculate the efficiency scores of all suppliers.Lau et al. (2006) developed an integrated ANN and GA approach for supplier selection. ANN was responsible for benchmarking the potential suppliers with respect to four evaluating factors. After that, GA was deployed to determine the best combination of suppliers. The four evaluating criteria were used again in the fitness function of GA.

The aim of this study is to propose a multi-criteria decision-making approach to evaluate the experts' preference orders, to examine experts' perceptions of supplier selection. The purposes of this study were to use Saaty's analytic hierarchy process (AHP) to investigate the factors that experts consider when choosing supplier, and to derive the relative weight of each factor.

3. SUPPLIER EVALUATION IN A CABLE COMPANY

An application is performed in a manufacturing company which is the most modern cable factory in Turkey. The factory has been established in 1989 with the %100 of national capital. With the understanding of quality and vision of chasing the development of market; the firm has been producing insulated medium voltage cables from 3,6/6 KV up to 20,3/35 KV and 154 KV high voltage cables.With modern IT structure and automation technology, the firm has 18.000 tons of colored and natural PVC granule production, 24.000 tons of 8 mm copper wire production and 4.000 tons ofXLPE material usage capacity annually.

The firm which has the finest cable factory ornamented with the modern machine park and the test laboratories gives service with its copper wire drawing machine, cable extrusion lines, PVC granulate production, automatic coiling and packaging lines on international quality basis.The company aims to get standard of quality management systems and owns to certificates of TSE-ISO EN 9000 quality secure systems and TSE-ISO EN 14000 environment management systems.

Due to the fact that main raw material used in all cables, the company strongly focuses on supply of the Electrolytic Copper Cathode. The company considers eight criteriaduring purchasing of the Electrolytic Copper Cathode. These are origin, quality, availability, cost, delivery requirements, cost of conveyance, reliability of supplier and quality certificates. All of the criteria are detected by purchasing department which is consist of four personnel: purchasing manager and three purchasing specialist. There are four candidate suppliers for providing the Electrolytic Copper Cathode to the firm.

The Electrolytic Copper Cathode is analyzed by the Quality Control Laboratory. In this process, the quality laboratory gives points to the raw material based on convenience of the quality

specifications determined by international institutions.Availability points are determined by the purchasing department according to the length of the supply process. The cost values are given as American dollar per 1000 kg. The cost of conveyance values are given as Turkish Lira per vehicle. The points of delivery requirement are identified by purchasing department according to the previous delivery times of suppliers. Reliability of suppliers points are defined with regard to fulfillments of commitments.

There are three important quality certificates for the firm in the supplier selection process. These are ISO 9000 Quality System Certificate, ISO 14001 Environmental Management System Certificate and OHSAS 18001 Occupational Health and Safety Certificate. The firm gives points to every supplier according to the weight determined by the purchasing department. As a result of the binary comparison made by purchasing specialist, weights were found 60, 30, 10respectively. However, the candidate supplier must have ISO 9000 Quality SystemCertificate beside other certificates. If the suppliers have more than one certificate, the total points is calculated by adding the weights. These values are determined as the input of TOPSIS method.

4. PROPOSED METHODOLOGY

The questionnaire conducted between the dates 1-7 March 2013 is answered by 4experts. Data were collected from the expertsin their offices.They are asked to compare the criteria at a given level on a pair-wise basis to identify their relative precedence. AHP is an effective decision making method especially when subjectivity exists and it is very suitable to solve problems where the decision criteria can be organized in a hierarchical way into sub-criteria. The findings of previous studies about factors influencing experts' choice of supplier were first identified by literature review. Experts expressed or defined a ranking for the attributes in terms of importance/weights. Each experts is asked to fill ''checked mark'' in the 9-point scale evaluation table. The AHP allows group decision making. One of the main advantages of the AHP method is the simple structure.

4.1. Using AHP to analyze priorities

AHP was developed in the 1970s by Thomas Saaty is a multi-criteria decision making (MCDM) methodology. It has been used extensively for analyzing complex decisions. The approach can be used to help decision-makers for prioritizing alternatives and determining the optimal alternative using pair-wise comparison judgments (Liberatore and, Nydick, 1997, p. 595;Yoo and Choi p. 137, 2006).Weighting the criteria by multiple experts avoids the bias decision making and provides impartiality (Dagdeviren, 2009).

The AHP is a selection process that consists of following steps (Saaty, 1990, 2008; Saaty and Vargas, 2001):

1. Define the problem and determine the criteria. Factors and related sub factors must be correlated

(Lee, 2012).

2. Structure the decision hierarchy taking into account the goal of the decision.

3. Construct a set of all judgments in a square comparison matrix in which the set of elements is compared with itself (size nxn) by using the fundamental scale of pair-wise comparison shown in

Table 1 assign the reciprocal value in the corresponding position in the matrix. Total number of comparison is n.(n-1)/2 (Lee, 2012).

Table 1: The fundamental scale of pair-wise comparison for AHP

Intensity of Importance	Definition	Explanation
1	Equal importance	Two activities have equal contribute to the objective
3	Moderate importance	Experience and judgment slightly favor one activity over another.
5	Strong importance	Experience and judgment strongly favor one activity over another
7	Very strong on demonstrated importance	An activity is favored very strongly over another
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2,4,6,8	For compromise between the above values	Sometimes one needs to interpolate a compromise judgment numerically

4. Use overall or global priorities obtained from weighted values for weighting process. For synthesis of priorities obtain the principal right eigenvector and largest eigenvalue.

Matrix $A=(a_{ij})$ is said to be consistent if $a_{ij}.a_{jk}=a_{ik}$ and its principal eigenvalue (λ_{max}) is equal to n.

The general eigenvalue formulation is:

$$Aw = \begin{bmatrix} 1 & w_1/w_2 & . & w_1/w_n \\ w_2/w_1 & 1 & . & w_2/w_n \\ . & . & . & . \\ w_n/w_1 & w_n/w_2 & . & 1 \end{bmatrix} \begin{bmatrix} w_1 \\ . \\ . \\ w_n \end{bmatrix} = nw \tag{1}$$

$$a_{ij} = w_i / w_j, \qquad i,j = 1,2,....n \tag{2}$$

$$Aw = \lambda_{max} w \tag{3}$$

For measure consistency index (CI) adopt the value:

$$CI = (\lambda_{max} - n)/(n-1) \tag{4}$$

Accept the estimate of w if the consistency ratio (CR) of CI that random matrix is significant small. If CR value is too high, then it means that experts' answers are not consistent (Lee, 2012;Saaty, 1980). Acceptable values of CR must be less than 0.1 (Saaty, 1990). The CR is obtained by comparing the CI with an average random consistency index (RI).

$$CR = \frac{CI}{RI}$$

(5)

The following gives the average RI:.

Table 2: Average RI values

n	1	2	3	4	5	6	7	8	9	10
Random Consistency Index(RI)	0	0	0.52	0.89	1.11	1.25	1.35	1.40	1.45	1,49

Briefly, maximized eigenvalue, CI and CR are found to obtain the weights of each criteria (Lee, 2012). Experts are asked to compare the criteria on a pair-wise basis to determine their relative importance. AHP was used in order to determine which supplier selection attributes are important and precedence order of eight criteria, i.e., origin of raw material, quality, availability, cost, delivery requirements, cost of conveyance, quality certificates and reliability of the suppliers.

4.2. Using Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) to rank the alternatives

Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) was first presented by Yoon (1980) and Hwang and Yoon (1981), for solving multiple criteria decision making (MCDM) problems based upon the concept that the chosen alternative should have the shortest Euclidian distance from the positive ideal solution (PIS) and the farthest from the negative ideal solution (NIS). For instance, PIS maximizes the benefit and minimizes the cost, whereas the NIS maximizes the cost and minimizes the benefit. It assumes that each criterion require to be maximized or minimized. TOPSIS is a simple and useful technique for ranking a number of possible alternatives according to closeness to the ideal solution. Expanded developments of TOPSIS were done by Chen and Hwang in 1992, Lai, Liu and Hwang (1994). This MCDM technique is widely used in many fields, including financial performance evaluation, supplier selection, tourism destination evaluation, location selection, company evaluation, selecting the most suitable machine, ranking the carrier alternatives (Behzadian, 2012). One of the advantages of TOPSIS is that pair-wise comparisons are avoided. TOPSIS is conducted as follows (Tsaur, 2011).

Step 1. Establish a decision matrix for the ranking. TOPSIS uses all outcomes (x_{ij}) in a decision matrix to develop a compromise rank. The viable alternatives of the decision process are A_1, A_2, ..., A_n. The structure of the decision matrix denoted by $X = (x_{ij})_{n \times m}$ can be expressed as follows:

$$m \quad Criteria$$

$$
X = \begin{array}{c} \begin{array}{cccccc} C_1 & C_2 & \cdots & C_j & \cdots & C_m \end{array} \\ \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1j} & \cdots & x_{1m} \\ x_{21} & x_{22} & \cdots & x_{2j} & \cdots & x_{2m} \\ \vdots & \vdots & \cdots & \vdots & \cdots & \vdots \\ x_{i1} & x_{i2} & \cdots & x_{ij} & \cdots & x_{im} \\ \vdots & \vdots & \cdots & \vdots & \cdots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{nj} & \cdots & x_{nm} \end{bmatrix} \begin{array}{l} A_1 \\ A_2 \\ \vdots \\ A_i \\ \vdots \\ A_n \end{array} \end{array} \Big\} n \quad Alternatives
$$

(6)

x_{ij} is the outcome of i$^{\text{th}}$ alternative with respect to j$^{\text{th}}$ criteria. $W = (w_1, w_2, \ldots, w_j, \ldots, w_m)$ is the relative weight vector about the criteria, and w_j represents the weight of the j$^{\text{th}}$ attribute and $\sum_{j=1}^{m} w_j = 1$.

Step 2. Normalize the decision matrix using the following equation:

$$r_{ij} = \frac{w_{ij}}{\sqrt{\sum_{k=1}^{n} w_{ij}^2}} \quad i=1,2,3,\ldots,n \quad j=1,2,3,\ldots,m$$

(7)

Step 3. Weighted normalized decision matrix is calculated by multiplying the normalized decision matrix by its associated weights as:

$$v_{ij} = w_j r_{ij} \quad i=1,2,3,\ldots,n \quad j=1,2,3,\ldots,m$$

(8)

Step 4. Identify the positive ideal solution (PIS) and negative ideal solution (NIS), respectively, as follows:

$$PIS = A^* = \left\{ v_1^*, v_2^*, \ldots, v_m^* \right\} = \left\{ \left(\max_i v_{ij} \mid j \in \Omega_b \right), \left(\min_i v_{ij} \mid j \in \Omega_c \right) \right\}$$

(9)

$$NIS = A^- = \left\{ v_1^-, v_2^-, \ldots, v_m^- \right\} = \left\{ \left(\min_i v_{ij} \mid j \in \Omega_b \right), \left(\max_i v_{ij} \mid j \in \Omega_c \right) \right\}$$

(10)

Ω_b is associated with benefit criteria, and Ω_c is associated with cost criteria.

Step 5.Determine the Euclidean distance (separation measures) of each alternatives from the ideal and negative-ideal solution as below respectively:

$$d_i^* = \sqrt{\sum_{j=1}^{m}\left(v_{ij} - v_j^*\right)^2} \; , \; i=1,2,3,\ldots,n \tag{11}$$

$$d_i^- = \sqrt{\sum_{j=1}^{m}\left(v_{ij} - v_j^-\right)^2} \; , \; i=1,2,3,\ldots,n \tag{12}$$

Step 6. Calculate the relative closeness of the ith alternative to ideal solution using the following equation:
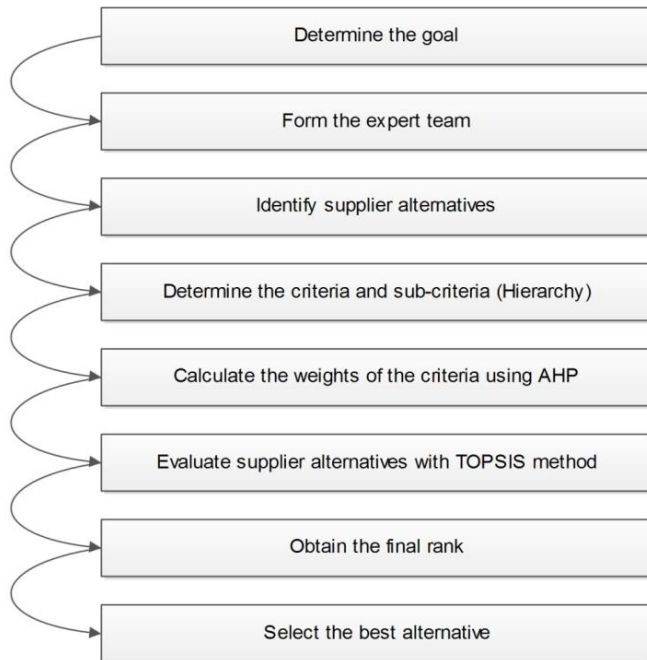
$$RC_i = \frac{d_i^-}{d_i^* + d_i^-} \qquad , \qquad i=1,2,3,\ldots,n \tag{13}$$

$$RC_i \in [0,1]$$

Step 7.By comparing RC_i values, the ranking of alternatives are determined. The higher the closeness means the better the rank. Ranked the alternatives starting from the value that closest to 1 and in decreasing order.

4.3. Combining AHP and TOPSIS to determine the rank of alternatives

**Figure 2: Steps of proposed method**

In analyzing the data, Analytical Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) methodologies are used for the outranking of supplier alternatives. Fig. 2 shows the steps of the proposed method.

5. SOLVING ILLUSTRATIVE PROBLEM

To apply proposed method a real world supplier selection problem was solved. In this supplier selection problem there are 8 criteria and 4 alternatives. The hierarchical structure to select the best supplier is shown in Fig 3.The firm prefers the Electrolytic Copper Cathode originating from America, Europe and Asia. An interview was performed with the purchasing department in order to identify weight coefficients regarding origin of the Electrolytic Copper Cathode. As a result of the binary comparison made by specialist, weights were found as follows: America (0.249), Europe (0.087) and Asia (0.039). These values are determined as the input of TOPSIS method.

Criteria to be considered in the selection of supplier are determined by literature review and experts in the cable firm. Past experience and the back-ground of the experts are utilized in the determination of the criteria and 8 important criteria to be used for supplier selection are established. These 8 criteria are as follows: Origin of Raw Material (C1), Quality (C2), Availability (C3), Cost (C4), Delivery Requirements (C5), Cost of Conveyance (C6), Quality Certificates (C7)and Reliability of Supplier (C8).

**Figure 3: Hierarchical Structure for Supplier Selection**
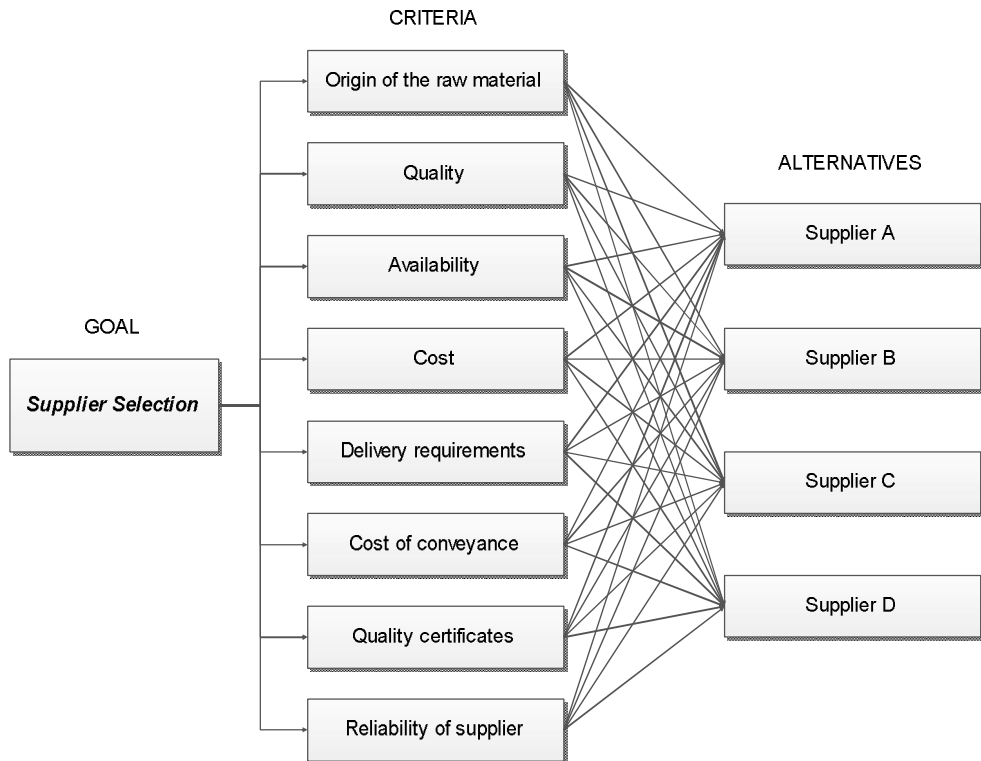
As a result, only these 8 criteria were used in evaluation and decision hierarchy is established accordingly. Decision hierarchy structured with the determined alternative supplier and criteria is provided in Fig. 3.There are three levels in the decision hierarchy structured for supplier selection problem. The overall goal of the decision process is ''the selection of the optimal supplier'' in the first level of the hierarchy. The criteria are on the second level and alternative suppliers are on the third level of the hierarchy.After forming the decision hierarchy for the problem, the weights of the criteria to be used in evaluation process are calculated by using AHP method. In this phase, the experts in the expert team are given the task of forming individual pairwise comparison matrix by using the Saaty's 1-9 scale.

Table 3: The pairwise comparison matrix for criteria

	C1	C2	C3	C4	C5	C6	C7	C8
C1	1,00	0,27	0,22	0,13	0,56	0,71	0,67	0,45
C2	3,71	1,00	1,39	0,58	3,36	3,31	4,36	2,00
C3	4,56	0,72	1,00	0,45	1,73	2,21	2,82	1,00
C4	7,97	1,73	2,24	1,00	5,03	5,89	5,14	3,13
C5	1,78	0,30	0,58	0,20	1,00	1,15	0,51	0,40
C6	1,41	0,30	0,45	0,17	0,87	1,00	0,80	0,40
C7	1,50	0,23	0,35	0,19	1,97	1,26	1,00	0,51
C8	2,21	0,50	1,00	0,32	2,51	2,51	1,97	1,00

Geometric means of experts' choice values are calculated to form the pairwise comparison matrix on which there is aagreement (Table 4). The results obtained from the calculations based on the pairwise comparison matrix provided in Table 3, are presented in Table 4.

Figure 4: Resulting weights of criteria obtained with AHP
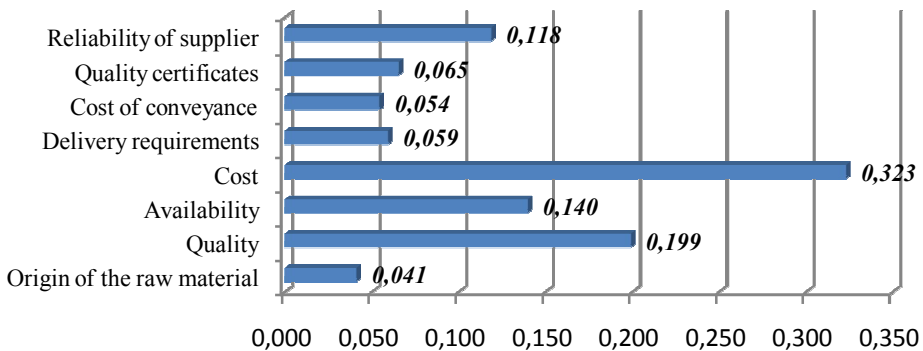
The C4 (cost), C2 (quality) and C3 (availability) are determined as the three most important criteria in the supplier selection process by AHP. Consistency ratios of the experts' pairwise comparison matrixes are calculated as 0.074 (expert 1), 0.077 (expert2), 0.096 (expert 3) and 0.083 (expert 4). They all are less than 0.1. So the weights are shown to be consistent and they are used in the selection process. The most important criterion is "cost" (0.323) and the least important criterion is "origin of the raw material" (0.041).

Table 4: Results obtained by AHP

	Expert 1	Expert 2	Expert 3	Expert 4	Geometric Mean
Criteria	**Weights (w)**	**Weights (w)**	**Weights (w)**	**Weights (w)**	**Weights (w)**
Origin of the raw material	0.054	0.037	0.025	0.052	*0.041*
Quality	0.121	0.254	0.302	0.122	*0.199*
Availability	0.168	0.114	0.071	0.242	*0.140*
Cost	0.372	0.234	0.284	0.302	*0.323*
Delivery requirements	0.029	0.081	0.089	0.047	*0.059*
Cost of conveyance	0.105	0.079	0.020	0.052	*0.054*
Quality certificates	0.045	0.049	0.107	0.076	*0.065*
Reliability of supplier	0.105	0.152	0.101	0.106	*0.118*
λ_{max}	8.726	8.762	8.949	8.817	8.142
CI	0.104	0.109	0.136	0.117	0.020
RI	1.410	1.410	1.410	1.410	1.410
CR <0,1	*0.074*	*0.077*	*0.096*	*0.083*	

Finally, TOPSIS method is applied to rank the alternative suppliers. The priority weights of alternative suppliers with respect to criteria, calculated by AHP and shown in Table 4, can be used as input ofTOPSIS (Table 5). The weighted normalized decision matrixcan be seen from Table 6.

Table 5: Input values of the TOPSIS analysis

Weight	*0,041*	*0,199*	*0,140*	*0,323*	*0,059*	*0,054*	*0,065*	*0,118*
	Origin of the raw material	Quality	Availability	Cost	Delivery requirements	Cost of conveyance	Quality certificates	Reliability of supplier
Supplier A	0,249	40	80	7450	85	500	90	90
Supplier B	0,249	25	60	7400	75	430	100	60
Supplier C	0,039	15	70	7550	80	400	90	85
Supplier D	0,087	10	80	7430	90	400	60	100

Table 6: Weighted evaluation for the supplier selection

	Origin of the raw material	Quality	Availability	Cost	Delivery requirements	Cost of conveyance	Quality certificates	Reliability of supplier
Supplier A	0.028	0.158	0.077	0.161	0.030	0.031	0.034	0.063
Supplier B	0.028	0.099	0.057	0.160	0.027	0.027	0.038	0.042
Supplier C	0.004	0.059	0.067	0.163	0.029	0.025	0.034	0.059
Supplier D	0.010	0.039	0.077	0.161	0.032	0.025	0.023	0.070
	+	+	+	-	+	-	+	+
A^{*}	0.028	0.158	0.077	0.160	0.032	0.025	0.038	0.070
A^{-}	0.004	0.039	0.057	0.163	0.027	0.031	0.023	0.042

By using TOPSIS method, the ranking of alternative suppliers are calculated. Table 7 shows the evaluation results and final ranking of alternative suppliers.

Table 7: TOPSIS results

Alternatives	d_i^{*}	d_i^{-}	RC_i
Supplier A	0.010	0.124	0.924
Supplier B	0.068	0.066	0.490
Supplier C	0.103	0.031	0.231
Supplier D	0.121	0.035	0.226

Depends on the RC_j values, the ranking of the alternatives from top to bottom order are supplier A, supplier B, supplier C and supplier D. Proposed model results show that supplier A is the best alternative with RC value of 0.924.

Table 8: Weighted and unweighted rankings

Rank	Weighted RC_i	Weighted Ranking	Unweighted RC_i	Unweighted Ranking
1	0.924	Supplier A	0.858	Supplier A
2	0.490	Supplier B	0.626	Supplier B
3	0.231	Supplier C	0.302	Supplier D
4	0.226	Supplier D	0.269	Supplier C

6. CONCLUSION

Supplier selection decision becomes more important strategic decision in complex and competitive business life. Choosing the suitable supplier involves the evaluation of subjective and objective factors;the decision criteria in Cable Company case are origin of raw material, quality, availability, cost, delivery requirements, and cost of conveyance, quality certificates and reliability of the suppliers. The results show that cost, quality and availability are most important criteria for the company to evaluate suppliers.Supplier A has the highest priority weight.Another important finding is that the proposed model is more reflecting the relation of how the selection criteria affect the selected suppliers and at the same time what is more important for the suppliers among

the selection criteria. Using multi criteria decision techniques such as AHP and TOPSIS methods provides a useful approach for Cable Company for selecting the best supplier. This supplier evaluation framework will give direction and help the cable company in establishing a process for supplier selection. Main purpose of this paper is to combine AHP and TOPSIS methods to select suitable supplier for the Cable Company from available alternative suppliers. The weights of criteria (input of TOPSIS) are important. It is shown that final TOPSIS ranking can by criteria weights.

Supplier selection for a Cable Company involves multiple criteria decision making. The TOPSIS is a successful MCDM method for ranking the alternatives. AHP-TOPSIS framework was proposed for evaluating and ranking of supplier alternatives. In next studies analytic network process (ANP) may be used to structure network and identifydependence among criteria. The proposed methodology can also be applied to any other selection problem involving multiple and conflicting criteria. Selection of the suppliers can also be done using other MCDM techniques including MOORA, PROMETHEE, VIKOR etc. for comparing the results.

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IMPACTS AND RESULTS OF THE GLOBAL FINANCIAL CRISIS ON TURKEY'S CENTRAL ADMINISTRATION BUDGETS IN 2008–2010

Serdar Ozturk[1], Ali Sozdemir[2], Ahmet Celik[3], Ozlem Ulger[4],

[1]Faculty of Economics and Administrative Sciences, Nevşehir University, 50300 Nevşehir, Turkey.
Email: serdarozturk@nevsehir.edu.tr.
[2]Faculty of Economics and Administrative Sciences Cumhuriyet University, 58100 Sivas, Turkey
[3]Tax Department, Kayseri, Turkey
[4]Institute of Social Sciences, Nevşehir University, 50300 Nevşehir, Turkey

KEYWORDS	ABSTRACT
Global financial crisis, central administration budget, fiscal policy.	Together with the global financial crisis, the increased economic uncertainty in Turkey is seen to have negatively affected trust and forward-planning. During the global crisis, Turkey's economy contracted and its national budget was negatively affected. Due to the overall decline in growth, tax reductions were enacted to support the real sector, which in turn decreased public revenues and quickly increased the administration's budget deficit. To reduce the effects of the crisis, some areas of spending were increased, as well. As a result of these developments, the budget deficit and treasury debt load ratio increased past the previously projected levels.

1. INTRODUCTION

In 2007, the financial crisis occurring in the USA mortgage market gained a global dimension by spreading first into the developed countries and then into the developing countries. The global financial crisis caused a worldwide shrinkage in trade volume, decrease in domestic and foreign demand, decline in the growth rate of countries, increase in unemployment rates, slowdown in international capital movements and decline in public revenues. The economic, social and geographical structures of countries are the root causes of the differences of the negative effects experienced by countries. Depending upon these differences, some countries were deeply influenced by the crisis while others were less affected. As in the USA and the EU, the economic crisis was very damaging and had an important impact on Turkey's foreign trade, and, due to the intensity in the capital movements in an ever-globalizing world, Turkey was inevitably influenced by this crisis.

In times of crisis, a decrease in economic activities and decline in per capita national income is realized; therefore, a decline in indirect taxes levied on consumption and direct taxes levied on personal and corporate income are expected events. Another factor that reduces tax revenues is tax reduction practice within the scope of incentive policies for the real sector. On the other hand, within the framework of fiscal policies practised for stimulating the demand (i.e., public investment expenditures and policies directed at softening the effects of widespread unemployment), the increase in public expenditures, especially social security and social assistance spending, is also an expected event. The reduction in income and the increase in

expenditures have pressurized the budget, so the budgets have had deficits created or existing deficits are made worse.

The aim of this study is to present how much budget of Turkish central administration was affected by the 2008 global financial crisis. In this context, comparing points of central budget administration in Turkey between 2008 and 2010, previous data with Short Term Fiscal Plans and with values aimed in Budget Laws, the effects of global financial crisis on central administration budget of Turkey are tried to be explained.

2. ECONOMIC CRISES AND PUBLIC FINANCE

It can be said that world economy has had a tendency of globalizing intensely, especially in the last thirty years. (Salvatore, 2004:543 – 551). In this process, foreign capital, financial institutions and domestic markets have extended to foreign goods (Mishkin, 2007: 259 – 287). At the same time, it is seen that the dependency of countries to each other has increased (Tanzi, 2004:525-542). Especially the effects of innovations in computer and information technology on financial tools and services, and the increase in new financial tools have eased the acceleration of capital movements. However, they have also played an accelerating role in the dissemination and perception of crisis (Nissanke and Thorbecke, 2006:1338-1360).

The basic reason for the occurrence of a financial crisis is the high alienation of financial markets. In other words, crisis is the decline of financial markets, which can create destructive effects on real economy and can spoil the effective running of markets (Taylor, 2009). The fluctuation, beginning with the decline of the USA subprime mortgage market in August, in 2007 and affected global financial markets, has been the biggest financial crisis since the Great Depression (Mendoza, 2010:24-29). The intense alienation, which has been created by a global financial crisis, has had a narrow result in households, firms and the spoils in financial statements of institutions, global growth, and volume of trade and capital movements (BRSA, 2008). Accordingly, there have been sharp declines in the growth rates of especially developed countries (IMF,2010). As a result of precautions taken due to the crisis, budget deficits and public debt stocks have increased rapidly (Yılmaz, 2010). In fact, the global crisis has highlighted the existing weaknesses in the financial system of world (Nanto, 2009).

Public fiscal policy practiced in Turkey since 2002 can be said to aim to decrease the rate of debt stock to national income as to increase the efficiency of monetary policies by removing the fiscal dominancy. Budget deficits have decreased considerably together with the practice of stability programs and the sustaining of the fiscal discipline in the post – 2001 crisis period. Since 2007, with the effect of global instability, a tendency in budget deficits to increase again has emerged (Yılmaz, 2009).

It is seen that, with the global crisis, uncertainties increased in Turkey, as well, and environment of trust and prospective expectations were negatively affected from this increase of uncertainty. Thus, adjournments occurred in private investment and consumption decisions, and contraction occurred in economic activities. It can be said that the global crisis affected mostly developed countries and EU countries in particular. During the global crisis, both the increase in the production capacity of Turkey having a significant trade volume with these countries was restricted and existing capacity utilization was negatively affected. The economic shrinkage experienced during the global financial crisis also negatively influenced the budget balances in Turkey. It is possible to say that the size of the budget deficit will be directly affected by the economic shrinkage. Fiscal policies applied for decreasing the effects of the economic crisis are targeted to have positive effect on

economic growth. However, expansionary fiscal policies may have an effect on the budget deficit by means of corroding the fiscal discipline. The economic stimulus package that was announced in Turkey in 2009 loosened the fiscal discipline. The fiscal policies applied in 2009 to ease the risk of slowdown and deflation in growth broke the budget balances in Turkey as it did all over the world. With decreases in revenues and increases in expenses, the central administration budget deficit rose significantly in 2009, thus public sector borrowing requirement increased. It can be said that, in the same period, not only Turkey but also the whole world encountered this phenomenon. Due to the decline in growth in Turkey, as a result of the tax reductions enacted to support the real sector, the public revenues decreased and the central administration budget deficit increased rapidly. To reduce the effects of the crisis, some spending items increased as well. With the shrinkage in economic activities, an important result of the crisis on the real sector is the failure in payment of social security contributions. Since the collection of social security contributions remained below the targets, a significant increase emerged in the deficit of the social security system. As a result of these developments, the budget deficit, debt burden and Treasury's domestic debt rollover ratio increased above the level projected (Karakurt, 2011:46-47).

3. CENTRAL ADMINISTRATION BUDGET BALANCE DURING GLOBAL CRISIS

3.1. Central Administration Budget Revenues During Global Crisis

According to law no. 5018, central administration budget revenues consist of revenues of general budget, revenues of special budget administrations and revenues of regulatory and supervisory agencies. Among the budget revenues of central administrations, general budget revenues have the largest share. Of the central administration budget revenues, 96.9% is revenues of general budget, 2.3% is revenues of special budget administrations and 0.8% is revenues of regulatory and supervisory agencies (Figure 1).
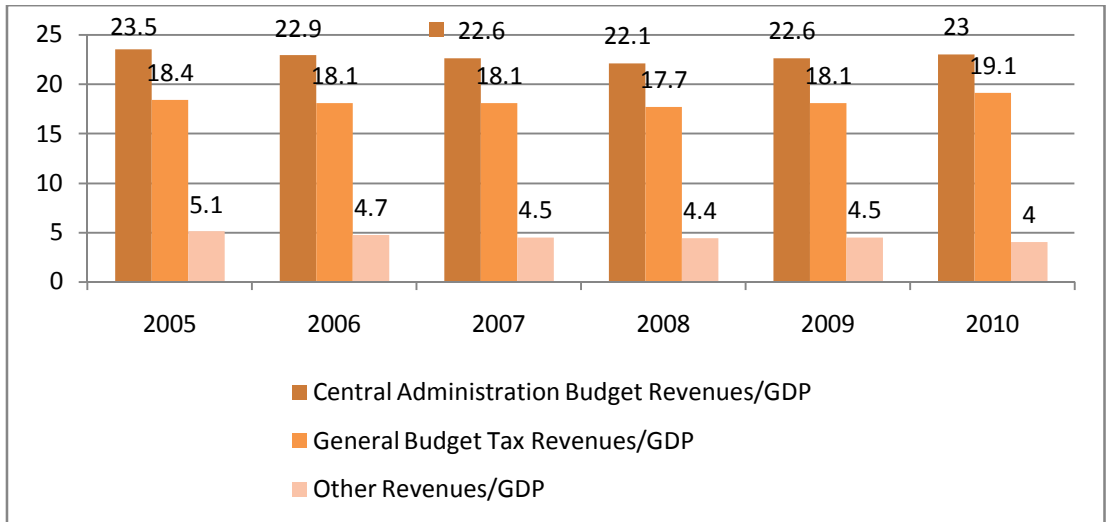
Figure 1: Distribution of Central Administration Budget Revenues (%)

Source: BFC, Budget Sizes and Budget Realizations, http://www.bumko.gov.tr
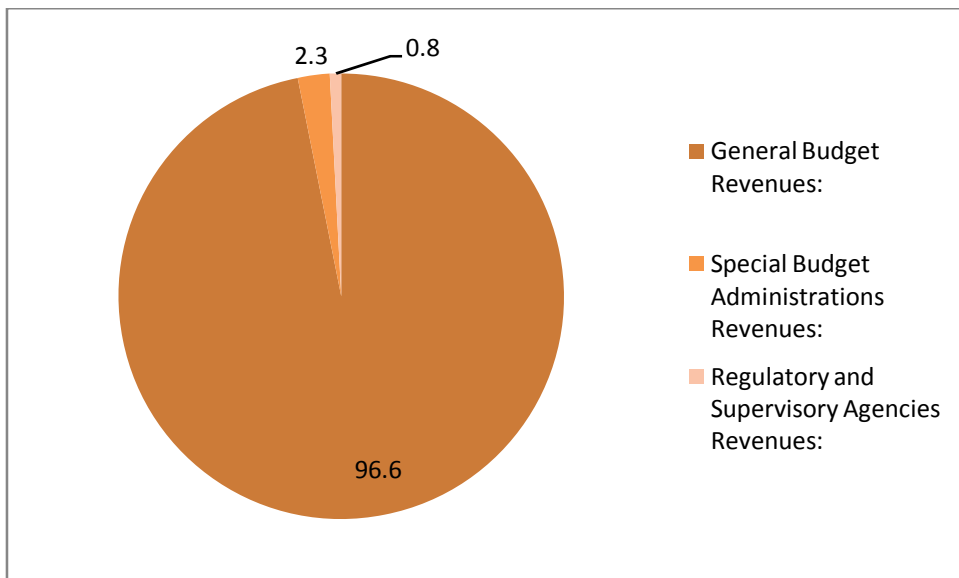
While the ratio of central administration budget revenues to GDP was 23.5% in 2005, it was 22.1% in 2008, following a decreasing course, and it increased to 22.6% in 2009 (Figure 2). The ratio of tax revenues to GDP between 2005 and 2010 was at its lowest level in 2008, when the global crisis was felt. This rate then increased beginning in 2009. In 2010 when the ratio of the Central Administration Budget (CAB) revenues to GDP increased to 23%, the ratio of tax revenues/GDP reached 19.1%. This value was the highest one between 2005 and 1010.

Figure 2: The ratio of Central Administration Budget Revenues to GDP (%)

While evaluating the ratio of central administration budget revenues to GDP, it will be beneficial to compare the values realized with the targets of the three-year Medium Term Financial Plan (MTFP) prepared by the Ministry of Finance and accepted by the Higher Planning Council based upon Public Finance Management and Control Law no. 5018.

In 2007-2009 Medium Term Financial Plan, the ratio of Central Administration Budget (CAB) Revenues / GDP was projected 28.2% and 27.2% for 2008 and 2009, respectively. In 2008-2010 MTFP, the ratio of CAB Revenues / GDP was revised and targeted as 28.7% and 27.9% for 2008 and 2009, respectively and the projected rate was 27.1% for 2010. It is seen that, in 2007-2009 and 2008-2010 MTFPs, the targeted ratio of CAB Revenues / GDP couldn't be achieved for the years of 2008, 2009 and 2010. Realizations were below the targets. It is possible to say that the shrinkage experienced in the growth due to the global crisis had an effect on staying away from the target in the ratio of CAB Revenues / GDP (Table 1).

Table 1: The Target Rate of Central Administration Budget Revenues (net) / GDP in MTFPs

	CAB Revenues / GDP (%)			GDP Increase (%)		
	2008	2009	2010	2008	2009	2010
MTFP (2007–2009)	28.2	27.2	-	7.0	7.1	-
MTFP (2008–2010)	28.7	27.9	27.1	5.5	5.7	5.7
MTFP (2009–2011)	-	22.0	21.5	-	5.5	6.0
Realizations	**22.1**	**22.6**	**23.0**	**0.7**	**-4.8**	**9.0**

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

In 2007-2009 and 2008-2010 MTFPs, the targeted GDP growth rates of 7.0% and 5.5%, respectively, for 2008 wound up outstripping the actual growth rates. Similarly, in these MTFPs, the targeted growth rates of 7.1% and 5.7% for 2009 remained just 4.8%. In 2008 and 2009, especially, the shrink in domestic and foreign demand and the slowdown in economic activities were reflected on the negative statement in growth and caused decreases in direct and indirect taxes due to the inevitable decline in earnings and consumptions of individuals and corporations. Furthermore, reduction of rates of the transaction taxes such as the Value-Added Tax and the Private Consumption Tax (in order to invigorate the domestic demand in 2008-2009) is another important factor reducing the tax revenue. The CAB revenues in 2008 overcame the targets (with 13,335 million TL and 2,647 million TL positive differences). The targets for 2009 showed a relatively acceptable deviation with a score of % ±2.5 in 2007-2009 and 2008-2010 MTFPs, however, for the same year, the realization in 2009-2011 MTFP remained below the targets with a rate of 13.1% and 28,134 million TL. According to the 2010 results of the budget, realized CAB revenues were 7.4% point above the 2008-2010 MTFP target and 5.5% point below the 2009-2011 MTFP target (Table 2).

Table 2: Estimations and Realizations of Central Administration Budget Revenue in MTFPs (Net)

	CAB Revenues (Net, Million TL)			Deviations (Million TL - %) (Estimations – Realizations)		
	2008	2009	2010	2008	2009	2010
MTFP (2007–2009)	196,263	210,143	-	-13.335 (-6.4 %)	-5.315 (-2.5 %)	-
MTFP (2008–2010)	206,951	220,755	235,526	-2.647 (-1.3 %)	5.297 (2.5 %)	-18.751 (-7.4 %)
MTFP (2009–2011)	-	243,592	268,309	-	28.134 (13.1 %)	14.032 (5.5 %)
Realizations	**209,598**	**215,458**	**254,277**			

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

When the estimations of revenue in budget laws are examined, a similar situation draws attention. While the central administration budget revenues were targeted as 204,556m TL for 2008, 248,758m TL for 2009 and 236,794m TL for 2010, a positive outlook was maintained by overcoming the estimations with approximately 17,500m TL. The realizations remained approximately 33m TL below the estimations of the budget in 2009 (Table 3).

Table 3: Estimations and Realizations of Central Administration Budget Revenue in the Budget Laws (Net)

(Million TL)	2008	2009	2010
Budget Revenues	**204,556**	**248,758**	**236,794**
General Budget Revenues	199,411	242,957	229,947
Tax Revenues	171,206	202,090	193,324
Tax-Free Income	28,205	40,867	36,623
Own Revenues of Special Budget Administrations	3,417	3,878	4,898
Revenues of Regulatory and Supervisory Agencies	1,728	1,924	1,949
Realizations	**209,598**	**215,458**	**254,277**

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

3.2. Central Government Budget Expenditures during the Global Crisis

The Public Finance Management and Control Law (PFMCL) no. 5018 began to take place in the budget on the basis of public expenditures economic classification and functional classification. So, it has been possible to analyze and make assessments by the basing functions on the public expenditures. The public expenditures featured in the PFMCL functions were classified as; 1) General public services, 2) Defense services, 3) Public order and defense services, 4) Economic activities and services, 5) Environmental protection services, 6) Housing and social welfare services, 7) Health services, 8) Recreational, cultural and religious services, 9) Training Services, 10) Social security and social aid services (Sağbaş, 2011:9).

One of the indicators concerning the growth of public expenditures is the ratio of central administration expenditures to GDP. When the growth of public expenditures between 2005 and 2010 are examined on the basis of economic classification, it is seen that the expenditures/GDP ratio running in 23-24% band between 2005 and 2008 increased to 28.2% in 2009 and that it is realized as 26.7% in 2010 with a decrease compared to the previous year even though it did not decrease to the level before the global crisis.

**Table 4: The ratio of CAB to GDP on the basis of Economic Classification**

	2005	2006	2007	2008	2009	2010
Central Admin. Budget Revenues	24.6	23.5	24.2	23.9	28.2	26.7
Budget Revenues Except the Interest	17.6	17.4	18.4	18.6	22.6	22.3
I. State Contributions of Staff and Social Security Institutions	5.8	5.7	5.9	5.8	6.6	6.6
II. Expenses of Purchase of Goods and Services	2.3	2.5	2.6	2.6	3.1	2.6
III. Current Transfers	7.1	6.6	7.5	7.4	9.7	9.2
IV. Capital Expenses	1.6	1.6	1.5	1.9	2.1	2.4
V. Capital Transfers	0.2	0.3	0.4	0.3	0.5	0.6
VI. Lending	0.6	0.8	0.5	0.5	0.6	0.8
VII. Replacement Allowance	0.0	0.0	0.0	0.0	0.0	0.0
VIII. Expenses of Interest	7.0	6.1	5.8	5.3	5.6	4.4

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

In 2008-2009 when the effects of the global crisis were much more felt, the interest expenses/GDP ratio that was realized as 5.3% and 5.6%, respectively, was lower than the pre-crisis period and this rate remained as 4.4% in 2010 with a remarkable decrease. The ratio of budget expenditures to GDP, except the interest, reached the highest levels in 2009 and 2010 with 22.6% and 22.3%, respectively. When looked at the subcomponents of non-interest budget expenses, the ratio of state contributions of staff and social security institutions, expenses of purchase of goods and services, current transfers and capital expenditures to the GDP increased in 2009 compared to the 2005-2008 period. Similarly, in 2010, the ratio of state contributions of staff and social security institutions, current transfers and capital expenditures to the GDP was higher than pre-crisis period even though it was below the present rate in the previous year (Table 4).

In the ratio of non-interest budget expenses and general CAB expenses to GDP, a 1 point change was seen between 2005 and 2008, and, in 2009, 4 point increase in non-interest expenses and 0.3 point increase in interest expenses in proportion to the previous year and the ratio of CAB expenses/GP increased to 28.2% with 4.3 point increase in total (Figure 3).

Figure 3: Interest and Non-Interest Expenses Ratio to GDP in CAB Expenses 2005-2010 (%)

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr
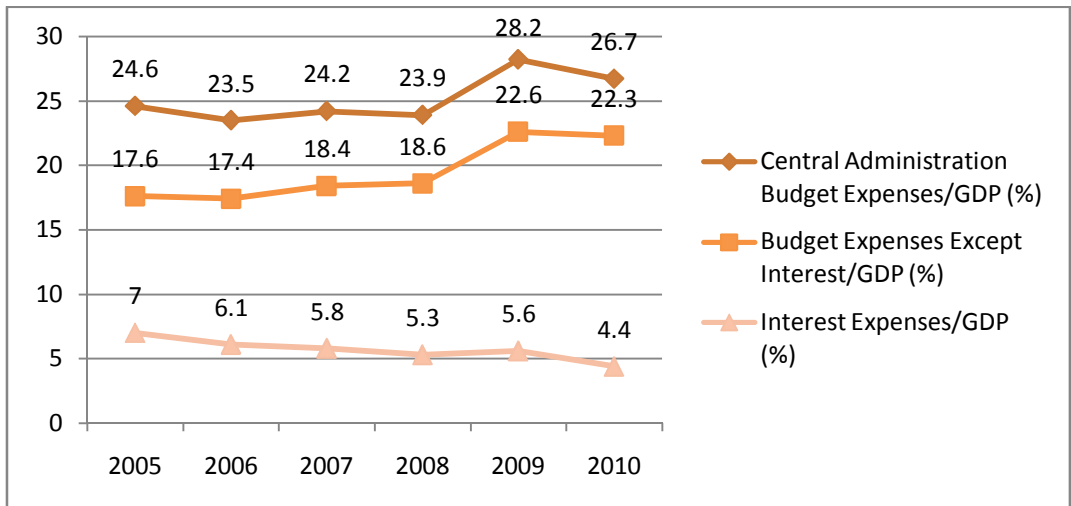
When the shares of interest expenses and non-interest budget expenses in central administration budget revenues between 2005 and 2010 were analyzed, the share of interest expenses in central administration expenses followed a decreasing course between 2005 and 2010. As the decreasing of interest expenses meant that more shares were allocated for expenses such as education, health and transport, it is possible to say that this trend was a positive development from the point of sustainable growth and fiscal sustainability. In other words, the difference between non-interest budget expenses and interest expenses gradually increased in this period (Figure 4). The difference which was 42.8 point in 2005 between the aforesaid items increased to 67.2 point in 2010 (Sağbaş, 2011:7-8).

Figure 4: The Shares of Interest Expenses and Non-interest Budget Expenses in Central Administration Budget Revenues 2005-2010 (%)

 Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr
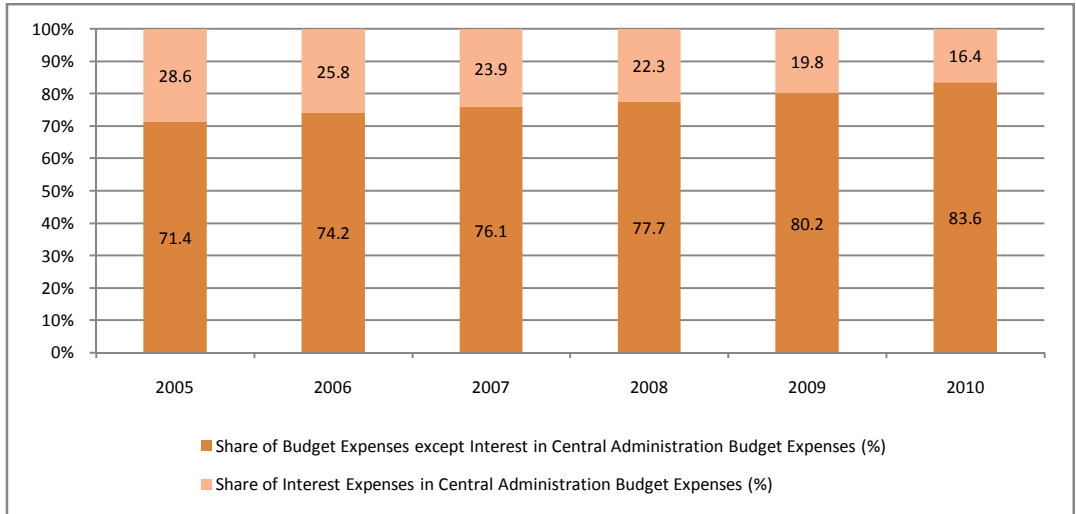
In 2009 when the expense/GDP rate on the basis of functional classification was at its highest level when it comes to subcomponents with 28.2%, it is seen that the most apparent increase occurred in social security and social aid services compared to the previous years.

Table 5: The Rates of CAB Expenses to GDP on the basis of Functional Classification (%)

	GDP SHARES (%)				
	2006	2007	2008	2009	2010
Expenses	23.5	24.2	23.9	28.2	26.7
I- General Public Services	9.3	9.0	8.6	9.3	8.1
II- Defense Services	1.5	1.4	1.4	1.5	1.4
III- Public Order And Defense Services	1.4	1.5	1.5	1.7	1.7
IV- Economic Activities And Services	2.8	2.8	3.1	3.5	3.7
V- Environmental Protection Services	0.0	0.0	0.0	0.0	0.0
VI- Housing And Social Welfare Services	0.5	0.6	0.4	0.4	0.6
VII- Health Services	1.2	1.3	1.4	1.6	1.5
VIII- Recreational, Cultural And Religious Services	0.4	0.4	0.4	0.5	0.5
IX- Training Services	2.9	3.1	3.2	3.8	3.8
X- Social Security And Social Aid Services	3.5	4.1	4.0	5.9	5.4

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

From 2008 on, the hitches occurring in the revenues of social security contributions were due to the effects of the crisis, as well as the transfers into the Social Security Institution as social security contributions [increased or decreased?] within the scope of social security reform. This caused an increase in the expenses of health, pension and social aid in the 2009 budget. From October 2008 and on, another reason for the increase in aforesaid expenses was that the 5% employers' share of social security contributions was met by the Treasury (Ministry of Finance, 2009:34).

Table 6: The Share of CAB Expenses in the Budget on the basis of Functional Classification (%)

	BUDGET SHARES (%)				
	2006	2007	2008	2009	2010
Expenses	100.0	100.0	100.0	100.0	100.0
I- General Public Services	39.5	37.2	36.2	32.9	30.4
II- Defense Services	6.5	5.8	5.7	5.4	5.1
III- Public Order And Defense Services	5.9	6.1	6.2	6.1	6.4
IV- Economic Activities And Services	11.9	11.6	12.8	12.3	14.0
V- Environmental Protection Services	0.1	0.1	0.1	0.1	0.1
VI- Housing And Social Welfare Services	2.2	2.3	1.7	1.4	2.2
VII- Health Services	5.2	5.5	5.7	5.8	5.5
VIII- Recreational, Cultural And Religious Services	1.6	1.6	1.7	1.7	1.8
IX- Training Services	12.5	12.6	13.4	13.3	14.1
X- Social Security And Social Aid Services	14.7	17.1	16.6	20.9	20.3

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

When looked at the shares of expenses in CAB, it is seen that there was not a significant change in 2008 compared to the previous year. However, in 2009, the share of general public services in the budget decreased approximately 3.3% compared to the previous year, while the share of expenses concerning social security and social aid services increased to 20.9% (with about a 4.3% increase). Thus, it reached its highest level between the 2006 and 2010 period. Compared to 2009, the 2010 budget outcomes showed a more positive outlook, as it can be seen that the share of expenses of the general public services in the budget decreased approximately 2.5 point compared to the previous year, and there was a 1.7% and 1.2% increase in the expenses of economic activities, general services, and training services, respectively (Table 6).Primary expenditures, according to the economic classification method, are broken down into two parts; current and [long-term?] investment expenditures (capital expenditures as stated in PFMCL). Capital expenditures between 2005 and 2010 seemed greatest in the 2008 to 2009 period when the share of total public expenditures was effective during the global crisis. It is understood that between 2005 and 2010, the share of interest expenses decreased from 28.6 % to 16.4%. On the other hand, capital expenditures increased from 6.5% to 8.8% at the same time. (table 7). Thus, it is possible to say that the redundancy resulted from the decrease in interest expenses in the 2005 to 2010 period, and was used in financing transfers to social security institutions rather than investment. (Sağbaş, 2011:8).

It is seen that central administration budget expenditures in 2008 increased when compared with the previous year and that the most important increase was on capital expenditures and interest expenditures. It is understood that while the increase in capital expenditures were due to the transfers to regional development projects such as the GAP Activity Plan, the increase in interest rates, nearly (1/3 of tax revenues) was a periodic situation because of the credit structure of debt stock. (TUSIAD, 2008: 59).

Table 7: Share of CAB Expenditures in Budget on the basis of Economic Classification (%)

(%)	Share of Expenditures in Budget					
	2005	2006	2007	2008	2009	2010
Central Administration Budget Expenditures	100.0	100.0	100.0	100.0	100.0	100.0
Budget Expenditures except interest	71.4	74.2	76.1	77.7	80.2	83.6
I. State Contributions of Staff and Social Security Institutions	23.4	24.1	24.2	24.3	23.5	24.9
II. Expenses of Purchase of Goods and Services	9.5	10.7	10.9	10.8	11.1	9.9
III. Current Transfers	28.7	28.0	31.0	31.0	34.3	34.6
IV. Capital Expenditures	6.5	6.8	6.4	8.2	7.5	8.8
V. Capital Transfers	0.9	1.5	1.7	1.4	1.6	2.3
VI. Loaning	2.4	3.2	1.9	2.0	2.1	3.0
VII. Reserved Fund	0.0	0.0	0.0	0.0	0.0	0.0
VIII. Interest Expenditures	28.6	25.8	23.9	22.3	19.8	16.4

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

According to the functional classification, it is seen that, in 2009, expenditures on CAB, social security and social aid services increased relatively when compared to the other years. On the basis of economic classification, the component (including transfers to institutions such as local administrations and social security institutions), which increased most in 2006 – 2010 was current transfer expenditures in 2009 because of treasury aids. (table 8)

Table 8: Change of CAB Budget Expenses, Social Security and Social Aid Services and Current Transfer Expenses in 2006-2010

		Change compared to previous year (%)				Change compared to initial fund (%)				
		2007	2008	2009	2010	2006	2007	2008	2009	2010
CAB Expenditures		14.6	11.3	18.1	9.7	2.2	-0.4	2.0	3.5	2.6
Functional Classification	Social Security and Social Aid Service	33.3	7.8	48.9	6.8	5.5	4.0	-4.1	12.7	-3.1
Economic Classification	Current Transfer Expenditures	27.0	11.2	30.7	10.7	1.5	4.0	1.7	4.6	-0.3
	Treasure aid	33.6	7.5	42.9	5.7	-.15	0.9	-1.5	19.1	-4.5

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

3.3. Budget Balance and Noninterest Surplus

That public budgets have a deficit in both developed and developing economies is a widely known notion. In order to follow a budget deficit, two basic indicators, the budget balance and noninterest surplus, are beneficial to know. While evaluating the performance of public finance, the proportion of budget deficits to GDP and the development of noninterest surpluses are criteria taken into consideration (Susam and Bakkal, 2008: 84). In almost all countries, governments aim at practicing effective money and revenue policy to provide fiscal discipline and to decrease budget deficits. The important thing at this point is the maintainability of budget deficits. To notice maintainability of budget deficits, many approaches have been developed. One of the recent approaches is the periodic loan limit approach. According to this approach, governments face some limits while loaning, and since loans cannot be paid by loans again, it will depend on the value of noninterest surplus to pay the loans in the long term. Noninterest surplus and budget deficits are compared and the budget deficit is accepted to be maintainable if the noninterest surplus is equal to or more than the budget deficit (Aslan,2009: 2-3). Thus, to evaluate a budget deficit, the budget deficit and noninterest surplus gain importance.

Table 9: CAB Expenditures, CAB Revenue and the Proportion of Budget Balance to GDP (%)

	2005	2006	2007	2008	2009	2010
Central Administration Budget Expenditures	24.6	23.5	24.2	23.9	28.2	26.7
1. NoninterestBudgetExp.	17.6	17.4	18.4	18.6	22.6	22.3
2. InterestExpenses	7.0	6.1	5.8	5.3	5.6	4.4
Central Administration Budget Revenue	23.5	22.9	22.6	22.1	22.6	23.0
1. General Budget TaxRevenues	18.4	18.1	18.1	17.7	18.1	19.1
2. OtherRevenues	5.1	4.7	4.5	4.4	4.5	4.0
Budget Balance	-1.1	-0.6	-1.6	-1.8	-5.5	-3.6
Noninterest Budget Balance (Defined by Treasury)	6.0	5.4	4.2	3.5	0.0	0.7

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

Between 2005 and 2008, the proportion of the budget deficit to the GDP was below 2%, while in 2009 it was 5.5%, which was almost 3 times more than the previous year. Even if the proportion was 3.6%, which meant a sudden fall compared to the previous year, it didn't fall to the pre-crisis level. The budget deficit, which emerged from an increase in central administration budget expenses in 2009, seemed to be affected by the crisis (table 9).

On the other hand, in analyzing the noninterest surplus development, it is seen that the proportion on noninterest surplus to GDP, which had a tendency to decrease between 2005 and 2009, had an important fall to 0.0% in 2009. The same rate increased but not to the pre-crisis level in 2010.

Table 10: Central Administration Deficit Predictions and Realizations in Budget Laws

	CAB Predictions			CAB Realizations			Variation (Prediction – Realization Difference)		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
CAB Balance (Million TL)	-18,909	-15,548	-50,034	-17,432	-52,761	-40,081	-1,477	37,213	-9,953
CAB Balance / GDP (%)	-2.6	-1.4	-4.9	-1.8	-5.5	-3.6	-0.8	4.1	-1.3
Noninterest Surplus (Million TL)	40,391	41,202	6,716	33,229	440	8,217	7,162	40,762	-1,501
Non interest Surplus / GDP (%)	5.6	3.7	0.7	3.5	0.0	0.7	2.1	3.7	0.0

Source: BFC, Budget Sizes and Budget Realizations (online) http://www.bumko.gov.tr

While especially the increase in investment expenditures and share having been given to local administrations made the public expenses beyond expectations in late 2008, it was seen that the revenue budget didn't increase at the same rate. While the erosion, at the indirect taxes at Christmas, is tolerated to some extent with the taxes from foreign trade, the reduction of foreign trade, during the year with the effect of crisis, has brought about some loss in VAT and customs, taken from imports. Budget deficits in central administration in 2008 accelerated in the last quarter of the year, and at the end of the year, the deficit was beyond expectations. While the real increase in the noninterest surplus was almost 5% in the last quarter of year, a decrease of almost 10% in budget revenues was recorded. This situation showed how much the Turkish tax system was affected by the periodic fluctuations that the system experienced (EPRFT, 2008).

Although the noninterest surplus was 7,162 million TL and below the target, the budget deficit for 2008 was achieved. Thus, it is possible to say that positive performance in interest expenses was achieved. Thus, the rate of interest expenses / GDP from BFC statistics was 5.3%, the lowest level between 2000 – 2009 occurred in 2008 (BUMKO, 2011).

While noninterest expenses in the central administration budget in 2009 increased 22%, the increase in revenues was 3%. As a result, the budget deficit increased almost 200% compared to 2008. The budget deficit in 2009 was 5 times larger than predicted in the budget law draft of the same year (EPRFT, 2009: 4).

That budget revenues were sensitive to development, while an important part of development was independent and obligatory, had an important role in the negative budget table of 2009. Practices, having an impact on expenses and decreasing the revenues within the economic precautions taken against the crisis, were joined by other factors having negative impacts on the budget balance (Ministry of Finance, 2009:23).

These evaluations about the results of central administration budget in 2009 (EPRFT, 2009:45):

- It is seen that budget expenses increased 3.1% compared to the initial fund and the rate of increase in noninterest expenses was 4.8%. Thus, it is possible to say that the increase in budget expenses in 2009 was due to the increase in noninterest expenses.

- Capital expenses (because of spending arising from green card), purchase of goods and service (including transfers to Social Security Institution), current transfers were the most effective components in the variation of noninterest expenses compared to initial fund.

- While budget expenses were beyond expectations, budget revenues were 13.6%, which was lower than the initial target. It can be said that the decrease in tax revenues had the most important role in low budget revenues. The variation in budget deficit was 4 times more than the initial prediction.

Looking at the budget realizations in 2010, the budget deficit, which was aimed at 50,034 million TL, had a 10 million TL variation and the noninterest surplus exceeded the target. The most important contribution to overcome the target was CAB revenue resource, which was beyond targets at the end of year. (table 9).

It is possible to say that at first, indirect taxes, which exceeded the budget target of 11%, and the return of tax revenues were the determiners of the increase of 7.3% budget revenues in 2010. This increase in tax revenues was due to the positive reflection of VAT and SCT in import and the increase in the level of total demand (EPRFT, 2010: 5-6). That is, the basic development of budget

performance in 2010 was due to the increase in tax revenues, which increased depending on rapid development tendency of economy.

A relative slowdown in noninterest expenses and a decrease in interest expenses, depending on interest rates in domestic debt, have all had positive contributions to the balance of public finance (CBRT, 2011).

It is observed that the rate of the central administration budget balance, which showed a recovery tendency with the positive effect of budget performance to GDP in the economic development experienced in 2011, got a little bit bad as a result of decreasing budget revenues together with slowdown in financial activities since the first half of 2012. Central administration budget had a deficit of 6.7 billion TL in the first half of 2012 and noninterest balance had a surplus of 19.6 billion TL (CBRT, 2012).

3.4 Public Net Debt Stock and Public Sector Borrowing Requirement

Examining the rates of EU defined public debt stock (PDS) to GDP, it had a permanent decrease between 2002 and 2006 and decreased from 74% to 39.9%, had almost no change in 2007, it increased to 46.1% and again had a decrease tendency and at last decreased to the level of crisis in 2010 (figure 5).

The rate of public finance stock, decreasing until 2008, to GDP increased in 2009 but not beyond expectations because of the increase in public deficit and reduction in development. In this sense, rate of EU defined general state debt stock, which was expected to be 47.3%, to GDP was 42.4%. (Ministry of Development, 2010: 12).

Figure 5: Rates of EU Defined Public Debt Stock to GDP between 2002 and 2010

Source: Treasury, Debt Determinants, (online) http://www.hazine.gov.tr
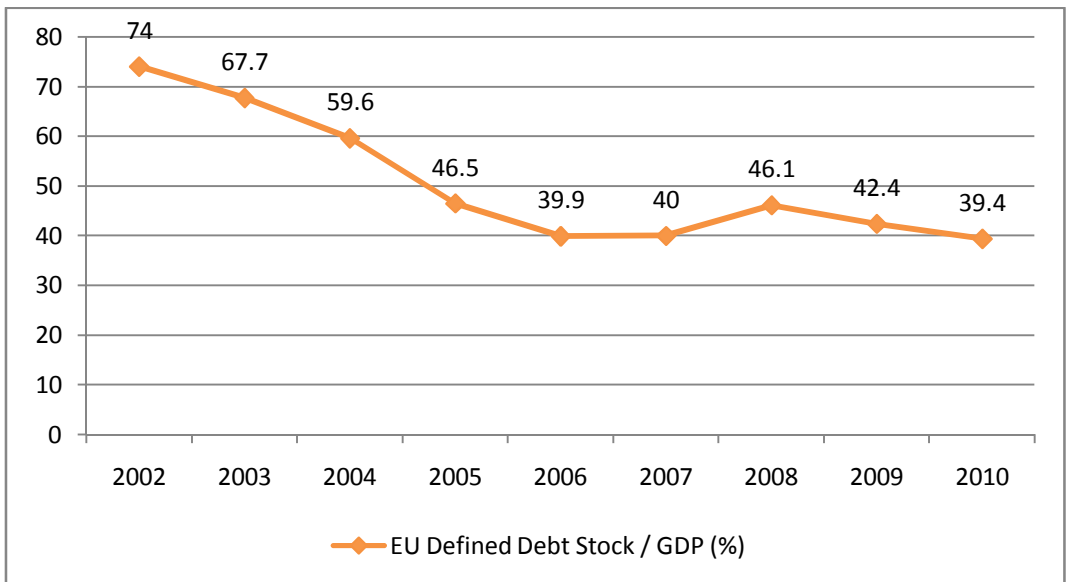
Public net debt stock trended upward in 2008, and in 2009 it was at its peak within the 2002 and 2010 timeframe with an almost 42 billion TL increase. Public net debt stock seemed to increase even when it was relatively low in 2010. (Figure 6).

Figure 6: Amount of Public Net Debt Stock between 2002 and 2010 (Billion TL)

Source: Treasury, Debt Determinants, (online) http://www.hazine. gov.tr
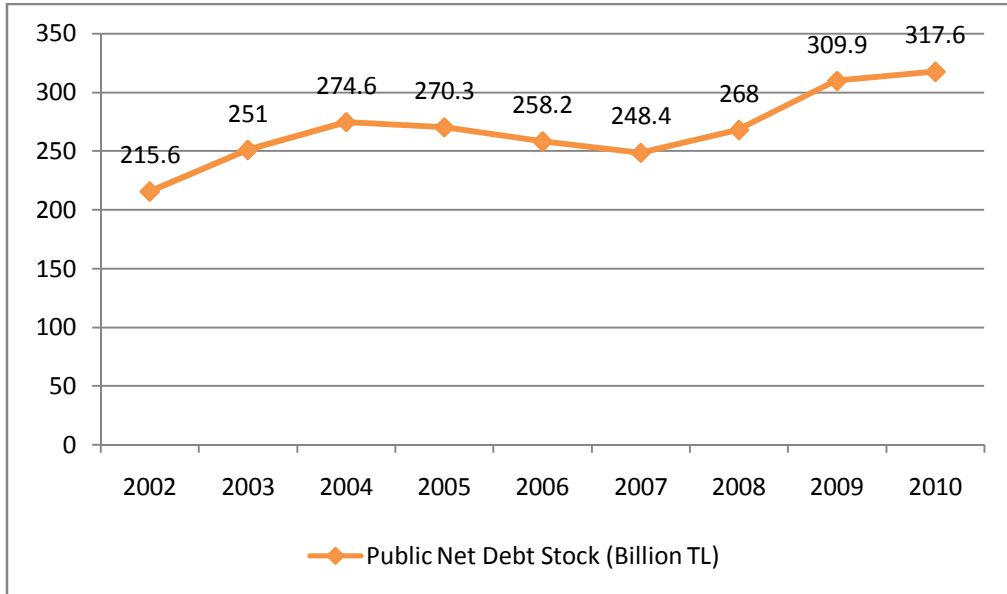
Looking at the rate of public net debt stock to GDP, in terms of Turkish Liras as well as foreign currencies, it had a tendency to decrease between 2002 and 2008. The rate of PNDS to GDP in 2010 again decreased compared to the previous year. The most important thing is that rate of debt in the form of foreign currency to GDP permanently fell even within the crisis period. (Figure 7).

Figure 7: Rates of Public Net Debt Stock in the form of TL and Foreign Currency to GDP between 2002 and 2010(%)

Source: Treasury, Debt Determinants, (online) http://www.hazine. gov.tr
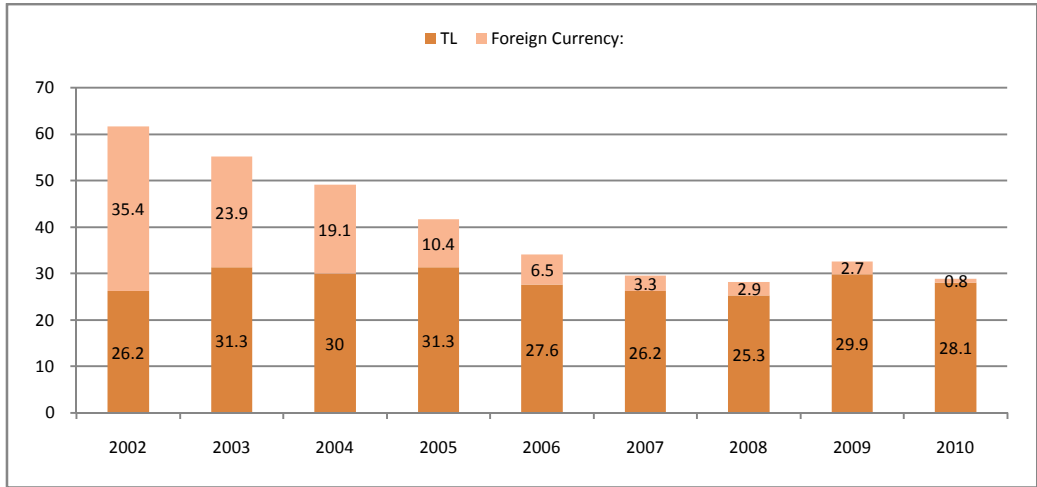
Examining the amount, PBR, in a general decrease, increased to its highest level in 2009. Looking in proportion, the rate of PBR to GDP, after 2004, caught its highest level in 2009 (Figure 9 and 10).
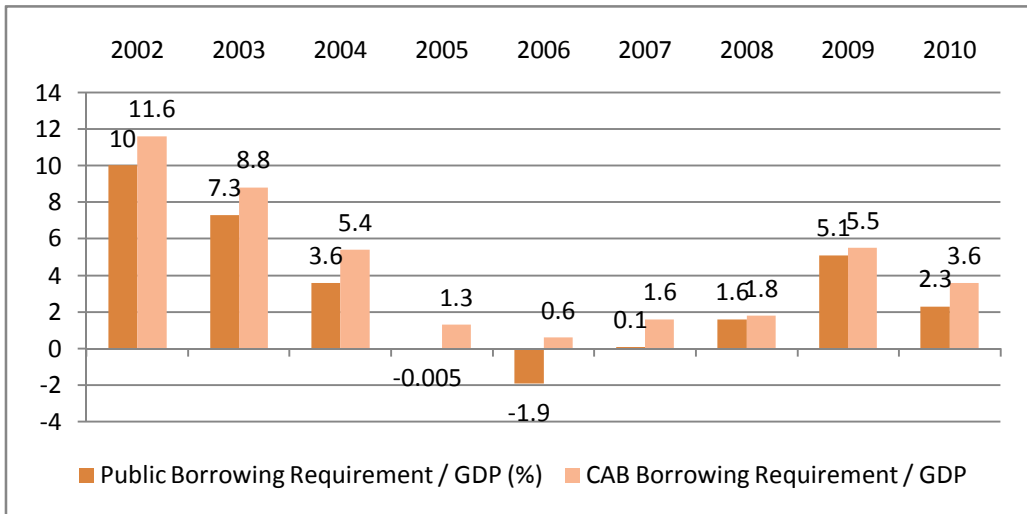
Figure 8: Public Borrowing Requirement and Amount of CAB Borrowing Requirement between 2002 and 2010

Source: Treasury, Debt Determinants, (online) http://www.hazine. gov.tr
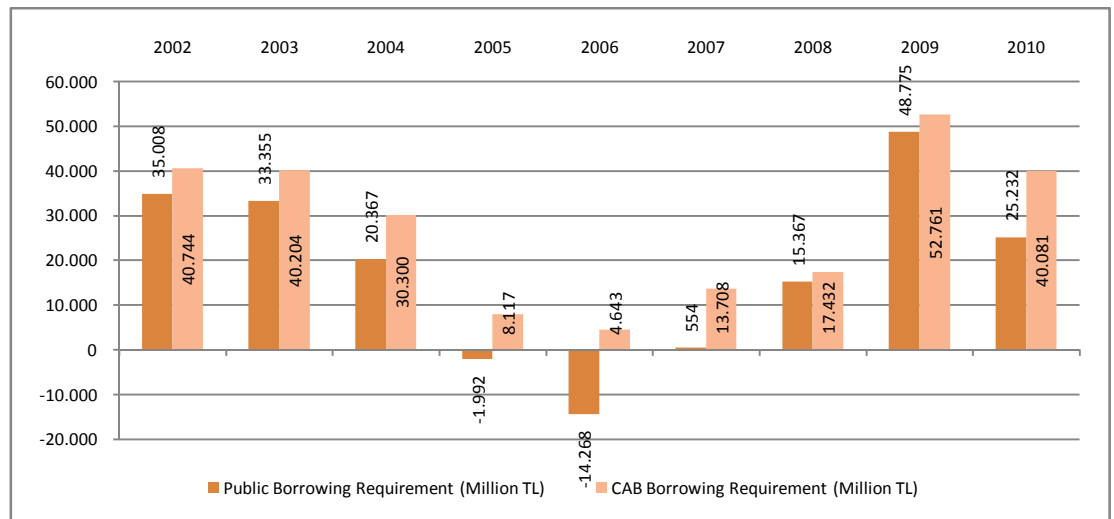
Compared to the previous year, the increase in the public borrowing requirement in 2009 emerged because of the increase in noninterest expenses and the decrease in indirect taxes and in privatization revenues (Ministry of Development, 2009:45).

Figure 9: PBR / GDP and CAB Borrowing Requirement / GDP Rates

Source: Treasury, Debt Determinants, (online) http://www.hazine. gov.tr

The ecnomic recovery in 2010 had a positive impact on the public borrowing requirement. In 2009, the rate of the public borrowing requirement to GDP was 5.1, and in 2010 it decreased to 2.3, which was 1.1 more than the expected number. The rate of the EU-defined general state debt stock to GDP rate decrease to 42.2% (Ministry of Development , 2011: 13-14).

CONCLUSION

A global financial crisis has been faced throughout the world since 2008, because of the bankruptcy of some investment banks together with the collapse of the housing market in the United States and the nationalization of some of these banks with financial aid packages. International capital movements and world trade slowed down, domestic and foreign demand reduced in nearly all countries, production decreased and unemployment increased. Public finance was affected negatively because of the expanding finance policies to keep demand alive.

One of the countries affected by the global crisis is Turkey. Although there are some problems such as reduction in external financing opportunities and return of domestic loans, general thought is that the financial sector of Turkey, which displayed better risk management after the crisis, didn't face serious problems compared to the financial markets of many developed and developing countries, because of the many unique structural arrangements in banking sector. However, the same cannot be said about the real sector.

Lack of confidence became widespread as the result of uncertainty after the crisis, and expectations worsened. In this uncertain environment, the real sector had loan difficulties. Because of the reduction in economic activities, the reduction in domestic and foreign demand especially in 2009 had some negative impacts on development, employment, foreign trade and direct capital entry. For example, while development of GDP was in positive points since 2002, there was a decrease of 4.8% in 2009.

The unemployment rate was 15.8% in the first quarter of 2009, which was the highest level in recent years, and export rate decreased to 22.6% and so did the import rate, to 30.2%. In 2009,

direct foreign capital entry, having decreased since 2008, was at its lowest level of the 2005 – 2010 period.

The reduction in financial activities, which emerged from the global economic crisis, led to an increase in public financial deficit and debt stock globally. Central administration budget revenues decreased remarkably. It was more about taxes. Because economic activities decreased in the crisis process, collection of indirect taxes, which depend on economic activities heavily and whose capacity improves with an increase in sale of goods and service, decreased. The rate of "Transaction Tax Revenues" increased, with a share of 45%, and its most important components were Value Added Tax and Special Consumption Tax (6.1% in 2008 and 7.1% in 2009). This situation was equal to the lowest levels between 2005 and 2010.

"Tax Revenues of International Trade and Transaction", including Customs Taxes and Value Added Taxes, decreased at a rate of 12.6% compared to the previous year in 2009 and stayed in negative for the first time nominally.

In 2009, Collection of Income and Corporate Tax, taken from income of individual and corporations, was at its worst performance with a decrease rate of -0.5% between 2005 and 2010.

When compared with Budget and Medium Term Financial predictions and targets, realizations in tax revenues had a negative variation of 3 million TL in 2008 and 29 million TL in 2009. The reduction of tax revenues in both 2008 and 2009 got better with a general review of the economy in 2010. Examining the development of tax revenues in between 2008 and 2010, they have a real increase of 0.5% in 2008, 2.8% real decrease in 2009 and 10.6% real increase in 2010.

The tax discounts to keep demand alive in crisis caused tax revenues to decrease and some problems in collection of social security premiums, because the recession increased central administration social security spending. According to functional classification, the share of social security and social aid services in the budget was 20.9% with an increase of 4 points in 2009, and it was the highest between 2006 and 2010.

The negation between central administration revenue and expense showed itself in noninterest surplus values and budget balance. The central administration budget balance's rates to GDP in 2008, 2009, and 2010 increased compared to previous three years. The rate of the budget deficit to GDP in 2009 was -5.5%, which was the highest between 2005 and 2010. The rate of the noninterest budget balance of the same year to GDP was at its lowest level (0.0%) after 2005. The rates of the CAB balance / GDP and noninterest surplus/GDP were beyond expectations (especially in 2009). In 2011, when compared to the last few months of 2010, the rate of central administration budget revenues, decreasing in a limited level, to GDP kept its level of late 2011 in the first quarter of 2012. [This sentence needs to be revised. Too clunky.]

The negative table of the balance of central administration budget balance and noninterest surplus value between 2008 and 2010 was reflected in the public net debt stock and public borrowing requirement. Thus, when compared the rate of public debt stock to GDP in previous periods, it was realized in high values between 2008 and 2010.

In brief, it is possible to say that the central administration budget was affected by the crisis in 2008 with almost parallel to macroeconomic determinants between 2008 and 2010, when the major effects of the crisis reverberated throughout the global economy. The budget displayed a bad performance in values of revenue-spending components in 2009, budget balance and public debt stock, and it showed a positive tendency with the economic recovery and the base effect of the previous year, 2010.

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COMPETITIVE MARKET ECONOMIES: SELF-REGULATING MARKETS VS. ECONOMIC STABILITY AND THE PARADOX OF CHANGE

Eric L. Prentis

University of St. Thomas, Cameron School of Business, Dept. of Economics, Finance & DIS, Houston, TX 77006, USA.
E-mail: eric.prentis@gmail.com

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ABSTRACT

Competitive market economies are a relatively new economic system, and while very productive, they are not self-sustaining, are unstable and require significant state support and regulation to function properly. Nevertheless, self-regulating market economies are superior to other political-economic systems—such as dictatorial fascism or autocratic communism—but they can be mismanaged. From 2009 through 2012, the Federal Reserve's four quantitative easing programs and deficit spending by the federal government—use over $7 trillion dollars, or 45% of a year's GDP—trying to solve the ongoing 2008 credit crisis. It is reasoned, the U.S. economy will soon experience negative GDP growth, and a double-dip recession will become evident—which will, at that time, call the Fed's experimental policy of quantitative easing into question. Instead, the U.S. 2008 credit crisis could have been solved in two years, and cost the U.S. government and the Federal Reserve about 5% of a year's GDP, by following the tried-and-true credit crisis management rules of Bagehot and Kindleberger.

1. INTRODUCTION

Competitive or self-regulating market economies are historically, relatively new. They promote dynamic creative destruction and rebirth—led by people's needs, wants and desires, thus properly directing economic progress. All free human beings should be permitted to fully participate in self-regulating or competitive market economies; be they politically connected or not, virtuous, psychopathic, intelligent, thoughtless, rational or irrational.

Economic systems are studied and reported on by the social sciences, which are unlike the physical sciences (e.g., physics, biology, chemistry).Social scientists require a unique awareness in order to perform dependable research. For example:

Physics has an absolute that never changes: the speed of light.

Social sciences have change that is an absolute: on one level.

Self-Evident Social Science Axiom:

"The only thing that doesn't change—is change itself."

Life and living is a journey, a process of change.

However, in the social sciences, there is added complexity:

Social Sciences Include Faith:

"There is nothing new under the sun,"(Ecclesiastes 1:9), or said in another way, *"The more things change, the more they stay the same."*

Because human nature is universal, once the cover of cultural differences is removed, and human beings have a tradition of religious faith, using various names for God, such as Yahweh, Allah and Ahura Mazda. Apparent change does not ultimately affect the underlying morality and deeper reality of persons' existence—through time.

Social sciences have meanings on different levels, because of the "paradox of change." Change is always with us, but the underlying truth of humanity (e.g., the subjective truth of how and why), remains constant down through the ages. Or, as is said, *"History doesn't repeat itself, but it rhymes."* Consequently, along with the near impossibility of performing appropriate, controlled social science experiments in a laboratory—the social sciences are difficult to test, evaluate and develop valid researched solutions to problems. Thus, in the social sciences, hardly anything is what it appears. Researchers need a worldly viewpoint, extensive experience, and the ability to perform in-depth studies with a profound understanding of human nature. Maturity is essential. Young prodigies perform better in other fields—such as mathematics or playing a musical instrument.

Economics is, perhaps, the premier social science.

2. LITERATURE REVIEW

2.1. Past Economic Systems

Market economies are nonexistent through most of history. Polanyi (1944) writes—for many thousands of years, first in tribal societies, then up to and including feudal societies, throughout the majority of man's existence, the following societal values dominate all then-existing economic systems:

1) *Reciprocity in social behavior*—giving gifts and thereby expecting to receive gifts in return.

2) *Redistribution of material gain*—this occurs in small primitive communities, and right up to and including wealthy empires. A portion of the food produced is put into storage and freely offered for the benefit of the entire community. Individual food collection and storage for family use is not practiced during these times.

3) *Social Approbation*—the need to be thought well of in the community, according to one's contribution to society.

During most of human history, primarily, individuals are motivated by:

1)*Self-Respect*—a proper regard for oneself, for one's good character and conduct.

2) *Joy-of-Work*—to work for its own sake, on one's own terms.

For many thousands of years, workers are not individually motivated by personal gain or self-interest. In the Western tradition of faith—greed is scorned as a deadly sin. Economic systems are rooted in social relations. The distribution of wealth this determined by the community, irrespective of economic motives. Wealth in past economic systems is not economic, but social in nature.

Long-standing customs, laws and religion support the societal norm, controlling the then-existing economic systems. Societal values have a strong hold on persons in all communities—who do not want to be ostracized, isolated or boycotted. Or as Aristotle says, *"Only gods or beasts can live outside of society—man is neither."*

2.2. Money Use through History

During early and feudal times, metal coins are used to partially pay taxes and make donations to the church. The state uses metal coins to partially pay government officials and military salaries. However, those in the community pay mainly in kind. Likewise, the state pays their officials and soldiers, mainly in kind. Money, through most of recorded history, is not decisive in determining the types of then-existing economic systems.

Money, during feudal times, among peasants and laborers, is rarely used in everyday life. Social organization in Europe, during feudal times, has peasants tied to the land on farms, and laborers in towns formed into craft gilds. Peasants and laborers have access to a garden plot for growing food and to grazing land, in order to tend to their animals. Peasants and laborers are often paid in kind, making money earnings much less important.

Economic rules are set by each gild trade. Gild leaders are also civic leaders, which combines politics and economics. For most of recorded history, human beings live with their social system controlling the economic system, and metal money is not an important factor in the peasant and laborer's life. Money, to the common man or woman, has only peripheral economic significance and eventually rises in importance only because of its use in external foreign trade.

2.3. Trade Begins

Trade does not begin, in early or feudal societies, between individuals. Trade is only sanctioned by civic leaders—between whole communities. Trade does not rely on markets, but is the means of carrying goods over long distances, and may be thought of as simply a hunting expedition. Exchanges between towns are limited, regulated, and do not govern society. Instead, reciprocity and retaliation are the guiding societal principles governing external foreign trade.

Local markets are nonexistent during primitive times, and even during feudal times, local markets remain small, with no tendency to grow. Local markets are organized by townships, carry the same regional products, and cooperation is the basis for exchange.

Markets for local community goods do not mix with markets for goods that come from afar. Local and external foreign markets differ in size, origin and function. External foreign markets carry specialty items—such as spices, salted fish and wine. Local and external foreign markets are not only strictly segregated, but neither is permitted to enter the countryside.

Beginning in the sixteenth century, markets become more numerous and important. However, markets still do not dominate human society. National protection of external foreign trade begins with the advent of tariffs on imported goods. The mercantile economic system develops and begins state control of external foreign trade.

2.4. Mercantilism and External Foreign Markets

Feudal society transitions into the mercantile society of the 16th to late 18th centuries, to preside over external foreign trade. The state determines it is crucial to control vital natural resources in foreign lands, for military purposes, and to run a positive balance of trade surplus, for economic advantage—often requiring governments to impose high tariffs on imported goods.

External foreign trade proves risky, without the backing of a strong state and military. External foreign trade is only created and maintained by a substantial increase in government administration, and by intervening in the societies and legal systems of the countries being traded with, all to protect the businesses doing the trading.

The state monopolizes the economic system for the state's benefit. Colonies are forbidden to trade with other countries, and workers' wages are restricted. However, mercantilism proves divisive; fostering imperialism, colonialism and many wars between the Great Powers. Market economies have yet to arrive, and would not do so until after 1790.

2.5. Market Economies Arrive

The Industrial Revolution creates the need for market economies. Production processes transition from handcrafting methods, into mechanized manufacturing. As a result, labor productivity and wealth creation significantly increase. In the industrialized countries, real wages accelerate, living standards improve, populations grow and the resulting favorable demographics have a positive effect on the industrialized country's well-being. Therefore, the Industrial Revolution prompts the state to design and implement the market economy, and then spend a great deal of time and resources maintaining and controlling their organization.

Private business entrepreneurs are the driving force pushing the state to found the market economy, during the Industrial Revolution expansionist period. Capitalism—the private ownership of the means of production—now mechanized and highly profitable, becomes the guiding economic principle in the West. The merchant class does not arise from the agrarian feudal society, but from the Industrial Revolution. Once established, defense of market economies also includes the traditional landed class and the emerging industrial workers.

In market economies, the source of a person's income is the result of sale of products to far-off, unknown customers. However, for many thousands of years, production is mainly for household use—that is, for family, friends and community members—never for sale to outsiders. Production for sale of goods in faraway markets, to those outside the community, is highly unusual for peasants and laborers, up to this time. Manufacturing centralizes industrial workers into towns, creating mass urbanization. Thus, the Industrial Revolution changes how societies are structured.

Unfortunately, in practice, market economies result in corporate monopolies. Corporations may use a product dumping predatory pricing strategy, by charging less than their cost to produce, in a specific market, in order to drive weaker, smaller competitors out of business, and then significantly raise prices at a later date, in order to gouge the consumer. If the monopoly is in a vital economic area and the company institutes monopoly pricing to overcharge the consumer, only the state has the power to protect its market economy from monopolistic inefficiencies and break up the offending company—thus re-instituting competitive pricing.

Government regulations and market economies develop simultaneously. Leaving business a free hand, especially when dealing with far off customers, leads to misrepresentations, shoddy practices and fraud (Rosner, March 12, 2013). For example: toxic subprime mortgage securitizations sold worldwide causes the 2008 credit crisis—and international corporations selling horsemeat as beef, reportedly triggers plummeting hamburger sales. This requires the government to protect market participants from difficult to detect fraudulent business practices. As a result, the state establishes the Food and Drug Administration, the Department of Weights and Measures and the Securities and Exchange Commission. Consumer trust, in everyday market transactions, is paramount for market economies to function properly.

Akerlof and Romer (1993) explain how businesses practicing fraud produces competitive advantage for dishonest companies, at the expense of honest companies. For example: the financial sector collapse in Chile, the 1980s U.S. savings and loan debacle leading to the collapse of real estate prices, and the U.S. junk bond market that funded business takeovers—all having similar fraudulent boom and bust cycles.

Without regulation and transparency, bad businesses drive out good businesses, following Gresham's Law. The economic system then atrophies, with a loss of trust in the marketplace. What is lost is not just the money on an inferior product or service, in the short run, but more importantly, the bad businesses may use their outsized profits to buy political protection and start changing laws, to make new laws favorable only for them—thereby damaging the market economy and reducing the state's long-term economic growth and welfare.

2.6. Management of Market Economies

Managers in market economies find they get what they measure, incentivize and dis-incentivize. Capitalism only works properly when disincentives are as important as the incentives. Wrongdoers have to be taken out of their employment positions and insolvent companies have to go out of business, in order to cleanse the economic system and restore confidence in the marketplace. If the government practices crony capitalism, malinvestment occurs, to the economy and society's detriment.

Once society has danger impressed upon it, after a credit crisis, fear remains latent in people's memory, until the cause of the danger is removed. This is why prosecuting fraud by the state is so important. Without justice restored, people now distrust those who remain in power, after they prove dishonest, because they believe fraudulent practices will quickly resume. Consequently, trust leaves the economic system, hindering economic recovery.

The next step in economic advancement is the institution of self-regulating or competitive market economies, which currently dominates social order in the West.

2.7. Self-Regulating or Competitive Market Economies

An economic market system capable of directing the whole of economic life, without outside help or interference, is called self-regulating. Once the self-regulating or competitive market economy is designed and implemented by the state, to give all participants an equal opportunity for success, the self-regulating market is to be let alone by the state and allowed to function, without after-the-fact government or outside intrusions, regardless of the expected consequences. The government's role is to set up and enforce impartial laws, not to play the game.

Self-regulating markets require competitive markets for labor, land and money. The state devises laws and regulations for their development and maintenance. This is the revolutionary change to how societies were previously organized. Land, unlike human beings, is part of the physical world (i.e., nature). However, land and people, down through history, are inexorably tied together. Institutions in tribal and feudal societies are dependent upon the people-land whole, and they are never separated. In contrast, self-regulating or competitive market economies split land and labor into two separate units of trade, resulting in a change in societal values.

In a self-regulating or competitive market economy, market prices are allowed to seek their own level—which is a price setting and market clearing mechanism. Initially, markets are expected to be in balance. However, when random information or external shocks to the self-regulating market

economy moves prices, markets are assumed to be self-equilibrating, without outside interference from government.

2.8. Liberal Economic Theory

Economic theory supporting the historic transition to a self-regulating or competitive market economy is called "liberal economics." Which, beginning in 1820, stands for: 1) competitive markets for land, labor and money; 2) the gold standard; and 3) foreign trade without protective tariffs, government subsidies or imposed monopolies.

Liberal economic theory champions decentralized competitive markets, rather than centralized, day-to-day state operation of the economy. Because decentralized self-regulating markets do an excellent job of allocating scarce resources, by setting market clearing prices, they therefore are more productive than centralized state operations. However, liberal economic theory of self-regulating markets proves utopian in practice. Competitive market economies go into disequilibrium, with falling sales, thus reducing industrial production and producing stagnant personal income, resulting in the scourge of self-regulating or competitive market economies—high unemployment and falling real wages. Consequently, liberal economic theory is discredited.

2.9. Death of Liberal Economic Theory

The first Great Depression lasts from 1873-to-1886. At the start of Great Depression 1, Germany and France have a most favored trading nation status and international trade is expanding. By the end of Great Depression 1, protective tariffs are in place, competitive markets change into monopolistic markets, and a social insurance system is established, to lessen the worst effects of the self-regulating market economy on workers.

The Russian revolution of 1905 is the result of a contraction of the western European money market, which the Russian economy is tied to. The Bolshevik revolution overthrows Tsarist Russia in 1917, and begins a collectivized, communist economic system, discarding both the autocratic Tsarist government and their failed self-regulating market economic model.

The second Great Depression, occurring less than 50 years later, lasts from about 1929-to-1940. The international trading system fails, once again. This prompts President Franklin D. Roosevelt to implement the New Deal, to help reduce social strife, as a result of the second major failure of a self-regulating or competitive market economy.

In Italy, Benito Mussolini, the duce of fascism, is installed in government in 1922, because of the market economy crash of 1919-1920. Adolf Hitler Nazi party fascists come to power in Germany in 1933, and Francisco Franco Nationalists fascists take over Spain in 1936, because of the economic turmoil resulting from the Great Depression 2. Fascists attack democracy and gain a foothold, because of self-regulating market economic failure. Fascists promise and deliver on market interventions to lessen the worst consequences of the Great Depression 2.

Communism and fascism reject the self-regulating or competitive market model and re-establish social society, as transcendent over failed self-regulating markets. Fascism and communism organize workers into "colleges" with a national purpose, so workers can pool their efforts and thereby eliminate poverty. Hitler's extensive public works, including building the Autobahn, extensive military spending, and Stalin's Five Year Plans are examples.

Communism succeeds, at this time in Russia, because they had no democratic traditions, the population was largely illiterate and the economy was not industrialized. However, keeping the

economy always expanding is impossible. So instead of regular business cycles that perform the creative destruction of driving out the bad and allowing the new to take over, in small managable increments, the resulting long-term economic imbalances become sovereign in size, which brings the Soviet Union (USSR) to an abrupt end in 1991, when their centrally planned state-operated economy ultimately fails.

The strength of strong-man dictatorial governments, in re-establishing societal values over the self-regulating market economies, also proves to be the system's greatest weakness. It is impossible for the countries to rid themselves of dictators, tyrants and their corrupt network of followers, short of death or political revolution—and absolute power corrupts absolutely. The wellbeing of the state is no longer of importance, since the economy's benefits are now mainly allocated among crony political officials.

Communism and fascism will not tolerate a self-regulating or competitive market economic system—at all—or for long. A self-regulating market economy has too many recessions and gets in the way of corrupt officials looting the economy. A self-regulating market or competitive economy can only function in a democratically elected republican form of government, but even then, it is unstable and prone to catastrophe, if mismanaged by the state.

2.10. Human Nature and Self-Regulating Market Economies

Those in Western societies are told that competitive market economies, which have self-regulated prices for land, labor and money, set solely by the market, are normal, and that human beings develop market economies on their own, without help from the state, which is the proof of human progress. Also, that market institutions will arise naturally and spontaneously, if only persons are left alone to pursue their economic interests, free from government control. This is incorrect.

Throughout most of human history, self-regulating markets are unnatural and exceptional. Human beings are forced into the self-regulating market economy, by the state. Look at the following false competitive market economy assumptions.

We are told people naturally bartered goods. Actually, human beings, down through history, have no predilection to barter. Social anthropology says that assuming tribal and feudal men and women bartered are rationalist constructs, with no basis in fact. Market economies are the result of often violent government directives, imposing a market society for the state's own non-economic benefit—for example: imperialism. The international trading company's aim is economic gain, achieved by partnering with governments, whose main goals are supremacy and conquest.

The assumption is man is a trader by nature, and that any different human behavior is an artificial economic construct. By not interfering in human behavior, markets will spring up spontaneously. This is proven incorrect in social anthropology.

2.11. Competitive Market Economies Dominate Society

Creating labor markets separates men and women from other priorities in life, subverting the other historical forms of society, replacing them with the laws of the marketplace. In a self-regulating market economy, initially, "nature's penalty" (i.e., starvation) forces the poor to become willing laborers. This is a major change in societal values. In tribal and feudal societies, individuals did not go hungry, unless the community itself is in danger.

The self-regulating or competitive market economy requires social relations to be embedded in the market economic system. That is why a self-regulated market economy only works if the society

has trust and faith in its proper and continued functioning. Capitalism, the globalization of trade and stable currencies alone, do not assure international order. Only society can guarantee, maintain and control competitive market economies.

2.12. Gold Standard

The gold standard is the second leg of liberal economic theory. Doing away with the gold standard in the 1930s during the Great Depression 2, the breakdown of the 1944 Bretton Woods agreement, requiring each country to tie its currency to the U.S. dollar, and finally President Nixon breaking the last link of direct convertibility of the U.S. dollar to gold, in 1971, destroys the long-standing monetary system, thought necessary for self-regulating market economies to function properly. This breakdown of a stable money market is, historically, sudden. One of the three legs of a competitive market economy is missing. This is still being felt, worldwide. The fall of the gold standard, and the rise of fiat currencies, is an ongoing complication in the globalization of international trade today.

Central banks, in the U.S., Japan and China, are currently electronically printing money to monetize their governments' debts—called quantitative easing (QE). As of the first quarter of 2013, the Federal Reserve (Fed) is injecting an open-ended $85 billion dollars a month of QE into the financial system. The Fed plans to continue QE3 and QE4 until either the U.S. unemployment rate drops below 6.5% or until inflation expectations increase above 2.5%. The Fed is pursuing this policy, despite the fact that government has no evidence that QE works.

These developed economies are using a "beggar thy neighbor" monetary policy, thus expecting to increase their country's foreign trade. This seems improbable, because central bankers are using the same QE electronic money printing strategy.

One function of a central bank is to instill confidence in current economic policies. If central bankers squabble among themselves, this hurts the required confidence in the international economic system. Currency wars typically transition into countries instituting trade protections and higher tariffs, thus harming global trade and world economic growth.

Fiat currencies allow central bankers great leeway in monetary policy. However, it is doubtful that central bankers can responsibly handle this freedom, over the long term. Since there is no restraint until the fiat currency completely collapses, see Zimbabwe as a recent example.

2.13. Neoliberal Economic Theory

The neoliberal economic theory grows out of the failure of liberal economic theory, during the Great Depression 2. Originally, in 1938, neoliberal economic theory means, "free enterprise, competitive markets, the priority of the market price setting mechanism, and a strong and impartial state—to ensure it all functions properly."

Milton Friedman and the University of Chicago school of economics go a step further and advocate "free markets," thus rejecting government regulation—calling it inefficient—and promote their efficient market theory (EMT), based on statistical analysis. However, new evidence shows the University of Chicago researchers asked the wrong questions, use erroneous data and an incorrect research method to analyze the data, and then jump to false conclusions based on half-truths (Prentis, 2011). Consequently markets are not efficient, as defined by the EMT, which goes to the heart of the market vs. state debate.

Today, neoliberal economic dogma promotes "free market" radicalism of reducing the size of government through the privatization of government services, deregulation and globalization. Privatization professes to reduce the state's authority over the economy, but state money is now being used by private companies to lobby legislators, to change laws, which will increase the government's demand for these same private corporation services. Privatization of government services by corporations, does not promote the common good, only private profit.

Essentially, neoliberal "free market" thinkers have doubled down on the failed liberal economic theory, with the ongoing 2008 credit crisis as the result. The only way a self-regulating or competitive market economy can function properly is to have fair laws and regulations, set up and enforced impartially, by a strong state. Yet neoliberal economists trumpet government deregulation because it is claimed, regulated markets are inefficient. However, neoliberal economists offer no proof, and recent evidence shows that deregulated markets are inefficient (Prentis, 2012). Therefore, government deregulation may hinder rather than help solve the ongoing 2008 credit crisis, possibly resulting in Great Depression 3.

The "free market," ideology, as practiced today, is just the opposite of what is stated. Instead, governments step in to save insolvent large international corporations, when they make bankrupting mistakes, and give the bill to the taxpayer. This transforms the current difficult but manageable ongoing 2008 credit crisis, mainly involving insolvent banks, into a much larger and dangerous sovereign credit crisis, involving entire countries, with potentially calamitous political consequences.

Nowhere is competitive market deregulation more highly trumpeted by neoliberal economists than in the financial markets. The foundation of neo liberalism is a deregulated financial sector will regulate itself efficiently, making better use of capital, thus ushering in a new age of prosperity. Tragically, the massive deregulation of the financial markets during the Clinton and Bush presidencies (1993-through-2008) results in the ongoing 2008 credit crisis—which the U.S. Government Accountability Office (January 16, 2013) reports, has cost the U.S. economy about $13 trillion dollars in lost GDP output.

The ongoing 2008 credit crisis is a result of changing the Glass-Steagall law to allow the combination of insurance, commercial and investment banking, creating too big to fail financial institutions; no regulation of the $700 trillion dollar OTC derivatives market; changing the bankruptcy law; falsified underwriting and subprime lending; securitization of toxic mortgages sold to unsuspecting purchasers worldwide; using Mortgage Electronic Registration Systems (MERS) to evade county title transfer fees; falsifying mortgage documents using robo-signing; and influencing politicians so that criminal bankers are not held accountable for fraudulent behavior. Only the uninformed or politically connected—who have something to gain—use the term "free markets," denoting the need for more deregulation, rather than the correct term, "competitive markets," which require government regulation to function properly.

2.14. Control Fraud

Financial deregulation has led to control fraud, as defined by Black (2005). Bankers lobbied to change U.S. laws to shield them from prosecution, when they practice control fraud, which is their financial "weapon of choice."

Unscrupulous CEOs use government deregulation, and their authority to install complicit corrupt executives in sensitive corporate positions. They use control fraud in their internal accounting system, thus removing all checks and balances, to fraudulently rapidly grow the business, typically

by using difficult to verify loans, lessees and asset market values, all while employing extreme debt leverage. Usually, this occurs in low barriers to entry businesses and industries, which also has the effect of driving good existing companies out of business.

Accounting control fraud produces rapid profit growth, however fictitious. Creditors then freely lend to these seemingly highly profitable borrowers. It is impossible for the markets to discipline accounting control fraud, since the wrongdoing is unknown. Instead, the marketplace, ironically, funds the fraudulent business' fast growth. Thus, the seemly high risk strategies are actually a sure thing.

Dishonest CEOs receive stock options and bonuses that pay off handsomely if the business grows quickly, even though the reported growth is actually fabricated. Executive compensation schemes incentivize this type of control fraud. When the truth becomes known, deceitful top executives merely walk away with their ill-gotten bonuses and let the government sort out the company's bankruptcy. Government prosecution is not a factor in stopping control fraud, because duplicitous CEOs are rarely brought to justice. Control fraud is material and significant, representing more losses than all other property crime—combined!

Control fraud occurs not just at the top executive level in financial institutions, but also at bank trading desks that are also profit centers. The looting happens when traders execute a trade that shows a profit this year, and the trader then receives a large bonus for making the trade, but the trade has a high probability of going bad in future years, especially in the $700 trillion dollar OTC derivatives market. This is called "gaming the firm's compensation system." The expression, "IBG, YBG" is used by unethical traders to justify their actions. It stands for "I'll be gone, you'll be gone," thereby implying there will be no negative consequences to their fraudulent behavior.

Schwab (2011) in the World Economic Forum's (WEF) Global Competitiveness Report 2011-2012, lists the 12 pillars of a country's competitiveness. One of these is, "the necessity of a well-functioning financial sector that allocates resources to high expected rate-of-return investments, irrespective of politics." Assessing financial risk correctly is essential to raising living standards. Consequently, "the banking sector needs to be trustworthy and transparent," and "financial markets require regulation to protect investors and other actors in the economy at large." The WEF report argues for "competitive markets" not deregulated "free markets."

Government financial regulation is required to ensure trust and fair competition. Regulation does not take away from effective and efficient allocation of scarce resources, which is the market's function. In addition, the only way to combat control fraud is with effective government regulation. "Self-regulation" by the financial industry is no regulation at all," it is only a pretense, leading to cover up—and when wrongdoing is identified by outsiders, only excuses and promises of change are forthcoming.

In practice, "free market" deregulation leads to crony capitalism and political corruption. Consequently, neoliberal economic theory is a complete failure, but the bankers still defend neoliberalism because they use moral hazard to privatize bubble economic gains, caused by the Fed, and socialize the inevitable losses when the bubble bursts, and then shift the bankers' massive loses to governments so the people have to pay for banker wrong doing. The resulting income inequality from this disruptive strategy is politically destabilizing (Stiglitz, 2012).

Ever increasing international business profits—coupled with negative real wage growth and increased labor productivity, leading to income inequality—is not the answer to a nation's economic prosperity. It is much too one sided. A better balance between capital and labor is

required. U.S. consumers need disposable income to spend, in order to show business what to invest in, and thereby restore the competitive market economy to balance.

2.15. Globalization

Globalism is another tenet of neoliberal economic theory—defined by no international trade barriers and unrestricted capital flows. However, this "free trade fundamentalism" is a myth. Business wants freedom from government production regulations, while still demanding government protection from outside competitors and foreign state intervention.

Globalization allows international companies to outsource production to countries with weak labor laws, lax environmental regulations and low taxes. The globalized free trade assumption of comparative advantage is proving incorrect, if the general population has to pay for international corporations' mistakes.

The correct name for current neoliberal economic theory should be corporatocracy. Laws and regulations favorable to large international corporations are solely for their own benefit, and detrimental to the U.S. common good. And because the media in the U.S. is largely owned by the same international corporations, this ensures the American people hear only self-selected news that the large corporations what them to hear. Obviously, this is a conflict of interest between large international corporations and the U.S. public.

"Free trade fundamentalism" cannot long endure. When global international trade is expanding, along with ever increasing debt levels, cooperation among countries is forthcoming. Declining international trade, because of falling real incomes and stagnate personal debt levels, leads to falling final demand, and increases business competition and conflict between sovereign nations. International corporations are now competing in declining demand markets. Therefore, business and sovereign nation conflicts are inevitable.

Globalization is an unstable system created under the "free market fundamentalist's" assumption of comparative advantage. Culture and politics make the "free market" assumption incorrect. Markets are dependent on the state for the rule of law, political stability and ultimately, military might. There is nothing free about a "free market."

3. EMPIRICAL FINDINGS

3.1. Self-Regulating or Competitive Markets vs. Economic Stability

Self-regulating or competitive market economies are dynamic, but are frequently unstable and experience recessions. The National Bureau of Economic Research (NBER) records 33 U.S. recessions or business cycles, from 1854 to 2009, each averaging 4.7 years in duration, from peak to peak. NBER reports the last U.S. recession started in December 2007 and ended June 2009 (18 months), the longest recession since WWII. Federal Reserve Chairman Bernanke, in response to the 2008 credit crisis, implements an experimental quantitative easing (QE) program, first used—unsuccessfully to date—by the Japanese, in their vain attempt to extricate themselves from a 23 year ongoing credit crisis. Surprisingly, there is no empirical evidence that QE solves credit crisis, yet governments persist.

Market economies are prone to devastating secular credit crises, leading to social catastrophe, if the state allows a credit crisis to spiral out of control. The grand art for the state is recognizing the difference between a cyclical recession and a potentially devastating credit crisis collapse, and

then when to step in, and how to solve the credit crisis. Bagehot (1892) presents tried-and-true management rules that states have followed numerous times, to successfully solve credit crises. They are: "1) first and foremost, the character of the borrower has to be judged excellent, with no taint of scandal or fraud; 2) only then lend freely; 3) at high interest rates; and 4) to solvent borrowers offering high quality collateral in return."

The state's timing in taking action in a credit crisis is also crucial. Stepping in too early, the state saves wrongdoers. Too late, the resulting downward spiraling economy causes political upheaval and possibly, war! The art, says Kindleberger (1978), "is after the credit crisis has occurred: 1) it is important to wait long enough for the insolvent firms to fail; then, and only then 2) not wait so long as to let the causes spread to solvent firms, needing liquidity." U.S. leaders, during the ongoing 2008 credit crisis, regrettably, violate all four of Bagehot's management rules and both of Kindleberger's timing requirements.

3.2. Case for the U.S. Economy Experiencing a Double-Dip Recession

The Economic Cycle Research Institute (ECRI) has an excellent professional reputation—correctly forecasting the past three U.S. recessions. During the last week of September 2011, ECRI gives advance warning that the U.S. economy had recently reached a peak expansion high, and the U.S. economy would then begin slowing down. On the same day as ECRI's recession announcement, Fed Chairman Bernanke reveals a new quantitative easing (QE) policy called operation twist, and in September 2012, QE3, and in December 2012, an open-ended QE4. The Fed's actions slow the inevitable economic decline, but will not stop it, says ECRI, and may ironically, make the eventual trough of the recession even worse. For as former Bundesbank President Axel Weber says, *"Central banks can buy time, but they cannot fix issues long-term."*

U.S. GDP growth is slowing. In 2010, GDP growth is +2.4%; in 2011, + 2.0%%; and for 2012, it further slows to +1.7%. Nalewaik (April 14, 2011), a Federal Reserve researcher, investigates economic growth, and discovers slowing economies reach stall speeds. Since 1947, a sub +2% GDP growth, year-over-year, as an economic expansion slows, always correctly predicts an economic recession, which normally becomes evident, 70% of the time, within the next year. Consequently, negative GDP growth is 70% probable in 2013, and if not then, almost a certainty by 2014. From this we can infer the U.S. economy is now in a recessionary slowdown, and will experience quarters of negative GDP growth, perhaps within the year.

Important real economic measures indicate the U.S. economy remains weak. The civilian labor force participation rate drops to 63.3%, during March 2013, from a high of 67.3% in 2000, matching levels last set in 1979. The unemployment rate decline over the past three years, from 10% to 7.6%, is almost solely attributed to discouraged workers leaving the labor force. About 90 million working age Americans do not have a job.

In addition, the quality of jobs in the U.S. is declining. Real wages, a good indicator of living standards, turn negative in both 2011 and 2012, falling by about 0.5% a year, even though labor productivity is increasing, according to the 2013 Economic Report of the President. This is indicative of a shift in the mix of U.S. jobs, from high wage full-time jobs, to low wage part-time jobs. The hollowing out of the U.S. economy continues. Good jobs are sent overseas, as part of U.S. corporations' globalization strategy—even while U.S. corporate profits, as a percentage of GDP, reach an all-time high. Without real wage growth, it is difficult for Americans to pay down their high levels of debt. Consequently, the 2008 credit crisis continues.

Other real economic indicators are just as dire. Over the past four years, the number of persons on the Supplemental Nutrition Assistance Program (SNAP) increases +50%, to about 48 million Americans. The Center for Retirement Research reports an increase in the number of the unemployed applying for Social Security Disability Insurance (SSDI) benefits, once their unemployment insurance ends. Social Security Research, Statistics, & Policy Analysis, as of January 2013, lists 10,895,000 Americans in the SSDI program, including their dependent spouses and children, up about +15% over the past four years. Few on disability insurance ever re-enter the labor force.

U.S. leaders hope a technological or energy discovery will help the U.S. economy recover, giving America a new growth engine. This is less likely to happen, because of massive malinvestment. Good money is being thrown after bad, going to insolvent banks and bankers, rather than to innovative engineers and productive operations managers.

4. DISCUSSION

4.1 High Debt Levels Are the Problem

To make up for lost employment income demand, debt levels significantly increase from 1980, when President Reagan said debt doesn't matter, to today. Total U.S. government and private debt-to-GDP was about 165% in 1980, and 33 years later, it is now at 350%. The total debt peak is 260%, in 1929, leading up to Great Depression 2. Therefore, the U.S. has hit a debt ceiling.

A nation's economic engine is circular and goes: employment income>consumption>production>employment income. Americans can no longer service their high debt levels. Therefore, there is leakage in demand from employment income to consumption, because of high consumer debt payments. In addition, since production is now moved offshore, this reduces payments from production to U.S. employment income, leaving less monetary demand to rotate through the next economic cycle.

High debt servicing levels and production outsourcing act as a break on U.S. economic growth. The ever increasing debt economic model is now exhausted. Deleveraging will have to occur. The longer the deleveraging is put off, the worse the eventual economic collapse could be.

4.2. Businesses Follow Demand

International corporations are cash rich, after championing weak trade unions, aggressive cost cutting displacing workers, slowing wage growth and reducing capital investment. However, these same companies are not hurrying to invest their large amassed cash reserves, because they do not know which products or services to invest in.

The Fed's Zero Interest Rate Policy (ZIRP) is taking about $425 billion dollars a year of interest income out of consumers' pockets (Duy, January 29, 2012). This is ironic, because when interest rates are high during the mid-1980s, the U.S. economy is strong. Restraint of economic growth is not because of high interest rates, but hinges on profitable productive opportunities for businesses to expand operations, based on growing consumer demand.

Because U.S. consumers have reduced disposable income to spend, businesses will not make capital investments if they observe declining demand for their goods and services. Even technology led products are risky and prone to economic failure. Rather than investing, large corporations are simply increasing stock dividend payments and buying back their shares.

The major economic problem is the U.S. is lacking final consumer demand, because of ZIRP and an over-indebted society. Increased government demand is not real demand, decided on by consumers. Businesses, rightly so, do not trust this fabricated government demand, since it can change on a politician's whim.

5. CONCLUSION

Society is dominated by markets for land, labor and money. Decentralized, competitive or self-regulating markets are extremely productive, but are unstable and prone to catastrophe, if mismanaged by the state. Centralized, state operated political-economic systems, such as dictatorial fascism and autocratic communism, are not successful, for long.

Self-regulating or competitive markets need effective and evenhanded laws, imposed by an impartial state, to guard against monopolies, cartels and shady business practices. Fraud makes "free markets" unproductive and a burden on society. "Free market fundamentalism" is promoted either by the uninformed, who do not understand what is necessary to make competitive markets function properly, or by those who have a political agenda and profit from the fraudulent behavior allowed by weak and poorly enforced government laws."Free market fundamentalism" carries the seed of its own destruction—witness the ongoing 2008 credit crisis.

Competitive or self-regulating market economies experience recessions, which are necessary for healthy long-term economic growth. This is the paradox of change within capitalism. Individual companies, whole industries, even most large banks can fail, but the underlying economy will revive, stronger and better able to achieve future success.

From 2009 through 2012, the Federal Reserve's four quantitative easing (QE) programs, including operation twist, and the federal government's massive deficit spending—use over $7 trillion dollars, or 45% of a year's GDP—trying to solve the ongoing 2008 credit crisis. A strong case is made the U.S. economy will soon experience negative GDP growth, and a double-dip recession will become evident for everyone to see. This will call the Fed's experimental policy of quantitative easing into question. Instead, the U.S. 2008 credit crisis could have been solved in two years, and cost the government and the Federal Reserve about 5% of a year's GDP, by following the tried-and-true credit crisis management rules of Bagehot and Kindleberger.

For the U.S. to extricate herself from the ongoing 2008 credit crisis, it is recommended that politicians: 1) allow insolvent banks to go bankrupt; 2) prosecute fraudulent behavior; 3) permit interest rates to rise, by doing away with the Fed's ZIRP, thereby increasing consumer demand; and 4) eliminate austerity for the people, by sharing productivity gains with workers. This will help restore income equality and further grow final demand, which will direct businesses on where to make profitable investments. Thereby benefiting the common good, and strengthening the United States.

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