THE EFFECTS OF THE INFLATION TARGETING REGIME ON THE ISTANBUL STOCK EXCHANGE

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_____

Prof. Dr. Sencer Ayata
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Business Administration.

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Prof. Dr. Cengiz Erol
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Business Administration.

_____

Assist. Prof. Dr. Seza Danışoğlu
Supervisor

Examining Committee Members

Assist. Prof. Dr. Seza Danışoğlu (METU, BA) _____

Assoc. Prof. Dr. Nuray Güner (METU, BA) _____

Assoc. Prof. Dr. Burak Günalp (Hacettepe, ECON) _____

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name: Firuze Bölükbaşı

Signature:

ABSTRACT

THE EFFECTS OF THE INFLATION TARGETING REGIME
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Bölükbaşı, Firuze
MBA, Department of Business Administration
Supervisor : Assist. Prof. Dr. Seza Danışoğlu

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The primary purpose of this study is to test the effects of inflation targeting in Turkey in terms of providing stability in the financial system by lowering the volatility in the Turkish stock market. Although there are many factors other than monetary policy which can affect stock market volatility, this study examines whether the volatility due to monetary policy can be reduced by increasing the accuracy of investors' expectations about the central bank's future actions. In the first part, a "Volatility Analysis" is conducted for three sub-periods including the pre- and post-periods of the implementation of inflation targeting in order to see whether the volatility in the Istanbul Stock Exchange changed over time. Second, an "Announcement Effect Analysis" is carried out by using the central bank's interest rate and inflation rate announcement dates in order to evaluate how investors' expectations react to a change in these rates during period from 2002 to 2007. Finally, a "Combined Analysis" is done in order to examine the relationship between the returns in the Turkish stock market and the surprise caused by the realized interest and inflation rates being different from their expected values.

The empirical findings about the level of volatility indicate that there is a decline in volatility of the Istanbul Stock Exchange returns when volatility is compared on a

pre- and post-policy period basis. Also, it is found that the announcement effect was present, meaning interest rate announcements generally came as a surprise to stock market participants. However, this announcement effect has a notably decreasing trend from 2002 to 2007 which is another evidence of the inflation targeting regime's success at reducing stock market volatility. Finally, the "combined analysis" shows that CBT's power to effect stock returns and to direct investors' expectations increases from 2002 to 2007.

Keywords: Inflation Targeting, Volatility, Announcement Effect, Monetary Policy Surprises

ÖZ

ENFLASYON HEDEFLEMESİ REJİMİ'NİN İSTANBUL MENKUL KIYMETLER BORSASI'NA OLAN ETKİLERİ

Bölükbaşı, Firuze

Yüksek Lisans, İşletme Bölümü
Tez Yöneticisi: Yrd. Doç. Dr. Seza Danışoğlu

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Bu çalışmanın temel amacı, enflasyon hedeflemesi rejiminin borsadaki volatiliteyi azaltmak suretiyle Türkiye'nin ekonomik istikrarı üzerindeki etkilerinin test edilmesidir. Türkiye'de, borsadaki volatiliteyi etkileyebilen para politikası dışında birçok faktör olsa da, bu çalışma Türkiye Cumhuriyeti Merkez Bankası'nın gelecekteki politikaları konusunda yatırımcıların beklentilerinin doğruluğunu artırarak borsadaki dalgalanmanın azaltılıp azaltılamayacağını incelemektedir. Çalışmanın ilk bölümünde, İstanbul Menkul Kıymetler Borsası'ndaki dalgalanmanın zaman içerisinde değişip değişmediğini görmek için enflasyon hedeflemesi uygulaması öncesi ve sonrasını da kapsayan üç alt dönem için volatilite analizi yapılmıştır. İkinci olarak, 2002'den 2007 yılına kadar yatırımcıların enflasyon ve faiz oranı değişimlerine olan tepkilerini ölçmek için "Anons Etkisi Analizi" yapılmıştır. Son olarak, Türk borsasındaki getiriler ile faiz ve enflasyon oranlarının gerçekleşen değerlerinin beklenenden farklı olmasından kaynaklanan sürprizler arasındaki ilişkiyi görmek için "Birleşik analiz" yapılmıştır.

Piyasadaki volatilite seviyesi ile ilgili elde edilen bulgular, İstanbul Menkul Kıymetler borsasındaki volatilitenin, politika öncesi ve sonrasında karşılaştırma yapıldığında bir düşüş eğilimde olduğunu göstermektedir. Ayrıca, faiz oranlarındaki

değişikliklerin genelde yatırımcılar için sürpriz olduğu anlamına gelen anons etkisinin mevcut olduğu, ancak enflasyon hedeflemesi rejiminin volatilite düşürme yönündeki başarısının diğer bir göstergesi olarak, bu etkinin 2002'den 2007 yılına kadar dikkat çekici bir düşüş eğilimi gösterdiği bulunmuştur. Son olarak, "Birleşik analiz" Türkiye Cumhuriyeti Merkez Bankası'nın borsa getirisini etkileme ve yatırımcı beklentilerini yönlendirme gücünün 2002'den 2007'ye arttığını göstermektedir.

Anahtar Kelimeler: Enflasyon Hedeflemesi, Volatilite, Anons Etkisi, Para Politikasi Sürprizleri

To My Parents
Faruk and Semiha Bölükbaşı

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CHAPTER 1

INTRODUCTION

The economics literature is rich with studies that address the various benefits and costs of inflation targeting (IT) and its effect on main economic indicators such as public debt and unemployment. In this study, the effect of IT on the Turkish stock market is examined in order to see whether adopting a monetary policy with a high level of informational transparency, clarity and credibility would have a decreasing impact on the volatility of stock returns. IT is often praised by economists and policymakers (Bernanke, 1999; Freedman, 2001; Dodge, 2002) for its accountable and transparent conduct of monetary policy since it is believed that these characteristics help reduce errors in the forecasts of stock market participants with regards to future monetary policy actions and this typically results in a decrease in the volatility of the stock returns. One implication of this argument is that in an emerging market economy where economic uncertainty is typically high, the central bank can adopt IT as a means of gaining confidence from economic agents and thereby lowering the uncertainty and risk in the financial system. More specifically, by increasing the accuracy of investors' expectations about interest and inflation rate changes and other economic indicators, the central bank can hope to promote financial stability.

This study is comprised of four main parts. In the Literature Review Chapter, a detailed description of IT as a monetary regime, its features and its effects on several economic variables such as unemployment and the debt level of a country are provided. Empirical studies about stock market volatility and announcement effects of monetary policy changes are included in this part of the study as well.

In the Data and Methodology Chapter, the sources of data, the methodology used, and the hypotheses tested are presented. In the volatility analysis, three different volatility measures (Classical estimator, Parkinson's volatility estimator, and the Garman and Klass estimator) are calculated to examine the change in stock return volatility over the sample period. It is expected that the adoption of IT has a reducing impact on volatility.

In the announcement effect analysis, markets are assumed to be efficient. In other words, it is assumed that the stock prices at any given time reflect all available information so that only new information moves stock prices. This means that following the announcements of interest and inflation rates, the stock prices should move only if there is a change in these rates and this change was not anticipated by the market participants prior to the announcement. In this study, a model by Kuttner (1980) is used to separate the anticipated and unanticipated portions of interest rate changes. It is expected that the unanticipated portion of the interest rate changes will decrease after the adoption of IT and this will provide evidence that inflation targeting has increased the accuracy of investors' forecasts of monetary policy actions. Moreover, the deviation of the inflation rate from its targeted value is expected to decrease over the sample period due to the financial stability provided by the IT regime. After calculating the unexpected portions of both the inflation and interest rate changes, the effect of these "surprises" on the stock market is examined. In order to support the claim that inflation targeting has reduced volatility in the Turkish stock market, a downward trend both in the volatility values and in the announcement effects should be apparent. Moreover, the reaction of the stock market and the direction of the monetary policy surprises (positive or negative) should be positively correlated in order to be consistent with the expectations.

The third part of the study will present the empirical results and the fourth part of the study will provide the concluding remarks.

CHAPTER 2

LITERATURE REVIEW

2.1. The Definition of Inflation Targeting

Inflation Targeting (IT) is a form of monetary policy in which a central bank targets a projected inflation rate, usually within a plus and minus band, and adopts a floating exchange rate system and uses interest rate changes and other monetary policy tools to achieve the quantitative inflation rate target that is announced to the public as part of the program.

In an IT regime, an easily understandable, numerical target value for inflation is defined as a representative of achieving and maintaining price stability. Given this target, by using the most complete information available, the central bank has the flexibility to choose the combination of monetary policy instruments to achieve the objective. These decisions are announced and explained to the public and this is one characteristic of the program that increases the transparency of monetary policy. As an obvious necessity, the central bank is made accountable for attaining the inflation goal (Research Department, Central Bank of Brazil, 1990).

IT is not a method to reduce the current inflation in a country but rather an anchor to monitor and control price stability in an economy after a disinflation period (Hazirolan, 1999). According to Mishkin (2004), an IT program has five main components:

1. The public announcement of medium-term numerical targets for inflation;

2. An institutional commitment to price stability as the primary goal of monetary policy, to which other goals are subordinated;
3. An information-inclusive strategy in which many variables, and not just monetary aggregates or the exchange rate, are used for deciding the setting of policy instruments;
4. Increased transparency of the monetary policy strategy through communication with the public and the markets about the plans, objectives, and decisions of the monetary authorities;
5. Increased accountability of the central bank for attaining its inflation objectives.

IT has been adopted as a monetary policy in many countries in order to achieve the objective of a low, stable, and predictable inflation rate with a medium-term target horizon. It is expected that such an environment will have positive effects on many macroeconomic elements by providing stability in production and employment. IT is also argued to be one of the best ways to protect the external value of the monetary unit under flexible exchange rates. Moreover, the inflation target provides full transparency in the implementation of monetary policy and this enables financial institutions in the market to foresee the future with less uncertainty and behave accordingly.

2.2. Prerequisites for Inflation Targeting

There are some requirements in order for a country to adopt the IT regime successfully. First, the central bank must be free to choose the instruments to achieve the target rate of inflation. This first requirement implies that there is no explicit rule on how the central bank will select its monetary policy instruments. Second, government borrowing from the central bank to resolve public debt problems and budget deficits must be low so that monetary policy does not diverge from its primary objective of price stability. Third, since an announced quantitative inflation target exists in the IT regime, the central bank must have tools to forecast inflation and implement the monetary policy in such a way that makes it possible to achieve the specified target. Fourth, an institutional structure

with a well-functioning secondary debt market must be developed to facilitate monetary policy implementation and open market operations.

During the implementation of IT, the main objective of the central bank has to be price stability rather than any other targeted variable such as wages, level of employment, or the nominal exchange rate (Masson, Savastano and Sharma, 1997). At any rate, according to the "impossible trinity" argument, it is impossible to have a fixed exchange rate, free capital flows and an independent monetary policy simultaneously since these three market characteristics contradict with each other and at least one needs to be sacrificed in order to achieve the other two. As a result of this, during the implementation of IT, a flexible exchange rate system becomes a requirement.

Although the IT regime was successfully implemented in many developed countries such as New Zealand, Canada, the United Kingdom, Sweden, Finland, Australia, and Spain, many researchers have questioned whether it would be equally suitable for adoptation in developing countries. In recent years, developing countries such as Brazil, Chile, Czech Republic, Poland, and Israel have started to implement an inflation targeting regime and become quite successful in terms of achieving price stability. According to Calvo and Mishkin (2004), there are six fundamental institutional differences between these emerging markets and advanced economies that may create potential problems in the successful implementation of an IT regime in the former:

1. Weak fiscal institutions
2. Weak financial institutions
3. Weak regulation and supervision by the government
4. Low credibility of monetary institutions
5. Currency substitution and liability dollarization
6. Vulnerability to sudden stops of capital inflows

According to Mishkin and Calvo's argument, most of the developing countries may lack the basic prerequisites (especially those related to the institutional elements) of the IT regime and, therefore, in many cases it may just be too early

and almost completely useless to adopt IT as a monetary policy in these countries.

2.3. The Advantages and Disadvantages of Inflation Targeting

The main advantage of an IT regime is that it enables a country to attain and maintain a low and stable rate of inflation. An inflationary environment such as this is expected to bring many benefits along with it, such as encouraging investment to improve productivity and supporting economic growth. Moreover, since central banks are required to regularly announce their predictions about expected inflation, an increased level of transparency and accountability is reached for the country's monetary policy. Central banks that have adopted IT as a regime regularly publish inflation reports and similar documents (originated by the Bank of England in February 1993) to clearly present and communicate their views about the past and future performance of inflation targeting and monetary policy (Mishkin and Posen, 1997; Bernanke, 1999).

As a second advantage, this system is easier for the public to understand compared to other monetary regimes. In addition, with a high level of transparency and simplicity in the system, the uncertainty about the future path of inflation is reduced and, thus, inflationary expectations may become more aligned and accurate among market participants.

Thirdly, in an IT regime, the monetary policy focuses on domestic considerations and tries to respond to shocks within the domestic economy as opposed to other regimes where the exchange rate is identified as a peg. Also, in contrast to monetary targeting, IT does not have to depend on a relationship between money supply and inflation but, instead, the best instruments of monetary policy are determined using all available information, with no prescription about what these instruments should be. In addition, because an explicit numerical target for inflation increases the accountability of the central bank, inflation targeting has

the potential to reduce the likelihood that the central bank will fall into the time inconsistency trap[1] (Mishkin, 2001).
Finally, the IT regime enables a central bank to use its monetary policy tools independently, rather than having to respond to political pressure during policy implementation.

Due to these advantages, the inflation targeting framework is often preferred to other monetary policy regimes. It makes it possible to maintain a low and stable rate of inflation, increases the transparency of monetary policy, provides accountability, and contributes to the improvement and stabilization of investor expectations.

Alongside its advantages, the IT regime also has some disadvantages. First, it is criticized to impose a rigid rule on the monetary authorities that does not allow them enough discretion to respond to unforeseen circumstances. Therefore, IT necessarily increases output instability, and as a result, it may hurt economic growth (Bernanke et all., 1999, Mishkin, Savastano, 2001).

In addition, IT cannot prevent fiscal dominance[2]. Also, since exchange rate flexibility is required by IT, this may cause financial instability. Finally, it is argued that it is usually harder to control the inflation rate compared to controlling exchange rates. The IT regime requires the central bank to make its

[1] If central banks do not execute what they announce as part of the monetary policy, after some time, monetary policies lose the ability to affect the expectations of market participants. This is a big problem in terms of the success of a monetary policy and is called the time inconsistency trap. The time inconsistency literature argues that a discretionary policy setting leads to higher long-run inflation without any gains in output (Kydland and Prescott, 1977; Barro and Gordon, 1983). In the IT regime, on the other hand, since the central bank has a numerical inflation target, the chances of slipping into a time inconsistency trap are reduced.

[2] Fiscal dominance is the dominance of fiscal policies over monetary policies. Such a situation usually exists in those countries with a huge amount of public debt, who therefore give more importance to fiscal discipline. When public debt is high and the real rate of return on government securities is higher compared to the economy's growth rate, an increase in the deficit and a rise in the stock of debt will occur which will eventually require an increase in seignorage. This situation has been called the "fiscal dominance of monetary policy" by Wallace (1981). A country's public debt may become a constraint and may end up disturbing the central bank's independence in terms of monetary policy implementation.

inflation forecast equal to the inflation target over the relevant policy horizon (Svensson, 1997). This may be a serious problem especially in countries where inflation is being brought down from relatively high levels. As a result, IT is likely to be a more effective strategy if it is implemented after a period of successful disinflation (Savastano, 2001). If the inflation rate stays at relatively higher levels, the central bank may have difficulty in explaining the reasons for the deviations from the target and thereby in gaining credibility, which is argued to be the most crucial element of the IT regime (Kadioglu, Ozdemir and Yilmaz, 2000).

2.4. Implementation of Inflation Targeting

2.4.1. Assignment of the Target

The assignment of the numerical inflation target varies across countries. For instance, in Australia, Finland, and Sweden, the central bank announces the inflation target without an explicit endorsement from the government. In Canada and New Zealand, the minister of finance and the governor of the central bank jointly determine and announce the inflation target. In most cases, the inflation target is first announced by the central bank and afterwards the government ends up endorsing it since the determined target is usually the result of an agreement between the government and the central bank (Debelle, 1997).

2.4.2. Definition of the Target

The definition of the inflation target also varies across countries. Specification of the inflation target has several components: the time horizon, the choice of price index for the measurement of inflation, the definition of the target as a point or a band, and the determination of the possible deviation interval from the inflation target under specific circumstances (Debelle, Masson, Savastano, and Sharma, 1998).

2.4.2.1. Time Horizon of the Target

The time horizon shows how long it would take to reach the goal and how long the target inflation rate would prevail in the market. The time horizon of the inflation target depends on the initial level of the inflation rate when the IT regime was first adopted. When there is a difference between the current rate of inflation and the targeted rate, the central bank determines a policy implementation period of around two years including lag periods of monetary policy to achieve the targeted rate (Hazirolan, 1999). For instance, in Canada a 12-month period was allowed for reaching the initial target. In New Zealand, this period was 18 months long. In both countries, once the inflation was reduced to its desired level, targets were set for the following five years (Debelle, Masson, Savastano, and Sharma, 1998).

2.4.2.2. Choice of the Price Index

The price index used for calculating the inflation rate also differs from country to country. A production-based price index such as the chain-weighted price index for GDP, or a consumption-based price index such as the Consumer Price Index (CPI) or the personal consumption expenditure deflator may be used. The critical point in making this choice is that an underlying inflation rate should reflect the balance of demand and supply in the economy (Debelle, 1997).

In practice, the target has been generally specified in terms of the CPI rather than the GDP deflator since it is the price index that is most familiar to the public. CPI is also timely and does not need much revision (Debelle, 1997). Once the index is chosen, the central bank also needs to decide about the overall and core inflation measures. Core inflation excludes some items such as the volatile food and energy sector prices and mortgage interest payments and is usually preferable to the headline (overall) CPI inflation rate, which is based on all items in the index. The core inflation rate does not include the first-round effect of the shocks that are accommodated by the monetary policy. However, it is still unable to exclude the second-round effects of the shocks on wages and prices (Debelle, 1997).

2.4.2.3. Width of the Target Band

Another point that makes the definition of inflation targets different across countries is the choice between a point inflation target versus a band around a point estimate as an inflation target. For example, Finland and Australia determined a particular point target while Canada, the United Kingdom, Sweden and New Zealand specified a band for the inflation target (Hazirolan, 1999). Spain, on the other hand, preferred a ceiling for the inflation rate. The advantage of constructing an inflation band is providing flexibility to the central bank in terms of "meeting the target." Making a precise prediction about the future inflation rate is difficult in an economy where variable lags of monetary policy and short term shocks exist since these factors allow only an imperfect control of monetary policy over the inflation rate (Debelle, 1997).

The choice of the bandwidth is another decision that has to be made within the definition of the inflation target. During making these decisions, the policy maker should take into consideration both the pros and the cons of a tighter and a wider band regime. A narrower band may be interpreted as stronger commitment to the inflation target by market participants since a strict control exists. Also, a tighter band makes it easier to observe the performance of central banks since the central bank has to give account for any deviation from the targeted value. On the other hand, a tighter band is riskier than a wider band due to the difficulty of remaining within the band. In addition, frequent deviations may occur due to short-term shocks and these can undermine any credibility gain (Debelle, Masson, Savastano, and Sharma, 1998). On the other hand, a wider band may cause the economic actors to consider the upper band an inflation expectation, which may result in an inflation increase.

To sum up, there is a credibility-flexibility trade off where a wider range provides flexibility but, at the same time, may reduce credibility.

2.5. Monitoring Inflation Targeting, Transparency and Accountability

As stated in the pre-requisites of IT regimes, a high degree of transparency and accountability is needed during the implementation of the regime. Therefore, inflation-targeting central banks regularly issue “Inflation Reports” which typically include the bank’s forecast of inflation and other related variables, a summary of its analysis behind the forecasts, and the motivation for its policy decisions in order to increase the level of in transparency in the economy. An explicit inflation target and an informative inflation report make it relatively easy to monitor the central bank’s performance. By the help of the transparent system, outside experts and interested observers can check whether the inflation performance is in line with the target within an appropriate horizon. Moreover, transparency allows the private sector to better asses both the competence of the central bank and its commitment to the inflation target. If the bank's competence and commitment are perceived to be adequate, its credibility improves, and it becomes easier for the bank to achieve its target since economic players are more willing to adapt to the target (Svensson, 1997). To sum up, a high degree of transparency and high quality and convincing monetary policy reports are often considered to be essential to establishing and maintaining central bank credibility. In addition, a high degree of credibility gives the central bank more freedom to be ‘flexible’ and also to stabilize the real economy (Svensson, 2002).

Another factor that is critical for the success of IT regime is accountability. A high degree of accountability is now considered as an important component in strengthening the incentives faced by inflation targeting central banks to achieve their objectives. When explicit objectives and a transparent monetary policy reporting exists, public begins to follow up on the developments in the monetary policy (Svensson, 2007).

2.6. Inflation Forecasts

At the earlier stages of policy implementation, central banks like the Reserve Bank of New Zealand, the Bank of Canada, the Bank of England, and the Bank of Sweden developed inflation forecasts mainly with a trial-and-error approach,

with little or no guidance from the academic literature. However, with the growing popularity of IT, the theoretical monetary economics started to be used more and more as part of policy design and implementation (Woodford, 2003). For instance, short and long term projection models, time series models, aggregate analysis, and other related statistical models are some of the models commonly being used during the forecasting stage.

Monetary policy is more effective if it is guided by forecasts since there is a lag between monetary policy actions and their impact on the central bank's target variables. Setting the instrument rate in such a precise way that the inflation forecast approaches the inflation target with minimum error is called "forecast targeting" and is very important in terms of the regime's success (Svensson, 2007).

The IT regime dynamically uses forecasts due to its forward-looking nature (Debelle, Masson, Savastano and Sharma, 1998). Action must be taken before the inflation rate begins to rise. If the expected and the targeted rates differ, monetary authorities take preemptive actions to eliminate the difference. As a result, the central banks' forecasts have a critical role in the IT regime (Debelle, 1997).

There are many factors that have to be taken into account while developing an inflation forecast. First of all, sufficient historical data are needed in order to estimate the relationship between inflation and several macroeconomic variables. Second, forecasters must be reasonably confident that these relationships will remain stable under the new regime. Finally, the authorities should base their monetary policy decisions on a projection of the future path of inflation, but this does not mean that the expectation should be based on a particular model. As a matter of fact, it is observed that using information from different models as an input for forecasting tends to give policymakers the most useful result (Debelle, Masson, Savastano and Sharma,1998).

2.7. Alternative Monetary Policies

Exchange rate targeting and monetary targeting are the two most frequently used regimes other than inflation targeting. These two regimes have their own features, advantages and disadvantages. In this section these points will be discussed.

2.7.1. Monetary Targeting

In monetary targeting the price level is influenced by money supply growth in the long term. Therefore, the primary aim of this regime is to ensure an appropriate growth rate of the chosen monetary aggregate. Mishkin (2000) argues that there are three components of a monetary targeting strategy. These are reliance on information conveyed by a monetary aggregate to conduct monetary policy, announcement of targets for monetary aggregates, and some accountability mechanism to preclude large and systematic deviations from the monetary targets. Moreover, there are some prerequisites for the success of such a regime. A strong and a reliable relationship between the goal variable which may be inflation or nominal income, and the targeted monetary aggregate should exist, and the targeted monetary aggregate must be under the control of the central bank (Mishkin, 1999).

In the 1970s, monetary targeting was adopted in the United States, Canada and the United Kingdom (for which monetary targeting was not particularly successful) and Germany and Switzerland (for which the policy was more successful)[3]. The main reason for adopting this strategy was the global inflationary trends existing at the beginning of the second half of the 1970s (Gokbudak, 1996).

The monetary targeting regime has its own advantages and disadvantages. One of the advantages of monetary targeting is that it provides an independent monetary policy so that monetary authorities can use monetary tools without any

[3] Bernanke and Mishkin (1992) and Mishkin and Posen (1997) contain more detailed discussion of these countries' experiences with monetary targeting.

restriction. Since monetary authorities have flexibility in terms of policy implementation, they have the chance to respond accordingly to shocks to the domestic economy. Moreover, since announced values for monetary aggregates are reported periodically with very short time lags, information about the achievement of the target by the central bank is disseminated immediately. Therefore, monetary targets send immediate signals to the markets about the stance of the monetary policy to keep inflation under control. Another advantage of monetary targeting is that it may prevent policymakers from falling into the time inconsistency trap since it has the ability to promote almost immediate accountability for monetary policy to keep inflation low (Mishkin, 1999). The most common disadvantage of the policy, on the hand, is that if the relationship between monetary aggregates and goal variables (inflation and nominal income) is not stable, it is not going to be possible to produce the desired inflation rate result (Estrella and Mishkin, 1997; Mishkin and Savastano, 2001).

2.7.2. Exchange Rate Targeting

In the exchange rate targeting regime, the central bank tries to establish exchange rate stability by using interest rate changes and foreign exchange market interventions designed to import low inflation from the anchor country.

Targeting the exchange rate may be in the form of fixing the value of the domestic currency to a commodity like gold, which is the key feature of the gold standard (Mishkin, 1999). Another way of implementing exchange targeting is to fix the value of the domestic currency in terms of the value of a large, low inflation country whose inflation is lower than the domestic country and which has a substantial share in the first country's international trade. Yet, as another alternative, the exchange rate targeting regime may allow the value of the domestic currency to float within a specified band. In such an arrangement, the central bank intervenes whenever there are deviations from the band. As an alternative "a crawling peg" can be adopted in which the targeted nominal rate is shifted by being devalued in a controlled fashion by less than the inflation differential in the relevant period. Finally, exchange rate targeting can be performed with the use of a "currency board." Under this system, the domestic

currency is issued only against the growth in foreign exchange reserves and at a fixed ratio. This would mean that the central banks would have very limited impact on the monetary base[4].

This regime has several advantages. First of all, it is simple and easily understood by the public (Kadioglu, Ozdemir and Yilmaz, 2000). Second, it serves as a mechanism for bringing down inflation by fixing the nominal exchange rate to that of a low inflation country. If the exchange rate target is credible, it ties inflationary expectations to the inflation rate of the anchor country to whose currency the domestic currency is fixed (Mishkin, 1999). Third, exchange rate targeting avoids the time inconsistency problem by providing an automatic rule for the conduct of monetary policy. When the possibility of depreciation in the domestic currency exists, a tighter monetary policy will be implemented. Alternatively, if there is a possibility of appreciation in the domestic currency, a looser monetary policy will be implemented. Finally, a fixed exchange rate regime reduces transaction costs and exchange rate uncertainty in international trade. In return, stabilized currency fluctuations reduce uncertainty and thereby stimulate international trade.

There are also some disadvantages of the exchange rate targeting regimes in general. First of all, since central banks are not independent in terms of monetary policy implementation, they cannot use monetary policy to respond to domestic shocks (Petursson, 2000). With liberalized capital flows, an exchange rate target causes domestic interest rates to be closely related to those of the anchor country. As a result, the targeting country becomes unable to use monetary policy to respond to domestic shocks (Mishkin, 1999). Second, exchange rate targeting causes financial fragility[5] in developing countries if the exchange rate target fails. Due to the uncertainty about the future value of the domestic currency, it is much

[4] Monetary base is a term relating to the volume of money in the economy. The monetary base comprises of only currency (banknotes and coins) and commercial bank reserves at the central bank. As such, it is a narrow definition of money supply, consisting of only the most liquid forms of money. Wider definitions of the money supply include the public's bank deposits and are therefore larger in volume and encompass money of a lower liquidity.

[5] Financial fragility is a situation where very small shocks may result in big crises in the economy.

easier for economic players to issue debt in terms of foreign currency. In that case, when there is a devaluation of the domestic currency, the debt burden of firms and banks rises since most assets are denominated in the domestic currency and there is no simultaneous rise in the value of those assets. As a result, devaluation leads to a deterioration of the company balance sheets and this further leads into a decline in economic growth (Mishkin, 1999). To sum up, economic players tend to issue their debts in terms of foreign currency under exchange rate targeting regimes although their income-generating assets are denominated in the domestic currency. Under these circumstances, currency mismatch[6] exists which may result in financial crises in the event of a large devaluation.

2.8. Inflation Targeting and Debt Level of the Country

Inflation targeting can be successful only if the institutions in the country support independence of the central bank, and a strong fiscal position and sound financial system exists (Mishkin, 2000). The absence of fiscal dominance is a precondition for the success of an inflation targeting framework (Amato and Gerlach, 2002 and Masson et al, 1997). On the other hand, fiscal discipline cannot be ensured and fiscal dominance cannot be prevented by the inflation targeting regime. In the IT regime, governments can still continue to implement irresponsible fiscal policy. In the long run, inflation targeting regime may break down because of the high level of fiscal deficits: either the fiscal deficits eventually will have to be monetized or the public debt will be eroded by a large devaluation, and high inflation will result.

In many emerging market countries the balance sheets of firms, households and banks are substantially dollarized, on both sides, and the bulk of long-term debt is denominated in dollars (Calvo, 2000). Since the existence of "exchange rate flexibility" is a prerequisite for inflation targeting, exchange rate fluctuations are

[6] An economy suffers from currency mismatch when its banks and operating companies have their assets denominated in the domestic currency but their liabilities are denominated in foreign currency. When a sudden increase in the value of foreign currency occurs, this can cause a large-scale financial crisis.

unavoidable. Therefore, if large and abrupt depreciations exist, the burden of dollar-denominated debt may increase which may result in a financial crisis (Mishkin, 1996). Moreover, unless there is a strict supervision of financial institutions that prevent exchange rate shocks, inflation targeting in partially dollarized economies may not be suitable because without a control over exchange rates by governments, the foreign exchange risk is suffered by all economic players in the market.

In 2002 and 2003, a research was conducted about the interaction between the interest rates, the exchange rates, and the probability of default in the Brazilian economy which carried a high level of risk and a high amount of public debt at the time. It was concluded that, in 2002, the level and the composition of public debt in Brazil had adverse effects on inflation because of the high level of real interest rate which is required to make domestic government debt more attractive. Since the default risk level is also high, domestic government debt becomes less attractive, and results in a real depreciation. The real depreciation, in turn, leads to an increase in inflation (Blanchard, 2004).

The IT regime has some imperfections such as providing no control for managing the debt of the country. "…Monetary policy is not too useful when debt stocks and export levels are such that bad equilibria are possible, and when the task at hand is preventing investors from panicking and heading for the exits..." (Velasco, 2001). When the realized inflation rate deviates from its targeted value, the central bank increases short term interest rates which results in an increase in the credit risk of that country. Under these conditions, the domestic currency is devaluated and the real value of country's foreign debt rises. At the end of this process, a real devaluation increases the home output value of foreign debt, and hence reduces the wealth (or net worth) of home residents. Therefore, with high levels of debt, a country cannot implement its monetary policies independently which further impedes the efficient IT regime implementation.

2.9. Inflation Targeting and Unemployment

Economic theory predicts an inverse relationship between the rate of unemployment and the rate of inflation in an economy and this relationship is shown by a curve called the Phillips curve. The NAIRU (non-accelerating inflation rate of unemployment) theory states that when unemployment is at its natural rate which is defined by the long-run Phillips curve, inflation will be stable. However, in the short-run, an inflation-unemployment rate tradeoff exists (movements occur on the short-run Phillips curve). Therefore, the unemployment rate can temporarily be reduced through expansionary policy. In other words, the reduction in unemployment below the natural rate will be temporary (an inflation-unemployment rate tradeoff exists only in the short run) and will lead to higher inflation in the long run.

In the literature, with the exception of Corbo et al., 1999 and Bernanke et al., 2000, very few studies are conducted about the impact of IT on the inflation-unemployment rate tradeoff. Regarding the effects of IT on unemployment, strengthening the credibility of monetary policy is generally seen as a development which brings about an improvement in the inflation-unemployment rate tradeoff since a given change in inflation would be associated with a smaller change in unemployment. Hence, the Phillips curve is expected to become steeper (Possen, 1998; Baltenspenger and Jordan, 1998). According to one study where a simple dynamic equilibrium model is used, if the price setting behavior depends on forward looking expectations, then a central bank faces an improved trade-off between inflation and unemployment (Clarida et al., 1999). Some other studies argue that if higher credibility also leads to increased nominal rigidities such as lengthening of labor contracts, then the effect on the inflation-unemployment tradeoff is unclear (Ball et al., 1988; Walsh, 1995; Hutchison and Walsh, 1998). Hutchison and Walsh (1998) show the offsetting effects of a monetary regime change on the inflation-unemployment rate tradeoff using a Phillips curve augmented by past expectations of current inflation and forward-looking expectations of future inflation. According to their study, the improvement of inflation-unemployment rate tradeoff comes from the fact that policy changes affect both the expected as well as the actual inflation. The

regime can also create more nominal rigidity and thus worsen the inflation-unemployment tradeoff in the presence of low inflation and longer-term contracts (Posen, 1998; Hutchison and Walsh, 1998). Therefore, the sign of the net impact on the unemployment-inflation tradeoff is ambiguous. The study also shows that the unemployment-inflation tradeoff improved in OECD countries after the implementation of IT. The improvement is not clear at the beginning immediately after the start of implementation, but it becomes more pronounced over time as the monetary policy gains credibility. In another study where a smooth transition model is used, it was shown that immediately after IT is adopted, the trend in the unemployment-inflation tradeoff is maintained, but it begins to flatten soon after. The tradeoff improves significantly over time as the credibility of the new policy is established (Blinder, 1998).

According to other studies in the literature, the IT regime does not have an effect on the unemployment-inflation tradeoff. In a study by Bernanke et al. (2001), the effect of the adoption of IT is examined by using sacrifice ratios and parameter instability tests in the inflation targeting period of Canada, New Zealand, and the United Kingdom. Essentially, no evidence is found about the fact that the adoption of inflation targets has reduced the real output and unemployment costs of disinflation, at least not during the early stages of the new approach. In the second part of their study, they also estimate Philips curves for Canada, New Zealand, the United Kingdom and Sweden before and after IT and also for a control group. It was found that, for three of the four IT countries, stability of the output-inflation parameter is not rejected at the 5 percent level comparing pre- and post- IT periods. In other words, the output-inflation tradeoff was not materially shifted by the introduction of IT. Corbo et al. (2000) find that the strength in the reaction of interest rate changes to both inflation and output shocks decrease significantly in IT countries but these reductions are weaker or non-existent among non-IT industrial countries. In other words, according to the examination of 9 IT countries and 16 other countries, it is found that the adoption of IT may have contributed to lowering the output costs of inflation stabilizing.

Interestingly, Ball and Sheridan (2005) conclude that IT does not affect output growth or output variability, nor does it affect interest rates and their variability.

A related study by Bodkin and Neder (2003) examines IT in the case of Canada for the period 1980-1989 and 1990-1999 (the IT period). Their results, based on graphical analysis, clearly indicate that the inflation over the IT period did fall but this was achieved at the expense of a significant cost of unemployment and output.

2.10. Inflation Targeting and Its Effects on the Stock Market

In this part, previous studies about the effects of the IT regime on the stock market are summarized. These studies can be grouped into three based on their subjects: "Stock market volatility", "Announcement Effects" and "Monetary Policy Surprises".

2.10.1. Stock Market Volatility

The volatility of a stock market depends on various factors, such as international relations, business risk, political factors and monetary policy. A monetary policy which can reduce the errors in investors' forecasts regarding macroeconomic parameters is expected to have a reducing impact on the volatility of the stock market. In fact, proponents of inflation targeting have made the claim that inflation targeting promotes financial market stability due to transparency, clarity and credibility (Bernanke, 1999; Freedman, 2001; Dodge, 2002) and ensures financial market participants' expectations to be in line with the actions of the central bank (Freedman, 2001). Under a clear and transparent monetary policy, investors should be able to forecast future interest rates more accurately so that they do not have to make substantial changes to their valuation due to the change in future cash flows based on the investment level at the new interest rate. Transparent monetary policy reduces abrupt and large changes in financial asset valuations since investors have a better understanding of the central bank's actions.

There are a number of different stock price volatility estimators that have been proposed in the finance literature. The main difference between these estimators is the assumption made regarding the mean value of the stock change over time.

Squared returns, Parkinson's (1980) volatility estimator, and the Garman and Klass (1980) estimator are some of the commonly used volatility estimators. The details about these methods are explained in the methodology chapter, and therefore, no further information about these methods are given in this part of the study.

The other frequently used historical parametric volatility models are the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) and Stochastic Volatility (SV). The parameters in these models are estimated with historical data and subsequently used to construct out-of-sample volatility forecasts. The high degree of volatility persistence observed by these models suggests that the variability of stock index returns is highly predictable and that past observations contain valuable information for the prediction of future volatility.

2.10.1.1. Announcement Effects

In this section, "Efficient Market Hypothesis" and "Effect of key policy rate announcements on investors' expectations" are discussed while emphasizing the effect of the IT regime on investors' expectations.

The efficient market hypothesis is one of the commonly used theories in order to understand price movements in financial markets (Fama, 1970). According to this theory, an efficient market is one in which "prices fully reflect all available information". An important model within the efficient market hypothesis is the "fair game model". According to the fair game model the information set is fully utilized to give an unbiased property to expected returns. In other words, an efficient market is a fair game since investors cannot expect to earn economic rents. Furthermore, during the determination of the appropriate price or return of a security at any point in time, all available information that can form expectations is included; otherwise investors could earn economic rents. Therefore, this theory is important for understanding the impact of IT on the stock markets. The price being formed in the market before the central bank makes a key policy rate announcement includes investors' expectations about

what action the central bank will take given information available at that time. At the time of the key policy rate announcement, prices will only change if these announcements create a change in expectations for future rate changes or economic variables.

An analysis of announcement effects at the macro level was first conducted by Waud (1970), who looked at change in the S&P 500 following discount rate (interest rate) changes by the Federal Reserve. In this model, the residuals during the 30 day period surrounding increase announcements and decrease announcements are analyzed and it was found that there was increased market volatility attributable to the Federal Reserve's discount rate change announcement.

More recently the effect of a variety of macroeconomic announcements on the UK interest rate and equity markets was examined (Jones, Lin, and Masih, 2005). For the equity market analysis, the authors used the FTSE 100 as the market proxy during the sample period of December 1, 1998 to November 18, 1999 and used 9 macroeconomic announcements as explanatory (dummy) variables: retail sales, public sector borrowing rate, retail price index, producer price index, industrial production, unemployment, national statistics, UK monetary policy change and US monetary policy change. It was found that the reaction of the investors to the information content of different news items is not the same for all and the announcement of changes in domestic monetary policy is the most important of the news items considered.

2.10.1.2. Monetary Policy Surprises

In order to examine the effects of monetary policy switches on the stock market, studies assess the market's reaction to monetary policy actions. One of the first studies on the subject is by Cook and Hahn (1989) who examine the one-day response of bond rates to changes in the target Fed funds rate during the 1974 - 1979 periods. The study models the daily reactions of bond rates to the changes in the target Fed funds rate as follows:

$$\Delta R_{nt} = \alpha_n + \beta \Delta r_t + \varepsilon_{nt} \quad (1)$$

In this equation, ΔR_{nt} is the change in the bill, note and bond rates, Δr_t is the change in the target Fed funds rate. This model is estimated for a sample consisting of 75 days on which the Fed changed the funds rate target and it was found that the response to target rate increases was positive and significant at all maturities, but smaller at the long end of the yield curve. Kutnner's (1980) argues that the results should be interpreted by keeping in mind that it is essential to distinguish between the expected and unexpected elements in assessing the market reaction to monetary policy, however, such a separation is not made in the Cook and Hahn study.

The impact of monetary policy actions on bill, note, and bond yields is studied by Kuttner (2001) using data from the futures market for Federal funds to separate changes in the target funds rate into anticipated and unanticipated components. Kuttner's study shows that although a strong relationship between surprise policy actions and market interest rates exists, the response to anticipated actions is small. Moreover, similar studies are done by Hardy (1996) in Germany and Haldane and Read (2000) in England and similar results are obtained.

Gürkaynak, Sack and Swanson (2005) show that United States Treasury bond rates cannot be used as a measurement tool to asses the market's expectations about monetary policy changes even though these are highly liquid and very low risk instruments. Problems also exist for financial instruments that have less liquidity and more risk. Rigobon and Sack (2002) use three-month Eurodollar futures interest rate to measure monetary surprises. The Eurodollar futures contract is the most actively traded futures instrument in the world. The Eurodollar futures prices are determined by the market's forecast of the three-month USD LIBOR interest rate over the delivery month. Hence the value of this instrument is directly dependent on the USD LIBOR interest rate. Predicting Federal Reserve monetary policy would be possible only if the LIBOR interest rate follows the federal funds interest rate.

Gürkaynak, Sack and Swanson analyze different financial instruments (Eurodollar futures, Eurodollar deposits, Treasury bills and others) in terms of their ability to reflect the expectation of the market about alternative monetary policies. They present evidence that the futures contract interest rates with a maturity up to six months are more powerful in terms of the prediction of monetary policy interest rate changes. For longer maturities, it is found that all financial instruments have approximately similar prediction power.

Using a Vector Autoregression (VAR) model, Edelberg and Marshall (1996) find a large and highly significant response of bill rates to policy shocks, but only a small and marginally significant response of bond rates. Other examples of the VAR approach include Evans and Marshall (1998) and Mehra (1996). Also, Demiralp and Jorda (1999) examine the response of interest rates using an autoregressive conditional hazard model to forecast the timing of changes in the Fed funds target and to predict the size of the change. It was found that the market reacts to proactive monetary policy in shorter run (3 and 6-month rates) but it reacts more vigorously to the inactive policy stance at longer horizons (10-year rate). These methods can be difficult to implement, however, and there is some debate as to the reliability of VAR based measures of policy shocks (Rudebusch, 1998; Brunner, 2000).

2.10.1.3. Taylor rule

The Taylor rule (Taylor, 1993) is a monetary policy rule that is used for calculating the change in nominal interest rate in response to divergences of actual GDP from potential GDP and divergences of actual rates of inflation from a target rate of inflation. The rule can be written as follows:

$$r = r^f + \pi + h(\pi - \pi^*) + g(y - y^*) \quad (2)$$

In this equation, r is the short-term nominal interest rate, r^f is the real interest rate, π is the rate of inflation as measured by the GDP deflator, π^* is the targeted rate of inflation, y is the logarithm of real GDP, y^* is the logarithm of potential

output, h is the inflation response coefficient and g is the growth response coefficient. These coefficients show the sensitivity of central bank to inflation and growth.

According to the rule, if the inflation rate is above its target or when the economy is above its full employment level, the central bank should increase short term nominal interest rates. A relatively low interest rate should be applied in the opposite situations. In Turkey since the beginning of 2006, IT has been used as a monetary policy. Under this monetary policy, the central bank sets a target for inflation rates for the coming three years and adjusts the short term interest rates each month by analyzing the deviation of the inflation rate from its targeted value. In this study, the Taylor rule is used in order to determine the favorable and unfavorable surprises contained in the interest rate announcements made by the central bank. The details of the rule are presented in the Methodology chapter.

CHAPTER 3

DATA AND METHODOLOGY

Inflation targeting is expected to provide stability in an economy since it is a clear, transparent and credible form of monetary policy. This study examines whether or not there is evidence in the Turkish stock market to suggest that inflation targeting reduces overall stock market volatility by increasing the accuracy of investors' expectations regarding the central bank's conduct of monetary policy. Stock market volatility is tested on a before-and-after basis around the important dates in the inflation targeting implementation program.

One aspect of volatility in the stock market is the severity of the stock market reaction whenever the central bank makes an announcement about the inflation and interest rates. The efficient markets hypothesis suggests that the stock market would respond to an interest or inflation rate announcement only and only if there is an element of surprise in the information content of the announcement. In other words, if the central bank announcement is already anticipated by the market, then the information is already reflected in the market prices and, thus, there should be no further response from or change in the prices unless the actual announcement provides a new piece of information that had not been expected by the market. The inflation targeting regime is argued to be a highly credible form of monetary policy since continuous information disclosure and absolute accountability by the monetary authority are two major characteristics of this policy. When the central bank adopts this regime, the informational efficiency of the market is expected to improve since now the market participants will have access to an uninterrupted flow of information regarding the monetary policy, its execution and performance. This improvement in informational efficiency is expected to increase over time with the prolonged

implementation of the policy while the monetary authority establishes its credibility and reputation over time, allowing the market participants to form more accurate expectations about the future of the economy. In such an environment, the stock market's reaction to interest and inflation rate announcements is expected to be less and less severe over time if the market participants can indeed form more accurate expectations based on the increased flow of information. This study analyzes the stock market reaction to inflation and interest rate announcements and presents the trend in this reaction over time.

3.1.Data

The sample period analyzed in this thesis is between January 1, 1990 and December 31, 2007. In order to test the volatility impact of the inflation targeting regime over this period, daily opening, closing, maximum and minimum values of the ISE-100 Index are collected from the Istanbul Stock Exchange.

In order to test the announcement effect, data on the dates and the actual content of the inflation and interest rate announcements by the Central Bank of Turkey and the Turkish Statistics Institute are also collected. As a first step in the announcement effect tests, the "element of surprise" in the interest rate announcement is calculated. For this calculation, price data on the government bonds are needed. The daily closing prices of the shortest maturity government bonds are collected over the sample period. All data related to interest and inflation rates are collected from the Central Bank of Turkey and the Turkish Statistical Institute.

3.2.Sample Period Selection

The sample period is determined based on the implementation dates of different monetary regimes in Turkey between 1990 and 2007. The stabilization policy that was adopted in 2000 resulted in a financial crisis in February 2001 and the central bank switched to a floating exchange rate system in order to avoid the potential damages to the economy caused by an unsustainable exchange rate. At that point in time, an alternative monetary policy regime was needed and after examining the experiences of other countries, inflation targeting emerged as an alternative

candidate. As it was discussed before, there are some preconditions that have to exist in the economy before inflation targeting can be adopted. If these conditions are not met, execution of the regime can lead to a credibility loss for both the CBT and the inflation-targeting regime itself. Until a reasonable set of preconditions could be met, the central bank adopted an intermediate regime called “implicit inflation targeting” between 2002 and 2005. Finally, at the end of 2004, the CBT announced that “Explicit Inflation Targeting” would be implemented starting January, 2006 and it has been in effect since then.

Based on this policy calendar, the sample period in the study is divided into three sub-periods: (1) The period between January, 1990 and December, 2001 before the implementation of inflation targeting, (2) the period between January, 2002 and December, 2005 during the implementation of implicit inflation targeting, and (3) the period between January, 2006 and December, 2007 during the implementation of explicit inflation targeting.

The first part of the analysis where the question of whether the stock market volatility decreases as a result of implementing inflation targeting is carried out for these three sub-periods. Examination of the change in the volatility measures over these sub-periods makes it possible to determine the effect of policy implementation on the stability of stock market returns.

The second part of the analysis examines the reaction of the stock market to the surprises contained in the interest and inflation rate announcements made by the central bank and the Turkish Statistics Institute. For tests conducted in this part of the study, it is assumed that the reaction in the stock market occurs immediately after the interest or inflation rate announcement since this information is costless and it is received simultaneously by all market players. Also, short term interest rates and realized inflation rates are economic indicators monitored by many of the decision makers in the market, and, therefore, the time between the announcement and the reaction of the investors to that information is not expected to be long. Hence, the sample period between January, 2002 and December, 2007 is divided into many smaller sub-periods in order to measure the stock market response to the interest and

inflation rate announcements. These sub-periods are determined on the basis of the announcements dates.

3.3.Methodology

3.3.1. Volatility Analysis of the Istanbul Stock Exchange

A number of different stock price volatility estimators have been proposed in the finance literature. Typically, the main difference between these estimators is the assumption made regarding the mean value of the stock changes over time. Some estimators assume that the stock price has no "drift" motion, meaning its mean value stays constant over time. Other estimators assume that, on a daily basis, there are no opening price jumps (i.e., the opening price on a given day is the same as the previous day's closing price). Each proposed estimator has advantages and disadvantages regarding its computation and/or efficiency. This study adopts three daily stock price volatility estimators in order to test whether inflation targeting as a monetary policy helps reduce stock market volatility. These estimators are (1) squared returns, (2) Parkinson's (1980) volatility estimator, and (3) the Garman and Klass (1980) estimator.

All three methods assume that price movements can be modeled as a geometric Brownian motion[7], which means that the logarithm of daily security prices is a Brownian motion with two undetermined parameters, volatility σ and drift μ.

The first volatility estimator used can be described as a classical estimator that uses the squared close-to-close logarithmic daily returns:

$$VOLATILITY_{CLASSICAL,\,daily} = \left[\ln\left(C_t / C_{t-1}\right)\right]^2 \qquad (3)$$

[7] A geometric Brownian motion (GBM) is a continuous-time stochastic process in which the logarithm of the randomly varying quantity follows a Brownian motion. By using a probability distribution function and the prices of the same random stock choice at random times, a steady state distribution function is derived, which is precisely the probability distribution for a particle in Brownian motion.

In this equation, C_t is the closing price on trading day *t*. Although this model has the advantage of computational simplicity, the price variation within a trading day may not be appropriately captured due to the insufficient information content of closing prices. The variance of an estimator measures the uncertainty of the estimator. The smaller the variance, the more accurate is the estimation. The variance of classical close-to-close variance estimator can be reduced either by increasing the number of periods or the available information by including additional information such as high, low and opening prices in the calculations. Parkinson (1980) and Beckers (1983) improved on the classical estimator by utilizing the daily high and low prices in calculating volatility and this is the second volatility estimator used in this study:

$$VOLATILITY_{PARKINSON,\ daily} = \frac{(\ln H_t - \ln L_t)^2}{4\ln 2} \tag{4}$$

In this equation, H_t is the highest price and L_t is the lowest price observed during trading day t. It is shown by Parkinson (1980) that this model is 5.2 times more efficient than the classical estimator based on closing prices. This estimator is only valid when there are no opening jumps and there is no drift $(\mu = 0)$.

Under the same assumptions (no opening jumps and no drift), Garman and Klass (1980) derived a minimum-variance unbiased variance estimator (named the G-K estimator) in the following manner:

$$VOLATILTY_{G-K,daily} = 0.511(a-b)^2 - 0.019\left[x(a+b) - 2ab\right] - 0.382x^2 \tag{5}$$

In this equation, x = ln(Closing Price/Opening Price), a = ln(Highest Price /Opening Price) and b = ln(Lowest Price /Opening Price). The joint effects of opening and closing prices are also taken into account in this estimator. Garman and Klass (1980) demonstrate that their estimator is 7.4 times more efficient than the classical estimator.

If a stock's price follows a geometric Brownian motion with a small drift and no opening jump, the G-K and Parkinson methods both provide reasonably good estimators of the true variance. If the drift term is large, however, both methods significantly overestimate the true variance. Also, the volatility caused by opening jumps is not reflected in either the Parkinson or the Garman and Klass estimators, whereas it is included in the close-to-close (classical) variance estimator. Ignoring the opening jumps causes the true volatility to be underestimated with the Parkinson and G-K methods. Therefore, calculating volatility by each of these three methods makes it possible to address the different characteristics of the price-generating process.

The objective of this study is to examine the affects of inflation targeting on the volatility of Istanbul Stock Exchange by measuring volatility using the three methods explained above. This regime is expected to decrease the volatility in the stock returns since it has many benefits, such as transparency, in terms of increasing the accuracy of the investors' expectations. The change in the volatility measures is examined over the three sub-periods described in the Data section above. The null and alternative hypotheses that are tested in this analysis are given below:

$\mathbf{H}_0$ **=** The mean of volatility in the ISE does not change or increases from Sub-Period 1 (1990 – 2001) to Sub-Period 2 (2002 – 2005) ($\mu_1 \geq \mu_2$)

$\mathbf{H}_a$ = The mean of volatility in the ISE decreases from Sub-Period 1 (1990 – 2001) to Sub-Period 2 (2002 – 2005) ($\mu_1 \prec \mu_2$)

$\mathbf{H}_0$ = The mean of volatility in the ISE does not change or increases from Sub-Period 2 (2002 - 2005) to Sub-Period 3 (2006 – 2007) ($\mu_2 \geq \mu_3$)

$\mathbf{H}_a$ = The mean of volatility in the ISE decreases from Sub-Period 2 (2002 – 2005) to Sub-Period 3 (2006 – 2007) ($\mu_2 \prec \mu_3$)

These null hypotheses state that there is no change or an increase in the volatility of the stock returns. If the null hypotheses can not be rejected, this would indicate that inflation targeting does not have a noticeable effect on volatility.

3.3.2. Announcement Effect Analysis in Turkish Stock Exchange

Public announcements of an interest rate and disclosure of an inflation target by central banks are two main factors that contribute to the transparency and credibility of inflation targeting regime. This study investigates how the Central Bank's short term interest rate announcements affect the returns in the Istanbul Stock Exchange. In addition to the interest rate announcements, The Turkish Statistics Institute publishes a news bulletin twelve times a year and announces the monthly realized inflation rates. Whenever there is a difference between the realized inflation rate and its targeted value, if this discrepancy was not anticipated by the market prior to the announcement, then it is expected to affect the daily returns in the Istanbul Stock Exchange.

The initial announcement date of the data set is on 16th of July 2001 and the last one is on 14th of December 2007 and there are 57 interest rates announced by Central bank. Between 16th of July 2001 and 1st of January 2005, Central Bank of the Republic of Turkey could change short term interest rates in any working day and it was announced at 10:00 in the morning. From 1st of January 2005 to 2006 The Monetary Policy Committee had meeting 8th of each month at 15:00 and the decisions about interest rates were announced at 09:00 the following day. From 2006 to 2007, Explicit IT implementation period, the Monetary Policy Committee announces the interest rate decisions with its reasons immediately after the Monetary Policy Committee meeting. The Monetary Policy Committee meetings starts at 13.00 and the decisions about interest rates were announced at 19:00 in the same day.

In this study, from 2001 to 2007, in order to analyze the change in the returns, the daily returns in the announcement day (interest rate and inflation rate announcement) and the average returns between the announcement dates will be compared by assuming that investors react to the announcements instantaneously. Also as expectations about the stock prices is started to being formed before the

announcement dates of both interest rate and inflation rate announcement dates by different sources in market, three days before these dates will be excluded during the average return calculation to see normal levels of returns in the stock.

In order to analyze the reaction of the stock the announcements through the whole day, hourly returns, morning session returns, afternoon session returns and same day daily return in the announcement day are taken into account and compared with average return. Therefore, the variables that will be compared in order to see the announcement effect will be formed in the way given below:

AR: Average of returns $[t_{i,j}+1 \rightarrow e_{i,j}-3]$ and $[e_{i,j}+1 \rightarrow t_{i,j}-3]$ where;

***i*:** i_{th} period, ***j*:** j_{th} announcement day, $\boldsymbol{t_{i,j}}$**:** the day of j_{th} interest rate announcement in the i_{th} period, $\boldsymbol{e_{i,j}}$: the day of j_{th} inflation rate announcement in the i_{th} period

R: Daily return in $t_{i,j}$, where ***i*:** i_{th} period, ***j*:** j_{th} announcement day, $\boldsymbol{t_{i,j}}$**:** the day of j_{th} announcement in the i_{th} period

Rh: Hourly return in $t_{i,j}$, where ***i*:** i_{th} period, ***j*:** j_{th} announcement day, $\boldsymbol{t_{i,j}}$**:** the day of j_{th} announcement in the i_{th} period

Rm: Morning session return in $t_{i,j}$, where ***i*:** i_{th} period, ***j*:** j_{th} announcement day, $\boldsymbol{t_{i,j}}$**:** the day of j_{th} announcement in the i_{th} period

Ra: Afternoon session return in $t_{i,j}$, where ***i*:** i_{th} period, ***j*:** j_{th} announcement day, $\boldsymbol{t_{i,j}}$**:** the day of j_{th} announcement in the i_{th} period

For instance,

AR1: Average return in $[t_{1,1}+1 \rightarrow e_{1,1}-3]$ and $[e_{1,1}+1 \rightarrow t_{2,2}-3]$ where,

AR1 is the average return between the day after the first interest rate announcement day in the first period and three days before the first inflation rate announcement day in the first period and between the day after the first inflation rate announcement day in the first period and three days before second interest rate announcement day in the second period.

R1 is the daily return in the day of the first announcement the first period

Rh1 is the hourly return in the day of the first announcement the first period

Rm1 is the morning session return in the day of the first announcement the first period

Ra1 is the afternoon session return in the day of the first announcement the first period

In addition, the actual hours of the announcement dates have to be taken into account in this analysis in order to see the reaction of the stock market to this announcement. For instance, as the inflation rates are announced at 16:30 from 01.01.2002 to 01.09.2006, and at 17:00 from 01.09.2006 until now, the effect of the inflation rate announcement does not affect the stock since the transactions end at 16:30 in Istanbul Stock Exchange. If the day after the first inflation announcement is called as **"Inflation Signal 1*(ES1)"*** the calculation of average and daily returns will as follows:

AR1: Average return in $[t_{1,1}+1 \rightarrow ES1\text{-}3]$ and $[ES1+1 \rightarrow t_{2,2}-3]$,

R1: Daily return the day after the first announcement in the first period (Next day daily return)

Rh1 is the overnight close-to-open return after the first announcement in the first period

Rm1 is next day morning session return after the first announcement in the first period

Ra1 is next day afternoon session after the first announcement in the first period

Also, the interest rates are announced at 10:00 from 20.02.2002 to 20.12.2004, at 09:30 from 11.01.2005 to 09.11.2005 and finally at 17:00-19:00 from 2006 to until now. Since the effect of interest rate announced at 17:00-19:00 do not have an impact on stock market on the announcement date, the same calculation as it is shown above, will be done for that period. If the day after the first interest rate announcement is called as "**Interest Signal 1*(FS1)***" and the day after the second interest rate announcement is called "**Interest Signal 2*(FS2)***", the calculation of average and daily returns will as follows:

AR1: Average return in [*FS1+1* $\rightarrow$ *ES1*-3] and [*ES1*+1 $\rightarrow$ *FS2-3*],

R1: Daily return the day after the first announcement in the first period (Next day daily return)

Rh1 is the overnight close-to-open return after the first announcement in the first period

Rm1 is next day morning session return after the first announcement in the first period

Ra1 is next day afternoon session after the first announcement in the first period

Also, the method used for the calculation of daily and average returns in periods with different monetary policy is shown in the Figure 1.

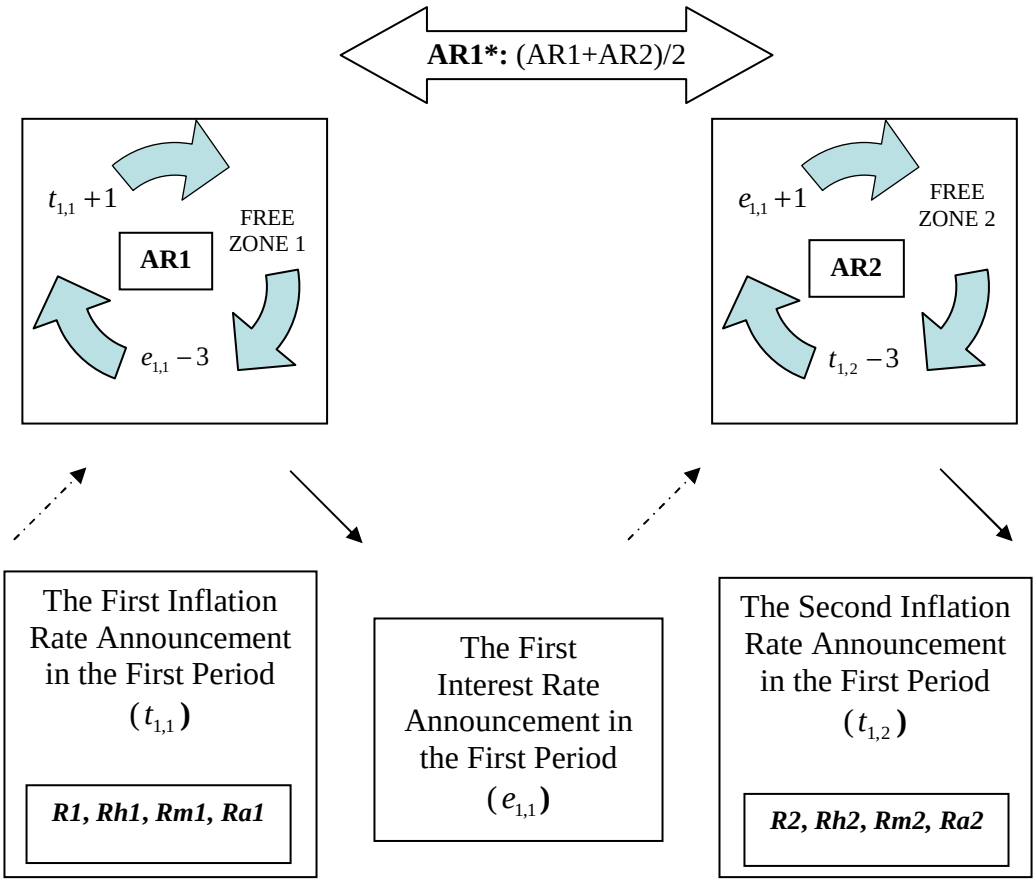

Figure 1. The Formation and Comparison of Daily and Average Returns

As it is shown in Diagram Y, the time periods between the day after the announcement date and three days before the following announcement date is called "Free Zone". On the other hand, for the announcements that do not affect stock market in the same day, the Free Zone will be specified by taking the day after the

announcement as a starting point as it was told in the average return formation above. Also days that to fall on holidays are adjusted.

In this study, the average returns are calculated within the free zones and compared with hourly returns, morning session returns, afternoon session returns and same day daily return in the announcement dates. Furthermore, the comparison is made between the same types of announcement dates. For instance, for inflation announcements, the average returns will be calculated by specifying free zones between two inflation announcement dates. In figure Y, the average return (AR1*) is the average of returns in "FREE ZONE 1 (AR1)" and "FREE ZONE 2 (AR2)". After this calculation, AR1* will be compared with the hourly return, morning session return, afternoon session return and same day daily return in the second inflation rate announcement in the first period (R2, Rh2, Rm2, Ra2) in order to measure the announcement effect.

Also, the announcement effect of IT regime can be examined by analyzing **the monetary policy surprises and deviations of realized inflation rate from the targeted inflation rate** specified by CBT in the market.

i. Monetary Policy Surprises Caused By Interest Rates: To use financial instruments, being traded in the financial markets, is the widely used way of measuring monetary policy surprises in the literature. In order to measure the surprises, the interest rates of Treasury bonds, which have minimum maturity, have been used to distinguish between anticipated and unanticipated changes in the CBT interest rate changes since the range of financial instruments is not wide and the maturities is too short in Turkey. The average maturity of the domestic government bonds used in the analysis is approximately 15 days. Since the effects of long term expectations are not reflected much in such short term financial tools (it reflects the expectations only for approximately 15 days which strengthens the effect of interest rate announcements since it does not contain expectations about long term events such as elections) and as the interest rates of the domestic government bonds with the shortest maturity is the one that is nearest interest rate to the overnight interest rate specified by Central Bank, the interest rates of the domestic government bonds with

the shortest maturity is expected to the be the best financial tool which can reflect the monetary policy surprise.

In addition, in efficient markets, financial markets prices on traded assets already reflect all known information and therefore they reflect the collective beliefs of all investors about future prospects. Since some information about the interest rate decisions of CBT are gathered from different sources in the market, the expectations of investors are formed and reflected to the price of the domestic government bonds the day before the announcement date. That is why the closing prices of domestic government bonds with the shortest maturity before the day of interest rate announcement by CBT are taken as a variable to measure monetary policy surprise in this analysis.

The monetary policy surprise can be measured as shown below:

$$\Delta i^{s} = p_{m,d} - p_{m,d-1} \tag{6}$$

Where, $p_{m,d}$ is the closing price of domestic government bonds (interest rate) with the shortest maturity in month m and day d when the interest is determined by CBT.

$p_{m,d-1}$ is the closing price of domestic government bonds (interest rate) with the shortest maturity one day before the day of interest rate announcement by CBT

Δi^{s} is the surprise part of monetary policy.

In this study, as interest rates are announced at 10:00 from 2002 to 2004 and at 09:00 in 2005, for these periods, the closing price of domestic government bonds one before the announcement day and on the announcement day will be used to calculate the surprise part of monetary policy. On the other hand, as interest rates are announced at 17:00-19:00 from 2006 to 2007, its' effect will not be reflected in that day since the Istanbul Stock Exchange is already closed. Therefore, the closing price of domestic government bonds on the announcement day and one day after the

announcement day will be used to calculate the surprise part of monetary policy for the period 2006-2007.

The next step after the calculation of surprises is to find out the anticipated changes in the CBT interest rate changes. As the realized interest rate change (Δi) and the unanticipated part of the interest rate change (Δi^s) are known, the anticipated part can (Δi^a) be easily calculated as follows:

$$\Delta i = \Delta i^s + \Delta i^a \quad (7)$$

$$\Delta i^a = \Delta i - \Delta i^s \quad (8)$$

In this study, the **surprise part is expected to be smaller in terms of magnitude** since financial markets would be more transparent after the implementation of IT regime. In addition the monetary policy surprises can be classified into three groups: Favorable surprise, unfavorable surprise and finally no surprise. For instance, favorable surprise means that the decrease in the overnight interest rate is bigger than expected which is the signal of an improvement in the economic conditions. The definitions of “Favorable surprise”, “Unfavorable surprise” “no surprise” is given in details below.

- $p_{m,d} \uparrow$: **Negative Change**
  - Actual increase in the interest rate $\succ$ Expected increase in the interest rate $\Rightarrow$ **Unfavorable Surprise**
  - Actual increase in the interest rate $\prec$ Expected increase in the interest rate $\Rightarrow$ **Favorable Surprise**

- $p_{m,d} \downarrow$: **Positive Change**
  - Actual decrease in the interest rate $\succ$ Expected decrease in the interest rate $\Rightarrow$ **Favorable Surprise**

- Actual decrease in the interest rate $\prec$ Expected decrease in the interest rate $\Rightarrow$ **Unfavorable Surprise**

– $p_{m,d} \leftrightarrow$: **No Change**

- Actual decrease in the interest rate = Expected decrease in the interest rate $\Rightarrow$ **No Surprise**
- Actual decrease in the interest rate = Expected decrease in the interest rate $\Rightarrow$ **No Surprise**

Since the prior aim of CBT is the price stability (reduction of inflation rate), a decrease in the short term interest rate occurs only if such a policy does not cause a risk in terms of inflation rate which is possible under stable and transparent economic conditions. In other word, CBT decides to lower the short term interest rate only if it does not cause an inflation rise.

In addition, when the conditions improve in terms of stability and transparency in the market, the expectations of the investors' become more optimistic in parallel with these improvements. In other words, they start to expect high levels of decrease in the short term interest rates since there is no barrier for CBT in terms of inflation rate rise. Consequently, **unfavorable surprise is expected to be analyzed much more compared to favorable surprise** since improvements in the market effects the expectations of the investors positively although CBT acts prudently which result in unfavorable surprise existence. On the other hand, expectations is started to be directed by monetary policy tools such as interest rates as a consequence of the increase in the level of information in the market. Therefore, as it is stated above, the surprise part is expected to be smaller in terms of magnitude, one step further it is expected to be near to zero. In other words, **"No Surprise" element is expected to be analyzed much more in 2006-2007 compared to 2002-2005.** Furthermore, regression will be used in order to examine whether there is a decreasing trend in the magnitude of the deviation of interest rates from its' anticipated value from 2001 to 2007.

ii. Deviation of Inflation Rates: Deviations of the inflation rate from its' targeted value can be another indicator in terms of analyzing effects of IT regime on economy. It is expected the deviations to go downward since the IT regime affects inflation rate expectations in a favorable way and realized inflation rate is formed dominantly by expectations of economic players in the market. Therefore, the deviations of the realized inflation rate from its' targeted value will be analyzed in the inflation rates announcement dates. The inflation rates were announced in the News Bulletin of TSI at 16:30 from 01.01.2006 to 01.09.2007 and at 17:00 from 01.09.2007 up to now. In the TSI news bulletin, information like "highest monthly increase by main expenditure groups", "The highest monthly increase among 26 regions (NUTS2)", "The number of items with increasing price level among the total of 454 items covered in the Consumer Price index" are given in order to increase the level of transparency of the market. By using the realized inflation rate given in this bulletin, the deviations of the realized inflation from its targeted values will be analyzed. The deviation of the inflation rate can be classified as shown below:

- $\Pi_R - \Pi_T \succ 0 \Rightarrow$ Overshoot deviation
- $\Pi_R - \Pi_T \prec 0 \Rightarrow$ Undershoot deviation
- $\Pi_R - \Pi_T = 0 \Rightarrow$ No deviation

As the inflation targets were specified from 2002 to 2006 in CBT website, this analysis will be conducted from the beginning of 2002. It is expected that **the magnitude of the deviations will decrease**; as a result of the positive effects of IT regime on the economy.

To sum, since it is expected interest rate and inflation rate announcements by Central Bank, not to cause big differences in the returns of the stocks (announcement effect is expected to decrease) after some time as it is emphasized before, the decrease in both the magnitude of interest rate surprise and inflation rate deviations will empower the fact that inflation targeting increases the accuracy of investors' expectations due to its transparency and credibility. Therefore it is able to reduce the

magnitude of the announcement effect and overall stock market volatility over time due to the increasing transparency and credibility of monetary policy.

3.3.3. A Combined Analysis using Announcement Effect, Monetary Policy Surprises Caused by Interest Rates and Deviation of Inflation Rates

Inflation targeting is a monetary regime that provides economic stability in an economy since it is a clear, transparent and credible form of monetary policy as it was emphasized before. All the analyses that are explained in detail above are the tools that are used to show the expected positive impact of IT to Turkish economy. Therefore the results of all the analysis has to be consistent in order to reach this expected evidence. In other words, the relationships between these analyses have to be specified and a "Combined Analysis" has to be made to have stronger results.

During making the "Combined Analysis", the expected results that have to be reached are as follows:

- When there is" Favorable Surprise", a positive market response is expected to exist where,
  - Daily return $\succ$ Average return $\rightarrow$ Positive Market Response
  - Current movement of the stock market "Up", Previous movement of the stock market "Down" $\rightarrow$ Positive Market Response[8]

- When there is" Unfavorable Surprise", a negative market response is expected to exist where,
  - Daily return $\prec$ Average return $\rightarrow$ Negative Market Response
  - Current movement of the stock market "Down", Previous movement of the stock market "Up" $\rightarrow$ Negative Market Response

[8] If the hourly return is bigger than average return, this means that the market feedback turns out to be positive, otherwise negative. If the average return is positive, this means that the previous state of the market is "up", otherwise "down". If the hourly return is positive, this means that the current state of the market is "up", otherwise "down".

- When there is" Undershoot Deviation", a positive market response is expected to exist where,
  - Daily return $\succ$ Average return $\rightarrow$ Positive Market Response
  - Current movement of the stock market "Up", Previous movement of the stock market "Down" $\rightarrow$ Positive Market Response
- When there is "Overshoot Deviation", a negative market response is expected to exist where,
  - Daily return $\prec$ Average return $\rightarrow$ Negative Market Response
  - Current movement of the stock market "Down", Previous movement of the stock market "Up" $\rightarrow$ Negative Market Response

After making this examination, the events in which the expected relations defined above occurs, will be specified and will be shown as "TRUE" event. Also, if just the opposite of the expected relation occurs, it will be shown as "FALSE" event. After specifying the "TRUE" and "FALSE" events from 2002 to 2008, the percentage of "TRUE" events will be calculated which gives the percentage of the accuracy of the predictions about the effects of interest rate and inflation rate announcements on the stock returns. This percentage will give an idea about the strength of the relationship between the interest rate surprises and realized returns and also between inflation rate deviations and realized returns.

On the other hand, there may be some dates where both the inflation and interest rate announcement effects exist at the same time. In that case, those dates will be excluded since it is hard to decompose the effect of each announcement and to find out the dominant factor.

Finally, as it was found in the study of Kuttner (2001), it is expected that the response of the market is much more powerful to the surprise (unanticipated) part of the interest rate changes compared to the change itself. Moreover, the response of the market to the anticipated part of the interest rate changes is expected to be in minimum levels.

CHAPTER 4

ANALYSES AND RESULTS

4.1.Results about the Volatility Analysis of Turkish Stock Exchange

The results for tests of the hypothesis about the change in the volatility of Turkish Stock Exchange stated in the methodology part are provided from Table 1 to Table 28 which is formed by using SAS (a business intelligence and predictive analytics software) and the volatility behavior of ISE is demonstrated for each period when different the monetary policy was implemented. It is reported that the volatility behavior of ISE shows a decreasing trend from period one to period three by using **"Classical Volatility Estimator" and** "**Parkinson Volatility Estimator". Moreover, according to "G-K Volatility Estimator"** volatility behavior of ISE shows a decreasing trend from period one to period two and maintains the same level in period three. As a result, it can be stated that "During the sample period one main reason, among others, why the volatility has decreased, seems to be the increase in the accuracy of investor expectations regarding the central bank's conduct of monetary policy while executing the inflation targeting program".

In Table 1, it is clearly evident that ISE volatility decreased significantly from period one to period two (Event 1). It was shown that the mean value of volatility decreased from 0.0011 to 0.0005 by using Classical estimator. In other word, a diminution with a magnitude of 0.0004 existed by the occurrence of Event 1. Moreover, the standard deviation of volatility is decreased from 0.0026 to 0.0012.

Also, a one-tailed standard t-test is used to evaluate whether the change in the monetary policy resulted in a decrease in the volatility of ISE by using two different methods: Pooled, Satterthwaite.

In Table 2, the method for computing the standard error of the difference of the means was specified. The method for computing this value is based on the assumption regarding the variances of the two groups. If the two populations are assume to have the same variance, then the first method, called "pooled variance estimator", is used. Otherwise, when the variances are not assumed to be equal, the Satterthwaite's method is used. Satterthwaite is an alternative to the pooled-variance t test and is used when the assumption that the two populations have equal variances seems unreasonable. It provides a t statistic that asymptotically (that is, as the sample sizes become large) approaches a t distribution, allowing for an approximate t test to be calculated when the population variances are not equal. Therefore, when using the t-test for comparing independent groups, the variances for the two groups has to be examined. As long as the two variances are close (one is not more than two or three times the other), Satterthwaite variance estimator can be used.

In addition, in Table 2, the results of t-test are reported where the mean of classical volatility between period one and period two is compared. Depending on the assumption that the variances for both populations are the same or not, the standard error of the mean of the difference between the groups and the degrees of freedom are computed differently. That yields two possible different t-statistic and two different p-values. The p-value is the two-tailed probability computed using the t distribution. It is the probability of observing a t-value of equal or greater absolute value under the null hypothesis. For a one-tailed test, halve this probability. If the p-value is less than the pre-specified alpha level, usually 0.05, this means that the difference is significantly different from zero. In this study, the p-value for the difference between period one and period two is less than 0.05. Therefore, the difference in means is statistically significantly different from 0 which means that the mean of volatility in the ISE decreases from period one to period two as it was stated in the alternative hypothesis.

In Table 3, a test of Equality of Variances is reported:

Pr > F - This is the two-tailed significance probability. In this study, the probability is less than 0.05. So there is evidence that the variances for the Classical volatility in period one and in period two are different. Therefore, Satterthwaite variance estimator can be chosen for the t-test.

In addition in Table 3, SAS labels the F statistic not F, but F', for a specific reason. The test statistic of the two-sample F test is a ratio of sample variances, $F = s_1^2/s_2^2$ where it is completely arbitrary which sample is labeled sample 1 and which is labeled sample 2. SAS's convention is to put the larger sample variance in the numerator and the smaller one in the denominator. This is called the folded F-statistic,

$$F' = \max(s_1^2, s_2^2)/\min(s_1^2, s_2^2) \qquad (4)$$

which will always be greater than 1. Consequently, the F test rejects the null hypothesis only for large values of F'. In this case, 0.0026 / 0.0012 = 4.64 was found as F' value. Since the calculated value of F' is large, the null hypothesis stating that, the mean of volatility in the ISE does not change or increases from period one to two although the monetary policy changes although Event 2, occurs was rejected which is consistent result with t-test.

In Table 4, it is clearly evident that ISE volatility, which was calculated by using Classical Volatility Estimator, decreased significantly (at conventional levels) from period two to period three (Event 2). By examining the change in the mean volatility of ISE following Event 2, a significant volatility decrease ranging from 0.0005 to 0.0004 was found. This finding lends strong support to the second hypothesis in this study stating that the mean of volatility in the ISE decreases from period two to three since the monetary policy changes - Explicit Inflation Targeting is started to being used in period 3. In other word, if the null hypothesis stating that there is no change or an increase in the volatility behavior of the stock prices was not rejected, this would indicate that Inflation targeting does not have a noticeable effect on the decrease in volatility of stocks.

Also, a one-tailed standard t-test is used to evaluate whether the change in the monetary policy resulted in a decrease in the volatility of ISE from period two to period three by using two different methods: Pooled, Satterthwaite.
In this study, the p-value is less than 0.05. So there is evidence that the variances for the Classical volatility in period two and in period three are different. Hence, Satterthwaite variance estimator can be chosen for the t-test.
In Table 5, the result of t-test is reported where the means between period one and period two is compared. Since the p-value for the difference between period two and period three is less than 0.05, the difference in means is statistically significantly different from zero which means that the mean of volatility in the ISE decreases from period two to period three as it was stated in the second alternative hypothesis in the methodology part of this study.

In addition in Table 6 it is seen that the calculated value of F' is large. Therefore, the second null hypothesis stating that the mean of volatility in the ISE does not change or increases from period two to three is rejected which is consistent result with t-test.

In Table 7, Table 8 and Table 9, the result of the same analysis (volatility calculation by using Classical volatility estimator, t-test and F test) conducted for period one and period three were reported and it is clearly seen that ISE volatility decreased in noticeable levels from period one to period three (Event 3). Also t-test confirms this fact with the result stating "difference in means is statistically significantly different from zero".

Similar analysis about the volatility behavior of ISE is made by using Parkinson's estimator and the G-K estimator. Generally, similar results are reached in each method although they are not exactly the same since each of them has different assumptions that they are based on. The detailed results of each method are given from Table 10 to Table 28. Moreover a summary of the results of the three methods used during volatility analysis is given in Table 29. It is seen that there is evidence in the Turkish stock market to suggest that inflation targeting one of the main factors that reduces overall stock market volatility by increasing the accuracy of investors' expectations regarding the central bank's conduct of monetary policy. In other word,

all of the three methods reject the null hypotheses stating there is no change or an increase in the volatility behavior of the stock prices.

In all the methods, it is seen that the change in the volatility shows a noticeable decline from period one to period two where implicit inflation targeting is started to be used. Also from period two to period three, it is observed that there is slight decrease or no change exists in the ISE. Therefore, it can be concluded that, there is a noticeable reduction in the overall stock market volatility when inflation targeting is first introduced to the economic participants as a result of increase in the information available in the market. Hereafter, the volatility became consistent and a “slight” or “no change” is observed from period two to period three where explicit inflation targeting was applied as it is shown in Table 29.

Also it is seen from Table 29, there is evidence in the Turkish stock market to suggest that inflation targeting reduces overall stock market volatility in terms of percentages. But the “% change” is much higher from period 1 to period 2 compared to “% change” from period 2 to period 3. For instance, according to “Classical Estimator” the mean of volatility is decreased by 55% from period one to period two and 20 % from period two to period three. Moreover the standard deviation of volatility is decreased by 54% from period one to period two and 17% from period two to period three.

To sum, when the central bank adopts inflation targeting regime, an improvement in informational efficiency is increased over time with the prolonged implementation of the policy while the monetary authority establishes its credibility and reputation over time, allowing the market participants to form more accurate expectations about the future of the economy. In such an environment, the overall stock market volatility declined over time based on the increased flow of information.

4.2. Results about the Announcement Effect Analysis in Turkish Stock Exchange

4.2.1. Monetary Policy Surprises Caused By Interest Rates

To measure the surprises, the interest rates of Treasury bonds with minimum maturity, which is approximately 15 days on average, have been used to distinguish between anticipated and unanticipated changes in the CBT interest rate changes as it was explained in details in the methodology part. The results of the calculation of "Monetary Policy Surprises Caused by Interest Rates" are reported in Table 30 and Table 31. Also the summary of the results is given in Table 32.

In this study, the **surprise part of the monetary policy is expected to be smaller in terms of magnitude** since financial markets would be more transparent after the implementation of IT regime. Therefore, a regression analysis was used in order to examine whether there is a decreasing trend in the magnitude of the deviation of interest rates from its anticipated value from 2001 to 2007 which is reported in Table 33 and Table 34. In the regression analysis, t value, F value and Adjusted R-Square shows that the magnitude of the interest rate surprises goes down over time which confirms the hypothesis about decreasing trend in the magnitude of the deviation of interest rates from its' anticipated value in this thesis. Also this noticeable decline can be analyzed in terms of "raw" and "absolute" value by the help of graphs given in Figure 2 and Figure 3

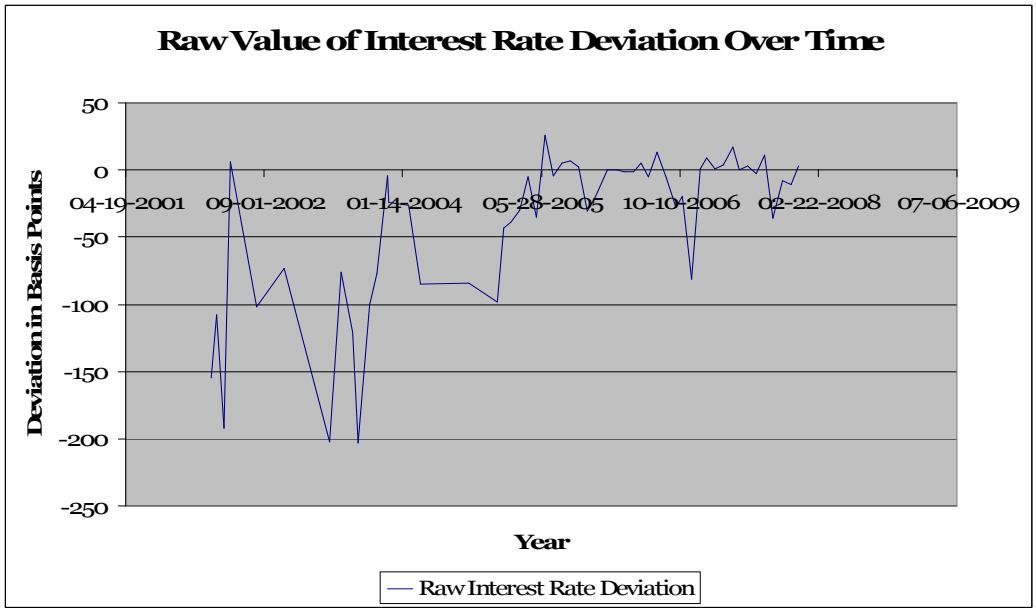

Figure 2. 2001-2007 The Central Bank of Turkey Interest Rates - Overnight (O/N)

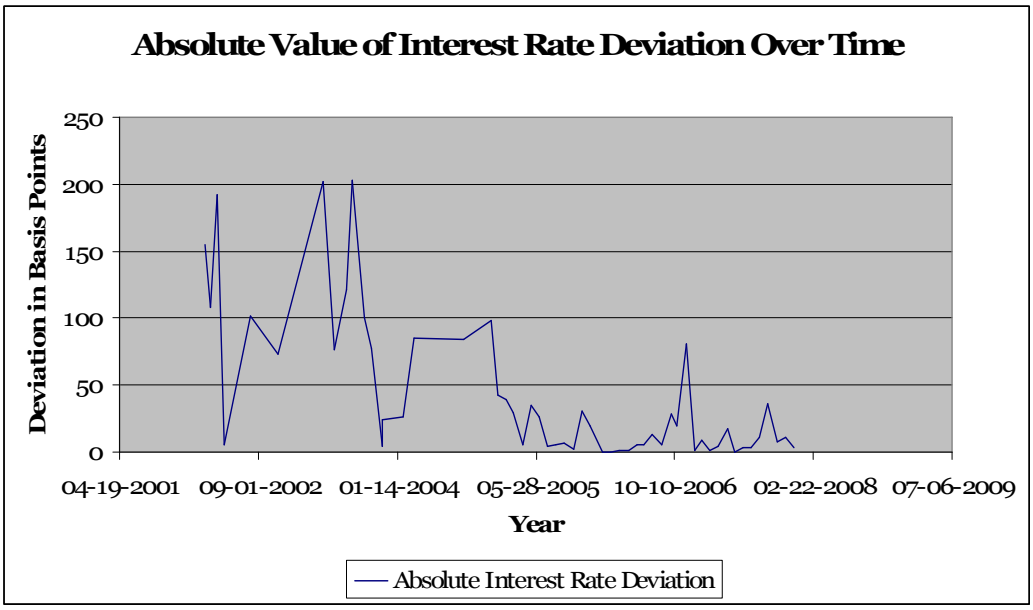

Figure 3. 2001-2007 CBRT The Central Bank of Turkey Interest Rates - Overnight (O/N**)**

In addition, it was hypothesized that the **unfavorable surprise is expected to be analyzed much more compared to favorable surprise** since improvements in the market effects the expectations of the investors positively although CBT acts prudently which result in unfavorable surprise existence. On the other hand, expectations is started to be directed by monetary policy tools such as interest rates as a consequence of the increase in the level of information in the market. Therefore, as it is stated above, the surprise part is expected to be smaller in terms of magnitude, one step further it is expected to be near to zero. In other word, **"No Surprise" element is expected to be analyzed much more in 2006-2007 compared to 2002-2005.** When Table 30 and Table 31 is analyzed to compare the number of **unfavorable, favorable and no surprise results in 2001-2005 and 2006-2007,** it is observed that the percentage of "**Unfavorable surprise"** rises up from 20.58% to 43.47% and also the percentage of **"No surprise" rises** up from to 15% which is reported in Table 35.

4.2.2. Deviation of Inflation Rates

By using the realized inflation rate and targeted inflation rates, the deviations of the inflation rates were calculated which is given in Table 36. Also, by using the "Overshoot" and "Undershoot" definitions specified in the methodology part, it was

found that, out of 72 inflation rate announcements, 51 overshoot and 21 undershoot events existed as it is seen in Table 36. Moreover, out of 51 overshoot events, 25 of them existed in 2006-2007 where the inflation target is much more challenging to reach. For instance, although the inflation target was 35% in 2002, it was 5% in 2007. Since it is harder to lower inflation rates after a certain level, it is normal to observe half of the overshoot events in 2006 and 2007.

In addition the magnitude of the deviations is expected to decrease; as a result of the positive effects of IT regime on the economy as it was stated in the methodology part. As it is seen in Figure 4 the trend line representing the inflation deviation shows a decreasing trend that confirms the positive effects of IT regime on inflation. The decrease in the magnitude of inflation rate deviations empowers the fact that inflation targeting increases the accuracy of investors' expectations due to its transparency and credibility. Therefore it is able to reduce the magnitude of the announcement effect and overall stock market volatility over time due to the increasing transparency and credibility of monetary policy.

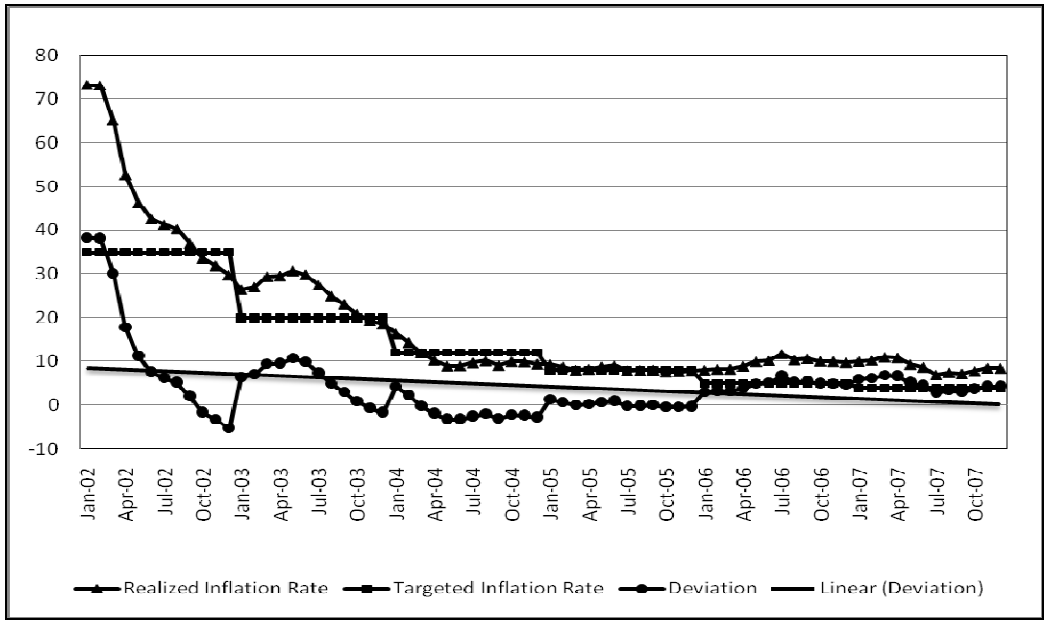

Figure 4. 2002-2007 Deviations of The Inflation Rates

4.3.The Results of the "Combined Analysis" using Announcement Effect and Monetary Policy Surprises

In this study, from 2001 to 2007, in order to analyze the change in the returns in ISE, daily returns, hourly returns, morning session returns and afternoon session returns realized in the announcement day (interest rate and inflation rate announcement) and the average returns between the announcement dates is compared by assuming that investors react to the announcements instantaneously. By making this comparison, the effects of interest rate surprises and inflation rate deviations on the stock returns are analyzed which is given from Table 37 to Table 46.

In both monetary policy surprises analyses caused by interest rates and deviation of inflation rates, for the year 2002, only the daily returns (09:00 open to 16:00 close day return) are used since the hourly return, morning session return and afternoon session return data are not available.

In **monetary policy surprises analyses caused by interest rates,** between 16th of July 2001 and 1st of January 2005, the short term interest rates were announced at 10:00 in the morning. Therefore, hourly return between 10:00 and 11:00 (10:00 open - 10:00 close) in the announcement day and the average return for the **same hours (10:00 open - 10:00 close)** in the specified free zone were used.

Moreover, from 1st of January 2005 to 2006, The Monetary Policy Committee had meetings at 8th of each month at 15:00 and the decisions about interest rates were announced at 09:00 the following day**.** Therefore, hourly return in the announcement day between 09:00 and 10:00 (09:00 open and 09:00 close) and the average return for the same hours (09:00 open and 09:00 close) in the specified free zone were used. But, as hourly return between 09:00 and 10:00 were not available for the interest rate announcements dates between 02.02.2006 and 09.06.2007, hourly return between 10:00 and 11:00 (10:00 open - 10:00 close) and the average return for the hours (10:00 open - 10:00 close) in the specified free zone were calculated and analyzed in this study.

From 2006 to 2007, when Explicit IT implementation period was implemented, the Monetary Policy Committee announced the interest rate decisions with its reasons immediately after the Monetary Policy Committee meeting. The Monetary Policy Committee meetings starts at 13.00 and the decisions about interest rates were announced at 19:00 in the same day. Since the effect of interest rate announced at 17:00-19:00 does not have an impact on stock market on the announcement date, the return at 09:00 (overnight 16:00 close to 09:00 open) **the day after the interest announcement and the average return for the same time hours (overnight 16:00 close to 09:00 open) within the specified free zone were as used.** But, as the overnight return (overnight 16:00 close to 09:00 open) for the interest rate announcements dates between 02.15.2007 and 08.14.2007 were not available, hourly return between 10:00 and 11:00 (10:00 open - 10:00 close) and the average return for the same time period (10:00 open - 10:00 close) in the specified free zone were calculated and analyzed in this study.

As it was explain in the previous paragraphs, except 2002, different analysis including the **hourly return, the morning session return, afternoon session return and daily return** were made in order to see the exact time when the stock market reacts to the interest rate announcements. Therefore the time lag between the announcements and the realized returns was extended using different session return data.

For morning session analysis, morning session return (09:00 open to 11:00 close morning session return) between 2002 and 2005 and the next day morning session return (Next day 09:00 open to 11:00 close morning session return) between 2006 and 2007 and the average return for the same time period within the specified free zones were calculated.

For afternoon session analysis, the same calculations were made using the afternoon session return data (16:00 close afternoon session return in 2002-2005) for 2002-2005 and the next day afternoon session return data for 2006-2007 (14:00 open to 16:00 close afternoon session return in 2006 - 2007).

Finally, for the daily return analysis, daily returns (09:00 open to 16:00 close day return) in 2002-2005 and the next day daily returns (09:00 open to 16:00 close day return) in 2006-2007 and the average return for the same time period within the specified free zones were calculated and compared in order to make the combined analysis stated in the methodology part of this study. A summary of the relations, which is expected to happen, defined in the methodology part is given below:

- When there is" Favorable Surprise", a positive market response is expected to exist where,
  - Daily return $\succ$ Average return $\rightarrow$ Positive Market Response
  - Current movement of the stock market "Up", Previous movement of the stock market "Down" $\rightarrow$ Positive Market Response[9]

The positive response of the market is observed by looking at two different elements which are "Market Feedback (overnight versus average return)" and "Current Movement in the ISE". If the daily, hourly, morning session or afternoon session return is bigger than the average return which is calculated in the way it was explained in the methodology part, this means that the return increases after the interest rate announcement. This reaction is shown as "the positive market feedback" from Table 37 to Table 43. If the expected relation that is defined above occurs, the surprise has to be "Favorable" since an increase exists in the returns after the interest rate announcements and it is shown as "TRUE" in the result tables. Moreover, if just the opposite of the expected relation occurs, it is shown as "FALSE".

Secondly, if the return turns to positive from its negative state (if the current movement turns to "up" from its previous "down" position) after the announcement (after the favorable surprise), this is also shown as "TRUE" in the result tables. In addition, if just the opposite of this expected relation occurs, it is shown as "FALSE".

[9] If the hourly return is bigger than average return, this means that the market feedback turns out to be positive, otherwise negative. If the average return is positive, this means that the previous state of the market is "up", otherwise "down". If the hourly return is positive, this means that the current state of the market is "up", otherwise "down".

- When there is" Unfavorable Surprise", a negative market response is expected to exist where,
  - Daily return $\prec$ Average return $\rightarrow$ Negative Market Response
  - Current movement of the stock market "Down", Previous movement of the stock market "Up" $\rightarrow$ Negative Market Response

Also, the negative positive response of the market is observed by looking at the same two elements which are which are "Market Feedback (overnight versus average return)" and "Current Movement in the ISE". If the daily, hourly, morning session or afternoon session return is smaller than the average return, this means that the return decreases after the interest rate announcement. This reaction is shown as "the negative market feedback" from Table 37 to Table 43. If the expected relation that is defined above occurs, the surprise has to be "Unfavorable" since a decline in returns is observed after the interest rate announcements and it is shown as "TRUE" in the result tables. Moreover, if just the opposite of the expected relation occurs, it is shown as "FALSE".

Secondly, if the return turns to negative from its positive state (if the current movement turns to "up" from its previous "down" position) after the announcement (after the unfavorable surprise), this is also shown as "TRUE" in the result tables. In addition, if just the opposite of this expected relation occurs, it is shown as "FALSE".

After specifying the "TRUE" and "FALSE" events from 2002 to 2008, the percentage of "TRUE" events is calculated which gives the percentage of the accuracy of the predictions about the effects of interest rate announcements on the stock returns. The summary results about the accuracy of the predictions are given in Table 41. For instance the percent of accuracy of the prediction is 48% in 2002-2005 and 58% in 2006-2007 which means that the percent of the "TRUE" events (the events where the expected reaction realizes by the effect of the interest rate surprise) increases. This also shows that the strength of the relation between the announcements/favorable-unfavorable surprises and the returns increases from 2002-2005 to 2006-2007 by the positive effect of explicit IT on expectations of investors.

When the results are analyzed in more details, it is seen from Table 41 that the percent of accuracy of the prediction is 45%, for "Hourly Return Observation", 52% for the "Morning Session Return Observation", 38% for the "Afternoon Session Return Observation" and 38% for the "Daily Return Observation" in 2002-2005, when implicit inflation targeting was implemented, and 58%, 63% and 42% and 54% in 2006-2007 in the same order, when explicit inflation targeting was implemented.

These results include two main points: CBT's power to effect stock returns and to direct investors' expectations increases since the percent of accuracy of the prediction increases from 2002-2005 to 2006-2007 that also confirms the fact that Explicit IT has a positive effect on the expectation of investor's by increasing the level of information available in the stock market. Secondly, since the accuracy of the prediction increases in the morning session returns (%63) compared to hourly returns prediction (58%), it can be concluded that it takes time investors to give a reaction to the interest rate announcements. On the other hand, it is observed that the accuracy of the prediction goes down after some time since the reaction of the investors' is already reflected in the morning session to the returns in the ISE and the change in the returns shows a declining movement in the afternoon session and in daily return observation. In other word, the "Announcement effect" decreases in the afternoon session since the information gathered is already reflected to the prices, and the relationship between the announcement and the return weakens. For instance the percent of the accuracy of the prediction decrease from 63% (morning session return accuracy of the prediction) to 42% (afternoon session return accuracy of the prediction) in 2006-2007 and 52% to 38% in 2002-2005.

In monetary policy surprises analyses caused by inflation rates, as the inflation rates are announced at 16:30 from 01.01.2002 to 01.09.2006, and at 17:00 from 01.09.2006 until now, the effect of the inflation rate announcement does not affect the stock since the transactions end at 16:30 in Istanbul Stock Exchange. Therefore, next day overnight close-to-open returns, next day morning session returns, next day afternoon session returns, next day daily return are taken into account during the analysis. The same exact hours are used as it was in the interest rate surprise analysis for each of these four different analyses. Only, since the 09:00 return data was not available from 03.02.2007 to 04.09.2007, next day 10:00- 11:00 morning session

return data was used instead of next day 09:00 Open to 11:00 close morning session return data in order to make the combined analysis stated in the methodology part of this study. A summary of the relations, which is expected to happen, defined in the methodology part is given below:

- When there is" Undershoot Deviation", a positive market response is expected to exist where,
  - Daily return $\succ$ Average return $\rightarrow$ Positive Market Response
  - Current movement of the stock market "Up", Previous movement of the stock market "Down" $\rightarrow$ Positive Market Response

By taking these expected relationships into account, the "FALSE" and "TRUE" events were specified by using the same logic and the same elements as it was in the "interest rate surprise" analysis which is reported from Table 42 to Table 46.

As it is seen from Table 46, the percent of "Market reaction to the announcement" is 43%, for "Hourly Return Observation", 55% for the "Morning Session Return Observation", 55% for the" Afternoon Session Return Observation" and 55% for the "Daily Return Observation" in 2002-2005, when implicit inflation targeting was implemented, and 33%, 50% and 58% and 58% in 2006-2007 in the same order, when explicit inflation targeting was implemented. These results include two main points: First of all, "Market reaction to the announcement" decreases from 2002-2005 to 2006-2007 that also confirms the fact that "The announcement effect" shows a declining movement. In other words, since Explicit IT has a positive effect on the accuracy of the expectations of investors' by increasing the level of information available in the stock market, the announcements that are made in 2006-2007 may not cause a surprise although the realized inflation rate deviates from its targeted value. Because, as the "prediction capability" improves after the implementation of Explicit IT, investors are probably be aware of the fact that it is hard to lower inflation rate after a certain level and to maintain the inflation levels in one digit is also a success although the CBT could not reach the inflation target for these years (for instance although the target was 35% in 2002, it was 5% in 2007). Therefore, this fact can also be analyzed from Table 45 to Table 48, where the number of "overshoot" is dominant in 2006 and 2007.

In addition, since to maintain the inflation rates in one digit is also a success and the investors are already aware of this fact, most of the reactions are “positive” although an” overshoot” exists which increase the number of “FALSE” events specified using the relation explained above. Also, the increase in the number of “FALSE” events results in a decline in the percent of accuracy of the prediction that is calculated by using the number of “TRUE” events shown in the Table 46.

On the other hand, “the decrease in the percent of accuracy of the prediction” does not mean that the capability of investor’s prediction about the realized inflation rate becomes worse. It means that the relation between the inflation deviations and the change in the return weakens, since the “overshoot” is not perceived as a negative sign after the inflation rate reaches a certain level such as one digit values. Therefore, the announcement effect decreases since the deviation from the target is not a surprise for the investors which is again a sign of improvement in the prediction of investors about the realized inflation rate and its deviation from its target.

Finally the decrease in the announcement effect is observed more dominantly in the hourly return observations compared to morning session and afternoon session observation since the percent of “Market reaction to the announcement” is smaller in the hourly return observation.

CHAPTER 5

CONCLUSION

In this master thesis, the effects of inflation targeting regime on the Istanbul Stock Exchange is examined by using three different analysis: Volatility analysis of Turkish stock exchange, announcement effect analysis in Turkish stock exchange and a combined analysis where announcement effect, monetary policy surprises, deviation of inflation rates are used together to examine the responses of the ISE after the interest rate and inflation rate announcements.

In order to test **the volatility impact of the inflation targeting regime** over this period, daily opening, closing, maximum and minimum values of the ISE-100 Index are collected from the Istanbul Stock Exchange between 1990 and 2007 and the sample period is determined based on the implementation dates of different monetary regimes in Turkey between 1990 and 2007. It was found that by increasing the accuracy of investors' expectations about interest and inflation rate changes, the central bank can hope to promote financial stability and can help to decrease the volatility of ISE".

In the **announcement effect analysis** in ISE, "the element of surprise" in the interest rate announcement and deviation of ınflation rates were specified in order to find out their effect on the responses of the investors in terms of the realized returns in ISE. The daily closing prices of the shortest maturity government bonds is used to decompose the changes in the CBT interest rate into its anticipated and unanticipated parts. In addition, the realized inflation rates and its targeted values are gathered from the Central Bank of Turkey to calculate the deviation of ınflation rates.

It was found the magnitude of the interest rate surprises and the interest rate deviations goes down over time since financial markets are expected to be more transparent after the implementation of IT regime. Also the unfavorable interest surprise was analyzed much more compared to favorable surprise from 2002-2005 to 2006-2007 since improvements in the market effects the expectations of the investors positively although CBT acts prudently which result in unfavorable surprise existence. Moreover, it was found that the percentage of "No surprise" element rised up from 0% to 15% since expectations was started to be directed by monetary policy tools which result in a decline in the the surprise part of interst rate changes in terms of magnitude.

In the **combined analysis**, the two questions "How the Central Bank's short term interest rate announcements affect the returns in the Istanbul Stock Exchange ?" and "What will be the reaction of ISE whenever there is a difference between the realized inflation rate and its targeted value, if this discrepancy was not anticipated by the market prior to the announcement?" are tried to be answered. In this analysis daily returns, overnight close-to-open returns (hourly returns), morning session return and afternoon session returns in the announcement days or the day after the announcement day are gathered from Istanbul Stock Exchange taking the exact times (hours) of the announcements into account. It is assumed that the reaction in the stock market occurs immediately after the interest or inflation rate announcement since this information is costless and it is received simultaneously by all market players. Hence, the sample period between January, 2002 and December, 2007 is divided into many smaller sub-periods on the basis of the announcements dates.

When the effects of short term interest rate announcements on the returns in the Istanbul Stock Exchange was analyzed, it was found that CBT's power to effect stock returns and to direct investors' expectations increases since the percent of accuracy of the prediction increases from 2002-2005 to 2006-2007 that also confirms the positive effect of IT. Secondly, since the accuracy of the prediction increases in the morning session returns (%63) compared to hourly returns prediction (58%), it can be concluded that it takes time investors to give a reaction to the interest rate announcements. Finally, it was observed that the accuracy of the prediction went down in the afternoon session since the reaction of the investors' was already

reflected in the morning session to the returns in the ISE. Therefore the "Announcement effect" decreases and the relationship between the announcement and the return weakens after a while.

When the reaction of ISE to the inflation rate deviation was analyzed it was seen that market reaction decreases from 2002-2005 to 2006-2007 that also confirms the fact that "The announcement effect" shows a declining movement. There are two reasons for that declining movement. First of all, since the Explicit IT has a positive effect on the accuracy of the expectations of investors, inflation rate deviations may not be a surprise for the investors. Secondly, As the "prediction capability" improves after the implementation of Explicit IT, investors were probably be aware of the fact that it is hard to lower inflation rate after a certain level and to maintain the inflation levels in one digit is also a success although the inflation target could not be reached in 2006-2007 (for instance although the target was 35% in 2002, it was 5% in 2007).

There is still more to do to discover about the effects of IT regime returns on the Istanbul Stock Exchange. Although this study addressed only the effects of IT on ISE in general, the effects of this regime can be investigated in sector level such as banking sector, industry sector and various other sectors since the effect of it is expected to differentiate from sector to sector.

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APPENDIX A: LIST OF TABLES

TABLES

Table 1. Measurement of volatility from period one to period two by using "Classical Volatility Estimator"

CLASSİCAL ESTİMATOR											
(1) The period between January, 1990 and December, 2001 before the implementation of inflation targeting, (2) the period between January, 2002 and December, 2005 during the implementation of implicit inflation targeting											
Event 1: *Switching to implicit IT from other monetary policies*											
Variable	**Per.**	**N[10]**	**Lower CL Mean[11]**	**Mean**	**Upper CL Mean[11]**	**Lower CL Std[11]**	**Std Dev.**	**Upper CL Std[11]**	**Std. error**	**Min**	**Max**
Classical volatility	1	1834	0.0010	0.0011	0.0012	0.0025	0.0026	0.0026	0.0000596	0.0000	0.0399
Classical volatility	2	992	0.0004	0.0005	0.0006	0.0011	0.0012	0.0012	0.0000376	0.000000013	0.0178
Classical volatility Diff	(1-2)		0.0004	0.0006	0.0008	0.0021	0.0022	0.0022	0.0001		

Table 2. Pooled and Satterthwaite Variance Estimator

Variable	Method	Variances	DF[12]	t Value	Pr > |t|
Classical volatility	Pooled	Equal	2824	7.03	<.0001
Classical volatility	Satterthwaite	Unequal	2771	8.54	<.0001

Table 3. Equality of Variances

Equality of Variances					
Variable	**Method**	**[13]Num DF**	**Den DF**	**F Value**	**Pr > F**
Classical volatility	Folded F	1833	991	4.64	<.0001

[10] This is the number of valid (i.e., non-missing) observations used in calculating the t-test.

[11] These are the lower and upper bounds of the confidence interval for the mean and for the standard deviation. A confidence interval specifies a range of values within which the unknown population parameter, in this cases the mean and the standard deviation, may lie.

[12] The degrees of freedom for the paired observations are simply the number of observations minus 2.

[13] The F distribution is the ratio of two estimates of variances. Therefore it has two parameters, the degrees of freedom of the numerator and the degrees of freedom of the denominator. In SAS convention, the numerator corresponds to the sample with larger variance and the denominator corresponds to the sample with smaller variance. In our example, Classical volatililty in period two has variance of 1,44E-06 and for the Classical volatility in period one the variance is 6,76E-06. Therefore, the degree of freedom for the numerator is 992-1=991 and the degrees of freedom for the denominator 1834-1=1833.

Table 4. Measurement of volatility from period two to period three by using "Classical Volatility Estimator"

CLASSİCAL ESTİMATOR											
(2) The period between January, 2002 and December, 2005 during the implementation of implicit inflation targeting and (3) the period between January, 2006 and December, 2007 during the implementation of explicit inflation targeting.											
***Event 2:** Switching to explicit IT from implicit inflation targeting.*											
Variable	**Prd.**	**N[14]**	**Lower CL Mean[15]**	**Mean**	**Upper CL Mean[15]**	**Lower CL Std[15]**	**Std Dev.**	**Upper CL Std[15]**	**Std. error**	**Min**	**Max**
Classicalvolatility	2	992	0.0004	0.0005	0.0006	0.0011	0.0012	0.0012	0.0000376	0.000000013	0.0178
Classicalvolatility	3	708	0.0004	0.0004	0.0005	0.001	0.001	0.0011	0.0000383	0.00000000064	0.0147
Classical volatility Diff	(2-3)		-0.0000074	0.0000341	0.0001	0.0011	0.0011	0.0012	0.0000550		

Table 5. Pooled and Satterthwaite Variance Estimator

Variable	Method	Variances	DF	t Value	Pr > |t|
Classical volatility	Pooled	Equal	1698	0.62	0.5361
Classical volatility	Satterthwaite	Unequal	1640	0.63	0.5258

Table 6. Equality of Variances

Equality of Variances					
Variable	**Method**	**[16]Num DF**	**Den DF**	**F Value**	**Pr > F**
Classical volatility	Folded F	991	707	135	<.0001

[14] This is the number of valid (i.e., non-missing) observations used in calculating the t-test.

[15] These are the lower and upper bounds of the confidence interval for the mean and for the standard deviation. A confidence interval specifies a range of values within which the unknown population parameter, in this cases the mean and the standard deviation, may lie.

[16] The F distribution is the ratio of two estimates of variances. Therefore it has two parameters, the degrees of freedom of the numerator and the degrees of freedom of the denominator. In SAS convention, the numerator corresponds to the sample with larger variance and the denominator corresponds to the sample with smaller variance. In our example, Classical volatility in period two has variance of 1,44E-06 and for the Classical volatility in period three the variance is 1,00E-06. Therefore, the degree of freedom for the numerator is 708-1=707 and the degrees of freedom for the denominator 992-1=991.

Table 7. Measurement of volatility from period one to period three by using "Classical Volatility Estimator"

CLASSİCAL ESTİMATOR											
(1) The period between January, 1990 and December, 2001 before the implementation of inflation targeting and (3) the period between January, 2006 and December, 2007 during the implementation of explicit inflation targeting.											
Event 3: *Switching to explicit IT from other monetary policies.*											
Variable	**Prd.**	**N[17]**	**Lower CL Mean[18]**	**Mean**	**Upper CL Mean[15]**	**Lower CL Std[15]**	**Std Dev.**	**Upper CL Std[15]**	**Std. error**	**Min**	**Max**
Classical volatility	1	1834	0.001	0.0011	0.0012	0.0025	0.0026	0.0026	0.0000596	0.0000	0.0399
Classical volatility	3	708	0.0004	0.0004	0.0005	0.001	0.001	0.0011	0.0000383	0.00000000064	0.0147
Classical volatility Diff	(1-3)		0.0004	0.0006	0.0008	0.0022	0.0022	0.0023	0.0001		

Table 8. Pooled and Satterthwaite Variance Estimator

Variable	Method	Variances	DF	t Value	Pr > |t|
Classical volatility	Pooled	Equal	2540	6.43	<.0001
Classical volatility	Satterthwaite	Unequal	2538	8.98	<.0001

Table 9. Equality of Variances

Equality of Variances					
Variable	**Method**	**[19]Num DF**	**Den DF**	**F Value**	**Pr > F**
Classical volatility	Folded F	1833	707	6.27	<.0001

[17] This is the number of valid (i.e., non-missing) observations used in calculating the t-test.

[18] These are the lower and upper bounds of the confidence interval for the mean and for the standard deviation. A confidence interval specifies a range of values within which the unknown population parameter, in this cases the mean and the standard deviation, may lie.

[19] The F distribution is the ratio of two estimates of variances. Therefore it has two parameters, the degrees of freedom of the numerator and the degrees of freedom of the denominator. In SAS convention, the numerator corresponds to the sample with larger variance and the denominator corresponds to the sample with smaller variance. In our example, Classical volatility in period three has variance of 1, 00E-06 and for the Classical volatility in period one the variance is 6,76E-06. Therefore, the degree of freedom for the numerator is 1834-1=1833 and the degrees of freedom for the denominator 708-1=707.

Table 10. Measurement of volatility from period one to period two by using "Parkinson Estimator"

PARKİNSON ESTİMATOR											
(1) The period between January, 1990 and December, 2001 before the implementation of inflation targeting, (2) the period between January, 2002 and December, 2005 during the implementation of implicit inflation targeting											
Event 1: Switching to implicit IT from other monetary policies											
Variable	**Period**	**N**	**Lower CL Mean**	**Mean**	**Upper CL Mean**	**Lower CL Std**	**Std Dev**	**Upper CL Std**	**Standard error**	**Min**	**Max**
Parkinson volatility	1	1769	0.0008	0.0009	0.0009	0.0013	0.0014	0.0013	0.0000318	0.0000282	0.0154
Parkinson volatility	2	988	0.0004	0.0004	0.0004	0.0006	0.0006	0.0006	0.0000187	0.0000185	0.0071
Parkinson volatility Diff	(1-2)		0.0004	0.0005	0.0005	0.0011	0.0011	0.0012	0.0000448		

Table 11. Pooled and Satterthwaite Variance Estimator

Variable	Method	Variances	DF	t Value	Pr > |t|
Parkinson volatility	Pooled	Equal	2755	10.28	<.0001
Parkinson volatility	Satterthwaite	Unequal	2635	12.49	<.0001

Table 12. Equality of Variances

Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
Parkinson volatility	Folded F	1768	987	5.21	<.0001

Table 13. Measurement of volatility from period two to period three by using "Parkinson Estimator"

PARKİNSON ESTİMATOR											
(2) The period between January, 2002 and December, 2005 during the implementation of implicit inflation targeting and (3) the period between January, 2006 and December, 2007 during the implementation of explicit inflation targeting.											
Event 2: Switching to explicit IT from implicit inflation targeting.											
Variable	**Period**	**N**	**Lower CL Mean**	**Mean**	**Upper CL Mean**	**Lower CL Std**	**Std Dev**	**Upper CL Std**	**Standard error**	**Min**	**Max**
Parkinson volatility	2	2	988	0.0004	0.0004	0.0004	0.0006	0.0006	0.0006	0.0000187	0.0000185
Parkinson volatility	3	3	707	0.0003	0.0003	0.0004	0.0005	0.0005	0.0006	0.0000198	0.0000245
Parkinson volatility Diff	(2-3)	(2-3)		-0.0000039	0.0000504	0.0001	0.0005	0.0006	0.0006	0.0000277	

Table 14. Pooled and Satterthwaite Variance Estimator

Variable	Method	Variances	DF	t Value	Pr > |t|
Parkinson volatility	Pooled	Equal	1693	1.82	0.069
Parkinson volatility	Satterthwaite	Unequal	1610	1.85	0.0641

Table 15. Equality of Variances

Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
Parkinson volatility	Folded F	987	706	1.24	0.0018

Table 16. Measurement of volatility from period one to period three by using "Parkinson Estimator"

PARKİNSON ESTİMATOR											
(1) The period between January, 1990 and December, 2001 before the implementation of inflation targeting and (3) the period between January, 2006 and December, 2007 during the implementation of explicit inflation targeting.											
Event 3: Switching to explicit IT from other monetary policies.											
Variable	**Period**	**N**	**Lower CL Mean**	**Mean**	**Upper CL Mean**	**Lower CL Std**	**Std Dev**	**Upper CL Std**	**Standard error**	**Min**	**Max**
Parkinson volatility	1	1769	0.0008	0.0009	0.0009	0.0013	0.0013	0.0014	0.0000318	0.0000282	0.0154
Parkinson volatility	3	707	0.0003	0.0003	0.0004	0.0005	0.0005	0.0006	0.0000198	0.0000245	0.0066
Parkinson volatility Diff	(1-3)		0.0004	0.0005	0.0006	0.0011	0.0012	0.0012	0.0000519		

Table 17. Pooled and Satterthwaite Variance Estimator

Variable	Method	Variances	DF	t Value	Pr > |t|
Parkinson volatility	Pooled	Equal	2474	9.86	<.0001
Parkinson volatility	Satterthwaite	Unequal	2473	13.65	<.0001

Table 18. Equality of Variances

Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
Parkinson volatility	Folded F	1768	706	6.48	<.0001

Table 19. "Measurement of volatility from period one to period two by using "G-K Estimator"

G-K ESTİMATOR											
(1) The period between January, 1990 and December, 2001 before the implementation of inflation targeting, (2) the period between January, 2002 and December, 2005 during the implementation of implicit inflation targeting.											
Event 1: Switching to implicit IT from other monetary policies											
Variable	**Period**	**N**	**Lower CL Mean**	**Mean**	**Upper CL Mean**	**Lower CL Std**	**Std Dev**	**Upper CL Std**	**Standard error**	**Min**	**Max**
GK- volatility	1	1769	0.0009	0.001	0.001	0.0014	0.0015	0.0015	0.0000349	0.0000282	0.0189
GK- volatility	2	988	0.0003	0.0004	0.0004	0.0005	0.0005	0.0005	0.0000155	0.0000153	0.0079
GK- volatility Diff	(1-2)		0.0005	0.0006	0.0007	0.0012	0.0012	0.0012	0.0000481		

Table 20. Pooled and Satterthwaite Variance Estimator

Variable	Method	Variances	DF	t Value	Pr > |t|
GK- volatility	Pooled	Equal	2755	12.53	<.0001
GK- volatility	Satterthwaite	Unequal	2369	15.79	<.0001

Table 21. Equality of Variances

Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
GK – volatility	Folded F	1768	987	9.07	<.0001

Table 22. Measurement of volatility from period two to period three by using "G-K Estimator"

G-K ESTİMATOR											
(2) The period between January, 2002 and December, 2005 during the implementation of implicit inflation targeting and (3) the period between January, 2006 and December, 2007 during the implementation of explicit inflation targeting.											
Event 2: Switching to explicit IT from implicit inflation targeting.											
Variable	**Period**	**N**	**Lower CL Mean**	**Mean**	**Upper CL Mean**	**Lower CL Std**	**Std Dev**	**Upper CL Std**	**Standard error**	**Min**	**Max**
GK- volatility	2	988	0.0003	0.0004	0.0004	0.0005	0.0005	0.0005	0.0000155	0.0000153	0.0079
GK- volatility	3	707	0.0003	0.0004	0.0004	0.0006	0.0006	0.0006	0.0000226	0.0000249	0.0079
GK- volatility Diff	(2-3)		-0.0000530	-0.0000006	0.0000514	0.0005	0.0004	0.0006	0.0000265		

Table 23. Pooled and Satterthwaite Variance Estimator

Variable	Method	Variances	DF	t Value	Pr > |t|
GK- volatility	Pooled	Equal	1693	-0.02	0.9825
GK- volatility	Satterthwaite	Unequal	1316	-0.02	0.9831

Table 24. Equality of Variances

Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
GK- volatility	Folded F	706	987	1.53	<.0001

Table 25. Measurement of volatility from period one to period three by using "G-K Estimator"

G-K ESTİMATOR											
(1) The period between January, 1990 and December, 2001 before the implementation of inflation targeting and (3) the period between January, 2006 and December, 2007 during the implementation of explicit inflation targeting.											
Event 3: Switching to explicit IT from other monetary policies.											
Variable	**Period**	**N**	**Lower CL Mean**	**Mean**	**Upper CL Mean**	**Lower CL Std**	**Std Dev**	**Upper CL Std**	**Standard error**	**Min**	**Max**
GK- volatility	1	1769	0.0009	0.001	0.001	0.0014	0.0015	0.0015	0.0000349	0.0000282	0.0189
GK- volatility	3	707	0.0003	0.0004	0.0004	0.0006	0.0006	0.0006	0.0000226	0.0000249	0.0079
GK- volatility Diff	(1-3)		0.0005	0.0006	0.0007	0.0012	0.0013	0.0013	0.0000570		

Table 26. Pooled and Satterthwaite Variance Estimator

Variable	Method	Variances	DF	t Value	Pr > |t|
GK- volatility	Pooled	Equal	2474	10.56	<.0001
GK- volatility	Satterthwaite	Unequal	2473	14.48	<.0001

Table 27. Equality of Variances

Equality of Variances					
Variable	Method	Num DF	Den DF	F Value	Pr > F
GK- volatility	Folded F	1768	706	5.95	<.0001

Table 28. Compared Results of Classical Estimator, Parkinson Estimator and G-K Estimator

(1) The period between January, 1990 and December, 2001 before the implementation of inflation targeting, (2) the period between January, 2002 and December, 2005 during the implementation of implicit inflation targeting							
Event 1: Switching to implicit IT from other monetary policies							
CLASSİCAL ESTİMATOR							
Variable	**Period**	**Mean**	**Std Dev**	**t Value**	**Pr > |t|**	**F Value**	**Pr > F**
Classical volatility Diff	(1-2)	0.0006	0.0022	8.54	<.0001	4.64	<.0001
PARKİNSON ESTİMATOR							
Variable	**Period**	**Mean**	**Std Dev**	**t Value**	**Pr > |t|**	**F Value**	**Pr > F**
Parkinson volatility Diff	(1-2)	0.0004	0.0011	12.49	<.0001	5.21	<.0001
G-K ESTİMATOR							
Variable	**Period**	**Mean**	**Std Dev**	**t Value**	**Pr > |t|**	**F Value**	**Pr > F**
GK- volatility Diff	(1-2)	0.0006	0.0012	15.79	<.0001	9.07	<.0001
(2) the period between January, 2002 and December, 2005 during the implementation of implicit inflation targeting, and (3) the period between January, 2006 and December, 2007 during the implementation of explicit inflation targeting							
Event 2: Switching to explicit IT from implicit inflation targeting							
CLASSİCAL ESTİMATOR							
Variable	**Period**	**Mean**	**Std Dev**	**t Value**	**Pr > |t|**	**F Value**	**Pr > F**
Classical volatility Diff	(2-3)	0.0000341	0.0011	0.63	<.0001	135	<.0001
PARKİNSON ESTİMATOR							
Variable	**Period**	**Mean**	**Std Dev**	**t Value**	**Pr > |t|**	**F Value**	**Pr > F**
Parkinson volatility Diff	(2-3)	0.0000504	0.0006	1.85	0.0641	1.24	0.0018
G-K ESTİMATOR							
Variable	**Period**	**Mean**	**Std Dev**	**t Value**	**Pr > |t|**	**F Value**	**Pr > F**
GK- volatility Diff	(2-3)	-0.00000058	0.0004	-0.02	<.0001	1.53	<.0001
(1) The period between January, 1990 and December, 2001 before the implementation of inflation targeting, and (3) the period between January, 2006 and December, 2007 during the implementation of explicit inflation targeting							
Event 3: Switching to explicit IT from other monetary policies							
CLASSİCAL ESTİMATOR							
Variable	**Period**	**Mean**	**Std Dev**	**t Value**	**Pr > |t|**	**F Value**	**Pr > F**
Classical volatility Diff	(1-3)	0.0006	0.0022	8.98	<.0001	6.27	<.0001
PARKİNSON ESTİMATOR							
Variable	**Period**	**Mean**	**Std Dev**	**t Value**	**Pr > |t|**	**F Value**	**Pr > F**
Parkinson volatility Diff	(1-3)	0.0005	0.0012	13.65	<.0001	6.48	<.0001
G-K ESTİMATOR							
Variable	**Period**	**Mean**	**Std Dev**	**t Value**	**Pr > |t|**	**F Value**	**Pr > F**
GK- volatility Diff	(1-3)	0.0006	0.0013	14.48	<.0001	5.95	<.0001

Table 29. Percent Change in the Volatility from Period 1 to Period 3

CLASSİCAL ESTİMATOR					
	Period 1 1990-2001	**Period 2 2002-2005**	**Period 3 2006-2007**	**% Change from period 1 to period 2**	**% change from period 2 to period 3**
Mean of volatility	0.0011	0.0005	0.0004	-55%	-20%
Standard deviation of volatility	0.0026	0.0012	0.001	-54%	-17%
PARKİNSON ESTİMATOR					
	Period 1 1990-2001	**Period 2 2002-2005**	**Period 3 2006-2007**	**% Change from period 1 to period 2**	**% change from period 2 to period 3**
Mean of volatility	0.0008	0.0004	0.0003	-50%	-25%
Standard deviation of volatility	0.0014	0.0006	0.0005	-57%	-17%
G-K ESTİMATOR					
	Period 1 1990-2001	**Period 2 2002-2005**	**Period 3 2006-2007**	**% Change from period 1 to period 2**	**% change from period 2 to period 3**
Mean of volatility	0.001	0.0004	0.0004	-60%	0%
Standard deviation of volatility	0.0015	0.0005	0.0006	-67%	20%

Table 30. Monetary Policy Surprises Caused by Interest Rates

Date	Borrowing	Realized interest rate change	Unanticipated part of the interest rate change	Magnitude of the surprise / p-p*: surprise (in terms of basis point)	FS[20]	UFS[21]	NS[22]
16.07.2001	67.00	400	-651	1051		*	
06.08.2001	62.00	-500	-234	-266	*		
27.08.2001	60.00	-200	-278	78		*	
04.09.2001	59.00	-100	-11	-89	*		
20.02.2002	57.00	-200	-45	-155	*		
14.03.2002	54.00	-300	-192	-108	*		
08.04.2002	51.00	-300	-108	-192	*		
30.04.2002	48.00	-300	-306	6		*	
05.08.2002	46.00	-200	-98	-102	*		
11.11.2002	44.00	-200	-127	-73	*		
25.04.2003	41.00	-300	-98	-202	*		
04.06.2003	38.00	-300	-224	-76	*		
16.07.2003	35.00	-300	-179	-121	*		
18.09.2003	29.00	-300	-200	-100	*		
15.10.2003	26.00	-300	-223	-77	*		
20.11.2003	23.00	-300	-296	-4	*		
24.11.2003	26.00	300	324	-24	*		
05.02.2004	24.00	-200	-174	-26	*		
17.03.2004	22.00	-200	-115	-85	*		
08.09.2004	20.00	-200	-116	-84	*		
20.12.2004	18.00	-200	-102	-98	*		
11.01.2005	17.00	-100	-57	-43	*		
09.02.2005	16.50	-50	-11	-39	*		
09.03.2005	15.50	-100	-70	-30	*		

[20] Favorable Surprise

[21] Unfavorable Surprise

[22] No Surprise

Table 31. Monetary Policy Surprises Caused By Interest Rates (Continue)

Date	Borrowing	Realized interest rate change	Unanticipated part of the interest rate change	Magnitude of the surprise / r-r*: surprise (in terms of basis point)	FS	UFS	NS
11.04.2005	15.00	-50	-45	-5	*		
10.05.2005	14.50	-50	-15	-35	*		
09.06.2005	14.25	-25	-51	26		*	
11.07.2005	14.25	0	4	-4	*		
09.08.2005	14.25	0	-5	5		*	
09.09.2005	14.25	0	-7	7		*	
11.10.2005	14.00	-25	-27	2		*	
09.11.2005	13.75	-25	6	-31	*		
09.12.2005	13.50	-25	-5	-20	*		
23.01.2006	13.50	0	0	0			*
23.02.2006	13.50	0	0	0			*
23.03.2006	13.50	0	1	-1	*		
27.04.2006	13.25	-25	-24	-1	*		
25.05.2006	13.25	0	-5	5		*	
20.06.2006	15.00	175	180	-5	*		
20.07.2006	17.50	250	237	13		*	
24.08.2006	17.50	0	6	-6	*		
26.09.2006	17.50	0	28	-28	*		
19.10.2006	17.50	0	20	-20	*		
23.11.2006	17.50	0	81	-81	*		
21.12.2006	17.50	0	-1	1		*	
16.01.2007	17.50	0	-9	9		*	
15.02.2007	17.50	0	-1	1		*	
15.03.2007	17.50	0	-4	4		*	
18.04.2007	17.50	0	-17	17		*	
14.05.2007	17.50	0	0	0			*
14.06.2007	17.50	0	-3	3		*	
12.07.2007	17.50	0	3	-3	*		
14.08.2007	17.50	0	-11	11		*	
13.09.2007	17.25	-25	11	-36	*		
16.10.2007	16.75	-50	-42	-8	*		
14.11.2007	16.25	-50	-39	-11	*		
13.12.2007	15.75	-50	-53	3		*	

Table 32. Summary of Monetary Policy Surprises Caused By Interest Rates

Years	Favorable surprise	Unfavorable surprise	No surprise
2002-2005	27	7	0
2006-2007	10	10	3

Table 33. 2002-2007 The Regression Analysis of Interest Rate Surprises (1)

Source	DF	Sum of Squares	Mean Squares	F Value	Pr > F
Model	1	69087	69087	41.45	<.0001
Error	52	86667	166.667.001		
Corrected Total	53	155754			
Root MSE	40.82	R-Square	0.4436		
Dependent Mean	41.67	Adj R-Sq	0.4329		
Coeff Var	97.98				

Table 34. 2002-2007 The Regression Analysis of Interest Rate Surprises (2)

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	104.78	11.27	9.30	<.0001
Trend	1	-2.29	0.36	-6.44	<.0001

Table 35. 2002-2007 Interest Rate Surprises (%)

	Favorable surprise (FS)	Unfavorable surprise (UFS)	No surprise (NS)	% of (FS)	% of (UFS)	% of (NS)
2002-2005	27	7	0		20.58%	0%
2006-2007	10	10	3		43,7%	15%

Table 36. 2002-2007 The Inflation Rates, Overshoot and Undershoot Deviation

Inflation Announcement Dates	Realized Inflation Rate	Targeted Inflation Rate	Deviation	Overshoot	Undershoot
03.01.2002	73.20	35.00	38.20	*	
03.02.2002	73.10	35.00	38.10	*	
03.03.2002	65.10	35.00	30.10	*	
03.04.2002	52.70	35.00	17.70	*	
03.05.2002	46.20	35.00	11.20	*	
03.06.2002	42.60	35.00	7.60	*	
03.07.2002	41.30	35.00	6.30	*	
03.08.2002	40.20	35.00	5.20	*	
03.09.2002	37.00	35.00	2.00	*	
03.10.2002	33.40	35.00	-1.60		*
03.11.2002	31.80	35.00	-3.20		*
03.12.2002	29.70	35.00	-5.30		*
03.01.2003	26.40	20.00	6.40	*	
03.02.2003	27.00	20.00	7.00	*	
03.03.2003	29.40	20.00	9.40	*	
03.04.2003	29.50	20.00	9.50	*	
03.06.2003	29.8	20	9.8	*	
03.07.2003	27.4	20	7.4	*	
03.08.2003	24.9	20	4.9	*	
03.09.2003	23	20	3	*	
03.10.2003	20.8	20	0.8	*	
03.11.2003	19.3	20	-0.7		*
03.12.2003	18.4	20	-1.6		*
03.01.2004	16.22	12	4.22	*	
03.02.2004	14.28	12	2.28	*	
03.03.2004	11.83	12	-0.17		*

Table 36. 2002-2007 The Inflation Rates, Overshoot and Undershoot Deviation (Continue)

Inflation Announcement Dates	Realized Inflation Rate	Targeted Inflation Rate	Deviation	Overshoot	Undershoot
03.04.2004	10.18	12	-1.82		*
03.05.2004	8.88	12	-3.12		*
03.06.2004	8.93	12	-3.07		*
03.07.2004	9.57	12	-2.43		*
03.08.2004	10.04	12	-1.96		*
03.09.2004	9	12	-3		*
03.10.2004	9.86	12	-2.14		*
03.11.2004	9.79	12	-2.21		*
03.12.2004	9.32	12	-2.68		*
03.01.2005	9.23	8	1.23	*	
03.02.2005	8.69	8	0.69	*	
03.03.2005	7.94	8	-0.06		*
04.04.2005	8.18	8	0.18	*	
03.05.2005	8.7	8	0.7	*	
03.06.2005	8.95	8	0.95	*	
04.07.2005	7.82	8	-0.18		*
03.08.2005	7.91	8	-0.09		*
02.09.2005	7.99	8	-0.01		*
03.10.2005	7.52	8	-0.48		*
02.11.2005	7.61	8	-0.39		*
02.12.2005	7.72	8	-0.28	*	*
03.01.2006	7.93	5	2.93	*	
03.02.2006	8.15	5	3.15	*	
03.03.2006	8.16	5	3.16	*	
03.04.2006	8.83	5	3.83	*	
03.05.2006	9.86	5	4.86	*	
02.06.2006	10.12	5	5.12	*	
03.07.2006	11.69	5	6.69	*	
03.08.2006	10.26	5	5.26	*	

Table 36. 2002-2007 The Inflation Rates, Overshoot and Undershoot (Continue)

Inflation Announcement Dates	Realized Inflation Rate	Targeted Inflation Rate	Deviation	Overshoot Deviation	Undershoot Deviation
04.09.2006	10.55	5	5.55	*	
03.10.2006	9.98	5	4.98	*	
03.11.2006	9.86	5	4.86	*	
04.12.2006	9.65	5	4.65	*	
04.01.2007	9.93	4	5.93	*	
02.02.2007	10.16	4	6.16	*	
02.03.2007	10.86	4	6.86	*	
03.04.2007	10.72	4	6.72	*	
03.05.2007	9.23	4	5.23	*	
04.06.2007	8.6	4	4.6	*	
03.07.2007	6.9	4	2.9	*	
03.08.2007	7.39	4	3.39	*	
03.09.2007	7.12	4	3.12	*	
03.10.2007	7.7	4	3.7	*	
02.11.2007	8.4	4	4.4	*	
03.12.2007	8.39	4	4.39	*	

Table 37. The Effects of Central Bank's Short Term Interest Announcement on The Returns in ISE – Hourly Returns

	Day	M[23]	Year	Event	Hourly Return	Reference Average Hourly Return	PM[24]	CM[25]	Previous versus Current	Market Feedback (Hourly ><? Average)	Interest Surprise	Current = Up and FS	Current = Down and UFS	Market feedback = positive and FS	Market feedback = negative and UFS
09:00 Open to 16:00 Close Day Return	20	2	2002	2	-0.03693	-0.006335	down	down	continue	negative	favorable	FALSE		FALSE	
	14	3	2002	4	0.00191	0.000732	up	up	continue	positive	favorable	TRUE		TRUE	
	8	4	2002	6	-0.03436	0.007858	up	down	reversal	negative	favorable	FALSE		FALSE	
	5	8	2002	12	-0.01318	-0.000006	down	down	continue	negative	favorable	FALSE		FALSE	
	11	11	2002	16	-0.03389	0.003381	up	down	reversal	negative	favorable	FALSE		FALSE	
Hourly Return Between 10:00 Open and 10:00 Close	25	4	2003	22	0.0067541	-0.002938563	down	up	reversal	positive	favorable	TRUE		TRUE	
	4	6	2003	24	-0.006329	-0.002130765	down	down	continue	negative	favorable	FALSE		FALSE	
	16	7	2003	27	-0.001436	-0.001808741	down	down	continue	positive	favorable	FALSE		TRUE	
	6	8	2003	29	0.0048564	-0.000506791	down	up	reversal	positive	favorable	TRUE		TRUE	
	18	9	2003	31	0.004474	0.000308762	up	up	continue	positive	favorable	TRUE		TRUE	
	15	10	2003	33	0.0002524	0.001899215	up	up	continue	negative	favorable	TRUE		FALSE	
	20	11	2003	35	-0.015374	-0.000717527	down	down	continue	negative	favorable	FALSE		FALSE	
	24	11	2003	36	0.0093022	.	down	up	reversal	positive	favorable	TRUE		TRUE	
	5	2	2004	40	-0.010785	-0.001201149	down	down	continue	negative	favorable	FALSE		FALSE	
	17	3	2004	42	-0.000101	0.000295914	up	down	reversal	negative	favorable	FALSE		FALSE	
	8	9	2004	49	0.0128371	-0.000531922	down	up	reversal	positive	favorable	TRUE		TRUE	
	20	12	2004	53	0.0069611	0.000433478	up	up	continue	positive	favorable	TRUE		TRUE	
Hourly Return Between 09:00 Open and 09:00 Close	11	1	2005	55	0.0004089	0.001181551	up	up	continue	negative	favorable	TRUE		FALSE	
	9	2	2005	57	-0.006423	-0.000526746	down	down	continue	negative	favorable	FALSE		FALSE	
	9	3	2005	59	-0.005487	-0.000407076	down	down	continue	negative	favorable	FALSE		FALSE	
	11	4	2005	61	-0.006687	0.00146367	up	down	reversal	negative	favorable	FALSE		FALSE	
	10	5	2005	63	0.0005137	0.000494891	up	up	continue	positive	favorable	TRUE		TRUE	
	9	6	2005	65	0.0023083	0.002620193	up	up	continue	negative	unfavorable		FALSE		TRUE
	11	7	2005	67	0.0011091	0.002895173	up	up	continue	negative	favorable	TRUE		FALSE	
	9	8	2005	69	-0.007886	0.003080163	up	down	reversal	negative	unfavorable		TRUE		TRUE
	9	9	2005	71	0.0115225	0.001297837	up	up	continue	positive	unfavorable		FALSE		FALSE
	11	10	2005	73	0.0015126	-0.000362139	down	up	reversal	positive	unfavorable		FALSE		FALSE

[23] Month

[24] Previous Movement

[25] Current Movement

Table 37. The Effects of Central Bank's Short Term Interest Announcement on The Returns in ISE – Hourly Returns (Continue)

	Day	M	Year	Event	Overnight Close to Open Return	Reference Average Overnight Close to Open Return	PM	CM	Previous versus Current	Market Feedback (Overnight ><? Average)	Interest Surprise	Current = Up and FS	Current = Down and UFS	Market feedback = positive and FS	Market feedback= negative and UFS	Market feedback =positive and NS
Overnight 16:00 Close to 09:00 Open (15/02/2007 to 14/08/2007 10:00 Open)	9	11	2005	75	0.0012205	-0.000403545	down	up	reversal	positive	favorable	TRUE		TRUE		
	9	12	2005	77	-0.011181	0.00392403	up	down	reversal	negative	favorable	FALSE		FALSE		
	23	1	2006	79	0	-0.000054412	down	down	continue	positive	none					TRUE
	23	2	2006	81	0	-0.000017821	down	down	continue	positive	none					TRUE
	23	3	2006	83	0.0029445	0.000111708	up	up	continue	positive	favorable	TRUE		TRUE		
	27	4	2006	85	0	0.0000240	up	down	reversal	negative	favorable	FALSE		FALSE		
	25	5	2006	87	0	-0.0001558	down	down	continue	positive	unfavorable		TRUE		FALSE	
	20	6	2006	89	0	0.0000260	up	down	reversal	negative	favorable	FALSE		FALSE		
	20	7	2006	91	-0.001563	0.0000323	up	down	reversal	negative	unfavorable		TRUE		TRUE	
	24	8	2006	93	-0.002076	-0.00006927	down	down	continue	negative	favorable	FALSE		FALSE		
	26	9	2006	95	0.0012043	0.000320292	up	up	continue	positive	favorable	TRUE		TRUE		
	19	10	2006	97	0.0015337	0.000145278	up	up	continue	positive	favorable	TRUE		TRUE		
	23	11	2006	99	0	-0.000061704	down	down	continue	positive	favorable	FALSE		TRUE		
	21	12	2006	101	0	-0.000161808	down	down	continue	positive	unfavorable		TRUE		FALSE	
	16	1	2007	103	0.0007889	6.64964E-05	up	up	continue	positive	unfavorable		FALSE		FALSE	
	15	2	2007	105	0.0016175	0.002378963	up	up	continue	negative	unfavorable		FALSE		TRUE	
	15	3	2007	107	0.0052329	-0.001546733	down	up	reversal	positive	unfavorable		FALSE		FALSE	
	18	4	2007	109	0.012779	0.000807593	up	up	continue	positive	unfavorable		FALSE		FALSE	
	14	5	2007	111	0.0029529	-0.002513707	down	up	reversal	positive	none					TRUE
	14	6	2007	113	0.0112262	-0.000654871	down	up	reversal	positive	unfavorable		FALSE		FALSE	
	12	7	2007	115	0.0005927	-0.00079534	down	up	reversal	positive	favorable	TRUE		TRUE		
	14	8	2007	117	-0.026524	-0.000341692	down	down	continue	negative	unfavorable		TRUE		TRUE	
	13	9	2007	119	0.0011752	0.001947251	up	up	continue	negative	favorable	TRUE		FALSE		
	16	10	2007	121	0.0025533	0.00467689	up	up	continue	negative	favorable	TRUE		FALSE		
	14	11	2007	123	-0.007947	-0.001101365	down	down	continue	negative	favorable	FALSE		FALSE		
	13	12	2007	125	-0.009774	0.00234564	up	down	reversal	negative	unfavorable		TRUE		TRUE	

Table 38. The Effects of Central Bank's Short Term Interest Announcement on The Returns in ISE – Morning Session Return

	Day	M	Year	Event	Morning Session Return	Reference Average Morning Session Return	PM	CM	Previous versus Current	Market Feedback (Morning ><? Average)	Interest Surprise	Current = Up and FS	Current = Down and UFS	Market feedback = positive and FS	Market feedback = negative and UFS
09:00 Open to 16:00 Close Day Return	20	2	2002	2	-0.03693	-0.006335	down	down	continue	negative	favorable	FALSE		FALSE	
	14	3	2002	4	0.00191	0.000732	up	up	continue	positive	favorable	TRUE		TRUE	
	8	4	2002	6	-0.03436	0.007858	up	down	reversal	negative	favorable	FALSE		FALSE	
	5	8	2002	12	-0.01318	-0.000006	down	down	continue	negative	favorable	FALSE		FALSE	
	11	11	2002	16	-0.03389	0.003381	up	down	reversal	negative	favorable	FALSE		FALSE	
09:00 Open to 11:00 Close Morning Session Return (2002 - 2005)	25	4	2003	22	0.0146057	-0.003880279	down	up	reversal	positive	favorable	TRUE		TRUE	
	4	6	2003	24	-0.007604	0.000614758	up	down	reversal	negative	favorable	FALSE		FALSE	
	16	7	2003	27	-0.012941	-0.001287423	down	down	continue	negative	favorable	FALSE		FALSE	
	6	8	2003	29	-0.011833	-0.003804495	down	down	continue	negative	favorable	FALSE		FALSE	
	18	9	2003	31	0.0172177	0.000974663	up	up	continue	positive	favorable	TRUE		TRUE	
	15	10	2003	33	0.0189629	0.006817487	up	up	continue	positive	favorable	TRUE		TRUE	
	20	11	2003	35	-0.073679	-0.002118587	down	down	continue	negative	favorable	FALSE		FALSE	
	24	11	2003	36	0.0718692	.	down	up	reversal	positive	favorable	TRUE		TRUE	
	5	2	2004	40	-0.00869	0.002860578	up	down	reversal	negative	favorable	FALSE		FALSE	
	17	3	2004	42	0.00044	0.004821688	up	up	continue	negative	favorable	TRUE		FALSE	
	8	9	2004	49	0.0194132	0.000631972	up	up	continue	positive	favorable	TRUE		TRUE	
	20	12	2004	53	0.0026196	0.00130063	up	up	continue	positive	favorable	TRUE		TRUE	
	11	1	2005	55	0.0075498	0.002079279	up	up	continue	positive	favorable	TRUE		TRUE	
	9	2	2005	57	-0.007502	0.004588317	up	down	reversal	negative	favorable	FALSE		FALSE	
	9	3	2005	59	-0.004127	0.003291953	up	down	reversal	negative	favorable	FALSE		FALSE	
	11	4	2005	61	-0.011398	0.00077891	up	down	reversal	negative	favorable	FALSE		FALSE	
	10	5	2005	63	0.003326	-0.00174411	down	up	reversal	positive	favorable	TRUE		TRUE	
	9	6	2005	65	-0.00038	0.00276094	up	down	reversal	negative	unfavorable		TRUE		TRUE
	11	7	2005	67	0.0006885	0.004152398	up	up	continue	negative	favorable	TRUE		FALSE	
	9	8	2005	69	-0.003393	0.00520196	up	down	reversal	negative	unfavorable		TRUE		TRUE
	9	9	2005	71	0.0115558	0.001895175	up	up	continue	positive	unfavorable		FALSE		FALSE
	11	10	2005	73	-0.002123	0.001096972	up	down	reversal	negative	unfavorable		TRUE		TRUE
	9	11	2005	75	0.0012848	3.27492E-05	up	up	continue	positive	favorable	TRUE		TRUE	
	9	12	2005	77	-0.014259	0.005151619	up	down	reversal	negative	favorable	FALSE		FALSE	

Table 38. The Effects of Central Bank's Short Term Interest Announcement on The Returns in ISE–Morning Session Return (Continue)

	Day	M	Year	Event	Morning Session Return	Reference Average Morning Session Return	PM	CM	Previous versus Current	Market Feedback (Morning ><? Average)	Interest Surprise	Current = Up and FS	Current = Down and UFS	Market feedback = positive and FS	Market feedback = negative and UFS	Market feedback = positive and NS
Next Day 09:00 Open to 11:00 Close Morning Session Return (2006 - 2007)	23	1	2006	79	0.0146523	0.002471022	up	up	continue	positive	none					TRUE
	23	2	2006	81	0.0058245	-0.000579756	down	up	reversal	positive	none					TRUE
	23	3	2006	83	-0.017882	-0.001852871	down	down	continue	negative	favorable	FALSE		FALSE		
	27	4	2006	85	0.0072786	0.002290546	up	up	continue	positive	favorable	TRUE		TRUE		
	25	5	2006	87	0.0010069	-0.014128216	down	up	reversal	positive	unfavorable		FALSE		FALSE	
	20	6	2006	89	0.0274451	-0.002997267	down	up	reversal	positive	favorable	TRUE		TRUE		
	20	7	2006	91	-0.00145	-0.002580946	down	down	continue	positive	unfavorable		TRUE		FALSE	
	24	8	2006	93	-0.00177	0.002971743	up	down	reversal	negative	favorable	FALSE		FALSE		
	26	9	2006	95	0.0021203	-0.000110627	down	up	reversal	positive	favorable	TRUE		TRUE		
	19	10	2006	97	0.0229142	0.001597558	up	up	continue	positive	favorable	TRUE		TRUE		
	23	11	2006	99	0.008806	-0.002115378	down	up	reversal	positive	favorable	TRUE		TRUE		
	21	12	2006	101	-0.005665	0.002206814	up	down	reversal	negative	unfavorable		TRUE		TRUE	
	16	1	2007	103	0.0136673	0.003688796	up	up	continue	positive	unfavorable		FALSE		FALSE	
	15	2	2007	105	0.0101906	0.00062179	up	up	continue	positive	unfavorable		FALSE		FALSE	
	15	3	2007	107	-0.009542	-0.001711702	down	down	continue	negative	unfavorable		TRUE		TRUE	
	15	4	2007	109	0.0061761	0.001542336	up	up	continue	positive	unfavorable		FALSE		FALSE	
	14	5	2007	111	-0.0000218	-0.0004247	down	down	continue	positive	none					TRUE
	14	6	2007	113	-0.0056750	0.0002728	up	down	reversal	negative	unfavorable		TRUE		TRUE	
	12	7	2007	115	-0.0013440	0.0001643	up	down	reversal	negative	favorable	FALSE		FALSE		
	14	8	2007	117	-0.0250770	-0.0004518	down	down	continue	negative	unfavorable		TRUE		TRUE	
	13	9	2007	119	-0.0132710	-0.0010603	down	down	continue	negative	favorable	FALSE		FALSE		
	16	10	2007	121	-0.0113320	0.0009078	up	down	reversal	negative	favorable	FALSE		FALSE		
	14	11	2007	123	0.0030933	0.0000834	up	up	continue	positive	favorable	TRUE		TRUE		
	13	12	2007	125	-0.004473	-0.00064736	down	down	continue	negative	unfavorable		TRUE		TRUE	

Table 39. The Effects of Central Bank's Short Term Interest Announcement on The Returns in ISE–Afternoon Session Return

	Day	M	Year	Event	Afternoon Session Return	Reference Average Afternoon Session Return	PM	CM	Previous versus Current	Market Feedback (Afternoon ><? Average)	Interest Surprise	Current = Up and FS	Current = Down and UFS	Market feedback = positive and FS	Market feedback = negative and UFS
09:00 Open to 16:00 Close Day Return	20	2	2002	2	-0.03693	-0.006335	down	down	continue	negative	favorable	FALSE		FALSE	
	14	3	2002	4	0.00191	0.000732	up	up	continue	positive	favorable	TRUE		TRUE	
	8	4	2002	6	-0.03436	0.007858	up	down	reversal	negative	favorable	FALSE		FALSE	
	5	8	2002	12	-0.01318	-0.000006	down	down	continue	negative	favorable	FALSE		FALSE	
	11	11	2002	16	-0.03389	0.003381	up	down	reversal	positive	favorable	FALSE		TRUE	
14:00 Open to 16:00 Close Afternoon Session Return (2002 - 2005)	25	4	2003	22	0.0060408	0.003661454	up	up	continue	positive	favorable	TRUE		TRUE	
	4	6	2003	24	-0.014815	0.00034283	up	down	reversal	negative	favorable	FALSE		FALSE	
	16	7	2003	27	0.001312	0.000516442	up	up	continue	positive	favorable	TRUE		TRUE	
	6	8	2003	29	-0.004652	0.00290175	up	down	reversal	negative	favorable	FALSE		FALSE	
	18	9	2003	31	0.0189279	0.003852257	up	up	continue	positive	favorable	TRUE		TRUE	
	15	10	2003	33	0.0048576	-0.000170437	down	up	reversal	positive	favorable	TRUE		TRUE	
	20	11	2003	35	.	0.002451685	up	down	reversal	negative	favorable	FALSE		FALSE	
	24	11	2003	36	0.0213371	.	down	up	reversal	positive	favorable	TRUE		TRUE	
	5	2	2004	40	-0.009239	0.000343574	up	down	reversal	negative	favorable	FALSE		FALSE	
	17	3	2004	42	-0.003968	0.000333502	up	down	reversal	negative	favorable	FALSE		FALSE	
	8	9	2004	49	-0.002208	-0.000262547	down	down	continue	negative	favorable	FALSE		FALSE	
	20	12	2004	53	-0.006596	0.000537862	up	down	reversal	negative	favorable	FALSE		FALSE	
	11	1	2005	55	0.0121021	0.00226066	up	up	continue	positive	favorable	TRUE		TRUE	
	9	2	2005	57	-0.018873	0.000690244	up	down	reversal	negative	favorable	FALSE		FALSE	
	9	3	2005	59	0.0054337	-0.002315455	down	up	reversal	positive	favorable	TRUE		TRUE	
	11	4	2005	61	-0.005251	-0.003869785	down	down	continue	negative	favorable	FALSE		FALSE	
	10	5	2005	63	-0.003545	-0.000903504	down	down	continue	negative	favorable	FALSE		FALSE	
	9	6	2005	65	-0.010032	-0.000872465	down	down	continue	negative	unfavorable		TRUE		TRUE
	11	7	2005	67	-0.003049	0.001481573	up	down	reversal	negative	favorable	FALSE		FALSE	
	9	8	2005	69	-0.004412	-0.000228003	down	down	continue	negative	unfavorable		TRUE		TRUE
	9	9	2005	71	0.0085842	0.000647764	up	up	continue	positive	unfavorable		FALSE		FALSE
	11	10	2005	73	0.0181066	-0.002936744	down	up	reversal	positive	unfavorable		FALSE		FALSE
	9	11	2005	75	0.0017977	-0.004484037	down	up	reversal	positive	favorable	TRUE		TRUE	
	9	12	2005	77	-0.013848	0.002689497	up	down	reversal	negative	favorable	FALSE		FALSE	

Table 39.The Effects of Central Bank's Short Term Interest Announcement on The Returns in ISE–Afternoon Session Return (Continue)

	Day	M	Year	Event	Afternoon Session Return	Reference Average Afternoon Session Return	PM	CM	Previous versus Current	Market Feedback (Afternoon ><? Average)	Interest Surprise	Current = Up and FS	Current = Down and UFS	Market feedback = positive and FS	Market feedback = negative and UFS	Market feedback = positive and NS
Next Day 14:00 Open to 16:00 Close Afternoon Session Return (2006 - 2007)	23	1	2006	79	0.0131044	0.002229271	up	up	continue	positive	none					TRUE
	23	2	2006	81	0.0132841	0.001274738	up	up	continue	positive	none					TRUE
	23	3	2006	83	0.0013209	-0.001749761	down	up	reversal	positive	favorable	TRUE		TRUE		
	27	4	2006	85	-0.003098	0.00059632	up	down	reversal	negative	favorable	FALSE		FALSE		
	25	5	2006	87	0.0071513	-0.00005127	down	up	reversal	positive	unfavorable		FALSE		FALSE	
	20	6	2006	89	-0.010664	-0.003908345	down	down	continue	negative	favorable	FALSE		FALSE		
	20	7	2006	91	0.0012935	0.002000715	up	up	continue	negative	unfavorable		FALSE		TRUE	
	24	8	2006	93	-0.000402	-0.001215055	down	down	continue	positive	favorable	FALSE		TRUE		
	26	9	2006	95	0.0107782	-0.000069034	down	up	reversal	positive	favorable	TRUE		TRUE		
	19	10	2006	97	-0.000618	0.00445235	up	down	reversal	negative	favorable	FALSE		FALSE		
	23	11	2006	99	0.0091894	-0.001466397	down	up	reversal	positive	favorable	TRUE		TRUE		
	21	12	2006	101	-0.006769	-0.001219857	down	down	continue	negative	unfavorable		TRUE		TRUE	
	16	1	2007	103	0.0130702	0.000258125	up	up	continue	positive	unfavorable		FALSE		FALSE	
	15	2	2007	105	0.0017516	0.000879643	up	up	continue	positive	unfavorable		FALSE		FALSE	
	15	3	2007	107	0.0049189	-0.001982104	down	up	reversal	positive	unfavorable		FALSE		FALSE	
	18	4	2007	109	0.0007153	0.000819623	up	up	continue	negative	unfavorable		FALSE		TRUE	
	14	5	2007	111	0.0114463	-0.000266809	down	up	reversal	positive	none					TRUE
	14	6	2007	113	0.004916	0.000431989	up	up	continue	positive	unfavorable		FALSE		FALSE	
	12	7	2007	115	-0.002359	0.003101582	up	down	reversal	negative	favorable	FALSE		FALSE		
	14	8	2007	117	-0.012676	0.000894899	up	down	reversal	negative	unfavorable		TRUE		TRUE	
	13	9	2007	119	0.0096668	0.00323514	up	up	continue	positive	favorable	TRUE		TRUE		
	16	10	2007	121	-0.017965	0.002208436	up	down	reversal	negative	favorable	FALSE		FALSE		
	14	11	2007	123	-0.003194	0.000428713	up	down	reversal	negative	favorable	FALSE		FALSE		
	13	12	2007	125	-0.009576	0.001025621	up	down	reversal	negative	unfavorable		TRUE		TRUE	

Table 40. The Effects of Central Bank's Short Term Interest Announcement on The Returns in ISE – Daily Return

	Day	M	Year	Event	Day Return	Reference Average Day Return	PM	CM	Previous versus Current	Market Feedback (Day ><? Average)	Interest Surprise	Current = Up and FS	Current = Down and UFS	Market feedback = positive and FS	Market feedback = negative and UFS
09:00 Open to 16:00 Close Day Return	20	2	2002	2	-0.03693	-0.006335	down	down	continue	negative	favorable	FALSE		FALSE	
	14	3	2002	4	0.00191	0.000732	up	up	continue	positive	favorable	TRUE		TRUE	
	8	4	2002	6	-0.03436	0.007858	up	down	reversal	negative	favorable	FALSE		FALSE	
	5	8	2002	12	-0.01318	-0.000006	down	down	continue	negative	favorable	FALSE		FALSE	
	11	11	2002	16	-0.03389	0.003381	up	down	reversal	negative	favorable	FALSE		FALSE	
09:00 Open to 16:00 Close Day Return (2002 - 2005)	25	4	2003	22	0.019944	-0.001020427	down	up	reversal	positive	favorable	TRUE		TRUE	
	4	6	2003	24	-0.023076	0.000503053	up	down	reversal	negative	favorable	FALSE		FALSE	
	16	7	2003	27	-0.011646	-0.001380008	down	down	continue	negative	favorable	FALSE		FALSE	
	6	8	2003	29	-0.016415	-0.001272842	down	down	continue	negative	favorable	FALSE		FALSE	
	18	9	2003	31	0.0355845	0.004676403	up	up	continue	positive	favorable	TRUE		TRUE	
	15	10	2003	33	0.0239127	0.006554227	up	up	continue	positive	favorable	TRUE		TRUE	
	20	11	2003	35	.	-0.000757072	down	down	continue	negative	favorable	FALSE		FALSE	
	24	11	2003	36	0.0950954	.	down	up	reversal	positive	favorable	TRUE		TRUE	
	5	2	2004	40	-0.017835	0.002894872	up	down	reversal	negative	favorable	FALSE		FALSE	
	17	3	2004	42	-0.003602	0.004484993	up	down	reversal	negative	favorable	FALSE		FALSE	
	8	9	2004	49	0.0156917	-0.000017076	down	up	reversal	positive	favorable	TRUE		TRUE	
	20	12	2004	53	-0.003994	0.001372027	up	down	reversal	negative	favorable	FALSE		FALSE	
	11	1	2005	55	0.0197433	0.00370586	up	up	continue	positive	favorable	TRUE		TRUE	
	9	2	2005	57	-0.026233	0.005102291	up	down	reversal	negative	favorable	FALSE		FALSE	
	9	3	2005	59	0.001734	0.000741728	up	up	continue	positive	favorable	TRUE		TRUE	
	11	4	2005	61	-0.01702	-0.003349669	down	down	continue	negative	favorable	FALSE		FALSE	
	10	5	2005	63	-0.000566	-0.003066982	down	down	continue	positive	favorable	FALSE		TRUE	
	9	6	2005	65	-0.010409	0.001624082	up	down	reversal	negative	unfavorable		TRUE		TRUE
	11	7	2005	67	-0.001234	0.005150977	up	down	reversal	negative	favorable	FALSE		FALSE	
	9	8	2005	69	-0.00748	0.004607128	up	down	reversal	negative	unfavorable		TRUE		TRUE
	9	9	2005	71	0.022781	0.002647403	up	up	continue	positive	unfavorable		FALSE		FALSE
	11	10	2005	73	0.0159449	-0.001536762	down	up	reversal	positive	unfavorable		FALSE		FALSE
	9	11	2005	75	0.0029292	-0.004176712	down	up	reversal	positive	favorable	TRUE		TRUE	
	9	12	2005	77	-0.028288	0.007579434	up	down	reversal	negative	favorable	FALSE		FALSE	

Table 41. The Effects of Central Bank's Short Term Interest Announcement on The Returns in ISE – Daily Return (Continue)

	Day	M	Year	Event	Day Return	Reference Average Day Return	PM	CM	Previous versus Current	Market Feedback (Day ><? Average)	Interest Surprise	Current = Up and FS	Current = Down and UFS	Market feedback = positive and FS	Market feedback = negative and UFS	Market feedback = positive and NS
Next Day 09:00 Open to 16:00 Close Day Return (2006 - 2007)	23	1	2006	79	0.0295183	0.004280845	up	up	continue	positive	none					TRUE
	23	2	2006	81	0.0190102	0.00072128	up	up	continue	positive	none					TRUE
	23	3	2006	83	-0.015919	-0.003500472	down	down	continue	negative	favorable	FALSE		FALSE		
	27	4	2006	85	0.0034166	0.002357914	up	up	continue	positive	favorable	TRUE		TRUE		
	25	5	2006	87	0.0081654	-0.014241451	down	up	reversal	positive	unfavorable		FALSE		FALSE	
	20	6	2006	89	0.0138318	-0.007418869	down	up	reversal	positive	favorable	TRUE		TRUE		
	20	7	2006	91	0.0007133	-0.000812275	down	up	reversal	positive	unfavorable		FALSE		FALSE	
	24	8	2006	93	-0.002676	0.003609356	up	down	reversal	negative	favorable	FALSE		FALSE		
	26	9	2006	95	0.0109904	-0.000516036	down	up	reversal	positive	favorable	TRUE		TRUE		
	19	10	2006	97	0.0223274	0.005964487	up	up	continue	positive	favorable	TRUE		TRUE		
	23	11	2006	99	0.0174668	-0.004403036	down	up	reversal	positive	favorable	TRUE		TRUE		
	21	12	2006	101	-0.012119	0.000694405	up	down	reversal	negative	unfavorable		TRUE		TRUE	
	16	1	2007	103	0.0256633	0.003969215	up	up	continue	positive	unfavorable		FALSE		FALSE	
	15	2	2007	105	0.0124962	0.001374246	up	up	continue	positive	unfavorable		FALSE		FALSE	
	15	3	2007	107	-0.002771	-0.00436234	down	down	continue	positive	unfavorable		TRUE		FALSE	
	18	4	2007	109	0.0097218	0.002445016	up	up	continue	positive	unfavorable		FALSE		FALSE	
	14	5	2007	111	0.0113133	-0.001742836	down	up	reversal	positive	none					TRUE
	14	6	2007	113	-0.002588	-0.000097445	down	down	continue	negative	unfavorable		TRUE		TRUE	
	12	7	2007	115	-0.006584	0.003246083	up	down	reversal	negative	favorable	FALSE		FALSE		
	14	8	2007	117	-0.042526	0.000105867	up	down	reversal	negative	unfavorable		TRUE		TRUE	
	13	9	2007	119	-0.002839	-0.000665644	down	down	continue	negative	favorable	FALSE		FALSE		
	16	10	2007	121	-0.031193	0.002483718	up	down	reversal	negative	favorable	FALSE		FALSE		
	14	11	2007	123	-6.39E-05	0.001013589	up	down	reversal	negative	favorable	FALSE		FALSE		
	13	12	2007	125	-0.014189	-0.000927764	down	down	continue	negative	unfavorable		TRUE		TRUE	

Table 41. The Effects of Central Bank's Short Term Interest Announcement on The Returns in ISE – Summary of the Results

	Hourly Return - Interest Rate Surprises		**Morning Session Return - Interest Rate Surprises**		**Afternoon Session Return - Interest Rate Surprises**		**Next day Return Observation - Interest Rate Surprises**	
	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007
Number of Favorable Interest surprise that is expected to happen / Number of Unfavorable Interest surprise that is expected to happen (**TRUE** / Current = Up and Surprise = Favorable, Current = Down and Surprise = Unfavorable)	**13**	**14**	**15**	**15**	**11**	**10**	**11**	**13**
	12 favorable	6 favorable	12 favorable	7 favorable	9 favorable	4 favorable	13 favorable	5 favorable
	1 unfavorable	5 unfavorable	3 unfavorable	5 unfavorable	2 unfavorable	3 unfavorable	1 unfavorable	5 unfavorable
	-	3 none	-	3 none	-	3 none	-	3 none
	6 reversal	5 reversal	7 reversal	7 reversal	7 reversal	8 reversal	10 reversal	2 reversal
	8 continue	9 continue	9 continue	9 continue	5 continue	2 continue	1 continue	11 continue
Number of Favorable Interest surprise that is not expected to happen / Number of Unfavorable Interest surprise that is not expected to happen (**FALSE**/Current = Down and Surprise = Favorable, Current = Up and Surprise = Unfavorable)	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007
	16	**10**	**14**	**9**	**18**	**14**	**18**	**11**
	13 favorable	5 favorable	13 favorable	4 favorable	16 favorable	7 favorable	12 favorable	6 favorable
	3 unfavorable	5 unfavorable	1 unfavorable	5 unfavorable	2 unfavorable	7 unfavorable	3 unfavorable	5 unfavorable
	9 continue	7 continue	6 continue	5 continue	8 continue	9 continue	12 continue	7 continue
	6 reversal	3 reversal	7 reversal	3 reversal	9 reversal	5 reversal	6 reversal	4 reversal
Percent of accuracy of the prediction	45%	58%	52%	63%	38%	42%	38%	54%
Number of Favorable Interest surprise that is expected to happen / Number of Unfavorable Interest surprise that is expected to happen (**TRUE** / Market feedback = positive and Surprise = Favorable, Market feedback = negative and Surprise = Unfavorable, Market feedback = positive and Surprise = None)	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007
	12	**12**	**13**	**14**	**12**	**13**	**12**	**12**
	11 favorable	5 favorable	10 favorable	6 favorable	10 favorable	5 favorable	11 favorable	5 favorable
	2 unfavorable	4 unfavorable	3 unfavorable	5 unfavorable	2 unfavorable	5 unfavorable	2 unfavorable	4 unfavorable
	0 none	3 none		3 none		3 none		3 none
	5 continue	7 continue	7 continue	7 continue	5 continue	5 continue	10 reversal	2 reversal
	6 reversal	5 reversal	7 reversal	7 reversal	7 reversal	8 reversal	2 continue	10 continue
Number of Favorable Interest surprise that is not expected to happen / Number of Unfavorable Interest surprise that is not expected to happen (**FALSE** / Market feedback = negative and Surprise = Favorable, Market feedback = positive and Surprise = Unfavorable)	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007
	17	**12**	**16**	**10**	**17**	**11**	**17**	**12**
	14 favorable	6 favorable	15 favorable	5 favorable	15 favorable	6 favorable	14 favorable	6 favorable
	2 unfavorable	6 unfavorable	1 unfavorable	5 unfavorable	2 unfavorable	5 unfavorable	2 unfavorable	6 unfavorable
	8 continue	9 continue	8 continue	7 continue	8 continue	6 continue	11 continue	4 reversal
	6 reversal	3 reversal	7 reversal	3 reversal	9 reversal	5 reversal	6 reversal	8 continue
Percent of accuracy of the prediction	48%	50%	48%	58%	48%	54%	48%	50%

Table 42. The Effects of Central Bank's Inflation Announcement on The Returns in ISE – Hourly Returns

	Year	Event	Overnight Close to Open Return	Reference Average Overnight Close to Open Return	PM	CM	Previous versus Current	Market Feedback (Overnight ><? Average)	IS[26]	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback= positive and Surprise = U	Market Feedback= negative and Surprise = O
09:00 Open to 16:00 Close Day Return	2002	1	-0.02248	-0.002891	down	down	continue	negative	O[27]		TRUE		TRUE
	2002	3	0.01695	-0.006502	down	up	reversal	positive	O		FALSE		FALSE
	2002	5	0.04603	0.003927	up	up	continue	positive	O		FALSE		FALSE
	2002	8	-0.0019	0.004024	up	down	reversal	negative	O		TRUE		TRUE
	2002	9	0.00679	-0.004571	down	up	reversal	positive	O		FALSE		FALSE
	2002	10	0.00573	-0.003981	down	up	reversal	positive	O		FALSE		FALSE
	2002	11	-0.01318	0.008335	up	down	reversal	negative	O		TRUE		TRUE
	2002	13	0.01749	-0.005887	down	up	reversal	positive	O		FALSE		FALSE
	2002	14	0.00438	-0.002178	down	up	reversal	positive	U[28]	FALSE		TRUE	
	2002	15	0.0614	0.007354	up	up	continue	positive	U	TRUE		TRUE	
	2002	17	0.00461	0.01438	up	up	continue	positive	U	TRUE		TRUE	
16:00 Close to Next Day 09:00 Open Overnight Return	2003	18	-0.026537702	-0.007328413	down	down	continue	negative	O		TRUE		TRUE
	2003	19	-0.022477297	-0.00491933	down	down	continue	negative	O		TRUE		TRUE
	2003	20	-0.001891461	-0.00795874	down	down	continue	positive	O		TRUE		FALSE
	2003	21	0.024851609	-0.002381585	down	up	reversal	positive	O		TRUE		FALSE
	2003	23	0.007732084	0.000538581	up	up	continue	positive	O		FALSE		FALSE
	2003	24	0.006270823	0.003936702	up	up	continue	positive	O		FALSE		FALSE
	2003	26	-0.027439141	0.000166008	up	down	reversal	negative	O		FALSE		TRUE
	2003	28	0.019089067	0.000500191	up	up	continue	positive	O		FALSE		FALSE
	2003	30	-0.001718733	-0.001563394	down	down	continue	negative	O		TRUE		TRUE
	2003	32	0.02690126	0.001005533	up	up	continue	positive	O		FALSE		FALSE
	2003	34	-0.006226853	0.001670291	up	down	reversal	negative	U	FALSE		FALSE	
	2003	37	-0.001474324	-0.002490266	down	down	continue	positive	U	FALSE		TRUE	
	2004	38	0.00335083	0.006285702	up	up	continue	negative	O		FALSE		TRUE
	2004	39	-0.001267484	0.000295389	up	down	reversal	negative	O		TRUE		TRUE
	2004	41	0.002782471	0.002381602	up	up	continue	positive	U	TRUE		TRUE	

[26] Inflation Surprise

[27] Overshoot

[28] undershoot

Table 42. The Effects of Central Bank's Inflation Announcement on The Returns in ISE – Hourly Returns (Continue)

	Year	Event	Overnight Close to Open Return	Reference Average Overnight Close to Open Return	PM	CM	Previous versus Current	Market Feedback (Overnight Average)	IS	Up and U	Down and O	Market Feedback= positive and Surprise = U	Market Feedback= negative and Surprise = O
16:00 Close to Next Day 09:00 Open Overnight Return	2004	43	0.006387322	0.002240065	up	up	continue	positive	U	TRUE		TRUE	
	2004	44	-0.004676964	-0.000927508	down	down	continue	negative	U	FALSE		FALSE	
	2004	45	-0.000992763	0.002149458	up	down	reversal	negative	U	FALSE		FALSE	
	2004	47	0.008844257	0.000360353	up	Up	continue	positive	U	TRUE		TRUE	
	2004	48	0.009364767	0.001718417	up	Up	continue	positive	U	TRUE		TRUE	
	2004	50	-0.004884085	-0.00280015	down	Down	continue	negative	U	FALSE		FALSE	
	2004	51	0.009193943	0.002681075	up	Up	continue	positive	U	TRUE		TRUE	
	2004	52	-0.009216248	0.00127804	up	Down	reversal	negative	U	FALSE		FALSE	
06:00 Close to Next day 09:00 Open Overnight Return	2005	54	-0.008770466	0.002232217	up	Down	reversal	negative	O		TRUE		TRUE
	2005	56	0.012161509	0.000348617	up	Up	continue	positive	O		FALSE		FALSE
	2005	58	0.003850239	-0.000465876	down	up	reversal	positive	U	TRUE		TRUE	
	2005	60	0.013175878	0.001036354	up	up	continue	positive	O		FALSE		FALSE
	2005	62	0.012797931	-0.000618171	down	up	reversal	positive	O		FALSE		FALSE
	2005	64	0.004249391	0.003011339	up	up	continue	positive	O		FALSE		FALSE
	2005	66	0.006939262	0.002214977	up	up	continue	positive	U	TRUE		TRUE	
	2005	68	-0.003881012	0.002147814	up	down	reversal	negative	U	FALSE		FALSE	
	2005	70	0.004103898	0.002370346	up	up	continue	positive	U	TRUE		TRUE	
	2005	72	-0.016691186	0.000598214	up	down	reversal	negative	U	FALSE		FALSE	
	2005	74	-0.005254197	-0.001659578	down	down	continue	negative	U	FALSE		FALSE	
	2005	76	-0.000232809	0.003768761	up	down	reversal	negative	U	FALSE		FALSE	
	2006	78	-0.000804111	0.00242094	up	down	reversal	negative	O		TRUE		TRUE
	2006	80	0.003922363	0.002715835	up	up	continue	positive	O		FALSE		FALSE
	2006	82	-0.013900885	-0.000039182	down	down	continue	negative	O		TRUE		TRUE
	2006	84	0.004257227	-0.000767388	down	up	reversal	positive	O		FALSE		FALSE
	2006	86	0.009263653	0.00086246	up	up	continue	positive	O		FALSE		FALSE
	2006	88	-0.006920498	-0.008537204	down	down	continue	positive	O		TRUE		FALSE
	2006	90	-0.017441298	0.003761687	up	down	reversal	negative	O		TRUE		TRUE
	2006	92	-0.003999767	-0.002162587	down	down	continue	negative	O		TRUE		TRUE
	2006	94	-0.002484022	0.002103016	up	down	reversal	negative	O		TRUE		TRUE
	2006	96	0.013371634	-0.001085831	down	up	reversal	positive	O		FALSE		FALSE

Table 42. The Effects of Central Bank's Inflation Announcement on The Returns in ISE – Hourly Returns (Continue)

	Year	Event	Overnight Close to Open Return	Reference Average Overnight Close to Open Return	PM	CM	Previous versus Current	Market Feedback (Overnight Average)	IS	Up and U	Down and O	Market Feedback= positive and Surprise = U	Market Feedback= negative and Surprise = O
06:00 Close to Next day 09:00 Open Overnight Return	2006	98	0.015843139	0.000355057	up	up	continue	positive	O		FALSE		FALSE
	2006	100	-0.000145953	0.00058673	up	down	reversal	negative	O		TRUE		TRUE
	2007	102	-0.014202885	0.003618424	up	down	reversal	negative	O		TRUE		TRUE
	2007	104	0.005139517	0.003672116	up	up	continue	positive	O		FALSE		FALSE
	2007	106	0.015539877	-0.001778222	down	up	reversal	positive	O		FALSE		FALSE
	2007	108	0.003746248	0.001284739	up	up	continue	positive	O		FALSE		FALSE
	2007	110	0.006564766	-0.003018989	down	up	reversal	positive	O		FALSE		FALSE
	2007	112	0.000255104	0.001572153	up	up	continue	negative	O		FALSE		TRUE
	2007	114	0.005925465	-0.001948546	down	up	reversal	positive	O		FALSE		FALSE
	2007	116	0.014351013	-0.001809199	down	up	reversal	positive	O		FALSE		FALSE
	2007	118	0.001583168	0.002529389	up	up	continue	negative	O		FALSE		TRUE
	2007	120	0.012181718	0.004416779	up	up	continue	positive	O		FALSE		FALSE
	2007	122	0.010457277	-0.000936081	down	up	reversal	positive	O		FALSE		FALSE
	2007	124	0.008538638	0.001565798	up	up	continue	positive	O		FALSE		FALSE

Table 43. The Effects of Central Bank's Inflation Announcement on The Returns in ISE – Morning Session Return

	Year	Event	Morning Session Return	Reference Average Morning Session Return	PM	CM	Previous versus Current	Market Feedback (Morning ><? Average)	IS	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback= positive and Surprise = U	Market Feedback= Negative and Surprise = O
09:00 Open to 16:00 Close Day Return	2002	1	-0.02248	-0.002891	down	down	continue	negative	O		TRUE		TRUE
	2002	3	0.01695	-0.006502	down	up	reversal	positive	O		FALSE		FALSE
	2002	5	0.04603	0.003927	up	up	continue	positive	O		FALSE		FALSE
	2002	8	-0.0019	0.004024	up	down	reversal	negative	O		TRUE		TRUE
	2002	9	0.00679	-0.004571	down	up	reversal	positive	O		FALSE		FALSE
	2002	10	0.00573	-0.003981	down	up	reversal	positive	O		FALSE		FALSE
	2002	11	-0.01318	0.008335	up	down	reversal	negative	O		TRUE		TRUE
	2002	13	0.01749	-0.005887	down	up	reversal	positive	O		FALSE		FALSE
	2002	14	0.00438	-0.002178	down	up	reversal	positive	U	TRUE		TRUE	
	2002	15	0.0614	0.007354	up	up	continue	positive	U	TRUE		TRUE	
	2002	17	0.00461	0.01438	up	up	continue	positive	U	TRUE		TRUE	
Next Day 09:00 Open to 11:00 Close Morning Session Return (2002 - 2007)	2003	18	-0.036386756	-0.010461354	down	down	continue	negative	O		TRUE		TRUE
	2003	19	-0.008600801	-0.001458802	down	down	continue	negative	O		TRUE		TRUE
	2003	20	-0.007385931	-0.006120416	down	down	continue	negative	O		TRUE		TRUE
	2003	21	0.021609176	-0.006177918	down	up	reversal	positive	O		FALSE		FALSE
	2003	23	-0.003607766	0.000969267	up	down	reversal	negative	O		TRUE		TRUE
	2003	24	0.000910266	0.00136927	up	up	continue	negative	O		FALSE		TRUE
	2003	26	-0.021493152	-0.0000756	down	down	continue	negative	O		TRUE		TRUE
	2003	28	0.018931581	-0.000124564	down	up	reversal	positive	O		FALSE		FALSE
	2003	30	-0.002746535	-0.001905282	down	down	continue	negative	O		TRUE		TRUE
	2003	32	0.023805147	0.003352627	up	up	continue	positive	O		FALSE		FALSE
	2003	34	0.004610207	-0.000957392	down	up	reversal	positive	U	TRUE		TRUE	
	2003	37	0.001930941	-0.000207815	down	up	reversal	positive	U	TRUE		TRUE	
	2004	38	-0.00529217	0.005444063	up	down	reversal	negative	O		TRUE		TRUE
	2004	39	0.002857764	-0.004095916	down	up	reversal	positive	O		FALSE		FALSE
	2004	41	0.000296601	0.00630927	up	up	continue	negative	U	TRUE		FALSE	
	2004	43	0.00183308	0.004737088	up	up	continue	negative	U	TRUE		FALSE	
	2004	44	-0.004965267	-0.005851609	down	down	continue	positive	U	FALSE		TRUE	
	2004	45	0.013284843	0.001491141	up	up	continue	positive	U	TRUE		TRUE	
	2004	46	-0.001120464	0.000970406	up	down	reversal	negative	U	FALSE		FALSE	

Table 43. The Effects of Central Bank's Inflation Announcement on The Returns in ISE–Morning Session Return (Continue)

	Year	Event	Morning Session Return	Reference Average Morning Session Return	PM	CM	Previous versus Current	Market Feedback (Morning ><? Average)	IS	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback= Positive and Surprise = U	Market Feedback= Negative and Surprise = O
Next Day 09:00 Open to 11:00 Close Morning Session Return (2002 - 2007) Next Day 10:00 Open to 11:00 Close Morning Session Return (03/02/2007 to 04/09/2007)	2004	47	0.008095347	0.001975403	up	up	continue	positive	U	TRUE		TRUE	
	2004	48	0.011844198	0.00037656	up	up	continue	positive	U	TRUE		TRUE	
	2004	50	-0.002802016	0.00000777	up	down	reversal	negative	U	FALSE		FALSE	
	2004	51	0.004332212	0.003610041	up	up	continue	positive	U	TRUE		TRUE	
	2004	52	-0.004927779	-0.001362116	down	down	continue	negative	U	FALSE		FALSE	
	2005	54	-0.020282725	0.004325862	up	down	reversal	negative	O		TRUE		TRUE
	2005	56	0.015983441	0.004967203	up	up	continue	positive	O		FALSE		FALSE
	2005	58	0.000686471	0.003544405	up	up	continue	negative	U	TRUE		FALSE	
	2005	60	0.021043985	-0.000435773	down	up	reversal	positive	O		FALSE		FALSE
	2005	62	0.01582437	-0.002887179	down	up	reversal	positive	O		FALSE		FALSE
	2005	64	-0.000936824	0.002985034	up	down	reversal	negative	O		TRUE		TRUE
	2005	66	0.010120699	0.004087921	up	up	continue	positive	U	TRUE		TRUE	
	2005	68	-0.005827659	0.004385341	up	down	reversal	negative	U	FALSE		FALSE	
	2005	70	0.003974347	0.002273949	up	up	continue	positive	U	TRUE		TRUE	
	2005	72	-0.013815099	0.00105995	up	down	reversal	negative	U	FALSE		FALSE	
	2005	74	-0.007987266	-0.000465272	down	down	continue	negative	U	FALSE		FALSE	
	2005	76	-0.003443074	0.004099283	up	down	reversal	negative	U	FALSE		FALSE	
	2006	78	-0.000060925	0.001431482	up	down	reversal	negative	O		TRUE		TRUE
	2006	80	0.003866183	0.00150439	up	up	continue	positive	O		FALSE		FALSE
	2006	82	-0.045205271	-0.000174498	down	down	continue	negative	O		TRUE		TRUE
	2006	84	0.00776725	-0.000762613	down	up	reversal	positive	O		FALSE		FALSE
	2006	86	0.000736611	0.001155715	up	up	continue	negative	O		FALSE		TRUE
	2006	88	-0.006674476	-0.014494327	down	down	continue	positive	O		TRUE		FALSE
	2006	90	-0.019901467	0.001185969	up	down	reversal	negative	O		TRUE		TRUE
	2006	92	-0.009740426	-0.001759044	down	down	continue	negative	O		TRUE		TRUE

Table 43. The Effects of Central Bank's Inflation Announcement on The Returns in ISE–Morning Session Return (Continue)

	Year	Event	Morning Session Return	Reference Average Morning Session Return	PM	CM	Previous versus Current	Market Feedback (Morning ><? Average)	IS	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback= Positive and Surprise = U	Market Feedback = Negative and Surprise = O
Next Day 09:00 Open to 11:00 Close Morning Session Return (2002 - 2007) Next Day 10:00 Open to 11:00 Close Morning Session Return (03/02/2007 to (04/09/2007)	2006	94	-0.005941755	0.002253655	up	down	reversal	negative	O		TRUE		TRUE
	2006	96	0.01759398	-0.00250825	down	up	reversal	positive	O		FALSE		FALSE
	2006	98	0.01702421	0.000824314	up	up	continue	positive	O		FALSE		FALSE
	2006	100	0.002948665	0.000140853	up	up	continue	positive	O		FALSE		FALSE
	2007	102	-0.021325271	0.002114514	up	down	reversal	negative	O		TRUE		TRUE
	2007	104	-0.006381878	-0.00019194	down	down	continue	negative	O		TRUE		TRUE
	2007	106	-0.009135299	-0.00080745	down	down	continue	negative	O		TRUE		TRUE
	2007	108	0.015549883	0.0013139	up	up	continue	positive	O		FALSE		FALSE
	2007	110	-0.000946971	0.000108373	up	down	reversal	negative	O		TRUE		TRUE
	2007	112	0.001686917	2.02139E-05	up	up	continue	positive	O		FALSE		FALSE
	2007	114	0.000165764	0.000445174	up	up	continue	negative	O		FALSE		TRUE
	2007	116	-0.00032549	-0.00048606	down	down	continue	positive	O		TRUE		FALSE
	2007	118	0.007185134	0.002949854	up	up	continue	positive	O		FALSE		FALSE
	2007	120	0.014964202	-0.00041839	down	up	reversal	positive	O		FALSE		FALSE
	2007	122	-0.001713087	0.002853411	up	down	reversal	negative	O		TRUE		TRUE
	2007	124	0.002479931	-0.00244231	down	up	reversal	positive	O		FALSE		FALSE

Table 44. The Effects of Central Bank's Inflation Announcement on The Returns in ISE – Afternoon Session Return

	Year	Event	Afternoon Session Return	Reference Average Afternoon Session Return	PM	CM	Previous versus Current	Market Feedback (Afternoon ><? Average)	IS	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback=positive and Surprise = U	Market Feedback= Negative and Surprise = O
09:00 Open to 16:00 Close Day Return	2002	1	-0.02248	-0.002891	down	down	continue	Negative	O		TRUE		TRUE
	2002	3	0.01695	-0.006502	down	up	reversal	positive	O		FALSE		FALSE
	2002	5	0.04603	0.003927	up	up	continue	positive	O		FALSE		FALSE
	2002	8	-0.0019	0.004024	up	down	reversal	negative	O		TRUE		TRUE
	2002	9	0.00679	-0.004571	down	up	reversal	positive	O		FALSE		FALSE
	2002	10	0.00573	-0.003981	down	up	reversal	positive	O		FALSE		FALSE
	2002	11	-0.01318	0.008335	up	down	reversal	negative	O		TRUE		TRUE
	2002	13	0.01749	-0.005887	down	up	reversal	positive	O		FALSE		FALSE
	2002	14	0.00438	-0.002178	down	up	reversal	positive	U	TRUE		TRUE	
	2002	15	0.0614	0.007354	up	up	continue	positive	U	TRUE		TRUE	
	2002	17	0.00461	0.01438	up	up	continue	positive	U	TRUE		TRUE	
Next Day 14:00 Open to 16:00 Close Afternoon Session Return	2003	18	-0.017353981	-0.00056934	down	down	continue	negative	O		TRUE		TRUE
	2003	19	0.010935517	0.006458464	up	up	continue	positive	O		FALSE		FALSE
	2003	20	0.022970633	0.004458437	up	up	continue	positive	O		FALSE		FALSE
	2003	21	0.010422134	0.003385231	up	up	continue	positive	O		FALSE		FALSE
	2003	23	-0.009932339	0.001486561	up	down	reversal	negative	O		TRUE		TRUE
	2003	24	0.002309057	0.001399919	up	up	continue	positive	O		FALSE		FALSE
	2003	26	0.00786188	-0.001292063	down	up	reversal	positive	O		FALSE		FALSE
	2003	28	0.016548687	0.004315111	up	up	continue	positive	O		FALSE		FALSE
	2003	30	0.003424752	0.002622712	up	up	continue	positive	O		FALSE		FALSE
	2003	32	-0.037980803	0.004926306	up	down	reversal	negative	O		TRUE		TRUE
	2003	34	0.005369255	0.002124966	up	up	continue	positive	U	TRUE		TRUE	
	2003	37	0.012501679	-0.001167857	down	up	reversal	positive	U	TRUE		TRUE	
	2004	38	-0.030200031	0.001544304	up	down	reversal	negative	O		TRUE		TRUE
	2004	39	-0.005227796	-0.003211399	down	down	continue	negative	O		TRUE		TRUE
	2004	41	0.007629635	0.002965134	up	up	continue	positive	U	TRUE		TRUE	
	2004	43	-0.003175902	-0.000887652	down	down	continue	negative	U	FALSE		FALSE	
	2004	44	0.007503193	-0.001199065	down	up	reversal	positive	U	TRUE		TRUE	
	2004	45	0.003960624	-0.004372078	down	up	reversal	positive	U	TRUE		TRUE	
	2004	46	-0.016221535	2.34239E-05	up	down	reversal	negative	U	FALSE		FALSE	

Table 44. The Effects of Central Bank's Inflation Announcement on The Returns in ISE–Afternoon Session Return (Continue)

	Year	Event	Afternoon Session Return	Reference Average Afternoon Session Return	PM	CM	Previous versus Current	Market Feedback (Afternoon ><? Average)	Inflation Surprise	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback= Positive and Surprise=U	Market Feedback= Negative and Surprise= U
Next Day 14:00 Open to 16:00 Close Afternoon Session Return	2004	47	0.007006895	0.001828444	up	up	continue	positive	U	TRUE		TRUE	
	2004	48	-0.001328777	0.002858697	up	down	reversal	negative	U	FALSE		FALSE	
	2004	50	-0.014099798	0.002309783	up	down	reversal	negative	U	FALSE		FALSE	
	2004	51	0.003833629	0.000553353	up	up	continue	positive	U	TRUE		TRUE	
	2004	52	0.006983028	-0.000185016	down	up	reversal	positive	U	TRUE		TRUE	
	2005	54	-0.003062703	0.002485969	up	down	reversal	negative	O		TRUE		TRUE
	2005	56	-0.001990236	0.002221163	up	down	reversal	negative	O		TRUE		TRUE
	2005	58	0.002836748	-0.003414773	down	up	reversal	positive	O	TRUE		TRUE	
	2005	60	-0.004613525	-0.003601443	down	down	continue	negative	O		TRUE		TRUE
	2005	62	0.006157233	7.74497E-05	up	up	continue	positive	O		FALSE		FALSE
	2005	64	-0.001459518	-0.00084399	down	down	continue	negative	O		TRUE		TRUE
	2005	66	0.005564359	0.0011172	up	up	continue	positive	U	TRUE		TRUE	
	2005	68	-0.000837822	-0.000390547	down	down	continue	negative	U	FALSE		FALSE	
	2005	70	-0.005095399	0.002670604	up	down	reversal	negative	U	FALSE		FALSE	
	2005	72	-0.010160355	0.000671175	up	down	reversal	negative	U	FALSE		FALSE	
	2005	74	0.005302127	-0.002057702	down	up	reversal	positive	U	TRUE		TRUE	
	2005	76	-0.005219058	0.002937982	up	down	reversal	negative	U	FALSE		FALSE	
	2006	78	0.008372491	0.000262388	up	up	continue	positive	O		FALSE		FALSE
	2006	80	-0.008469309	0.001217301	up	down	reversal	negative	O		TRUE		TRUE
	2006	82	0.000458176	0.001000726	up	up	continue	negative	O		FALSE		TRUE
	2006	84	-0.008426954	0.000633708	up	down	reversal	negative	O		TRUE		TRUE
	2006	86	-0.002016834	0.000850966	up	down	reversal	negative	O		TRUE		TRUE
	2006	88	-0.005724766	0.000924897	up	down	reversal	negative	O		TRUE		TRUE
	2006	90	-0.009210959	-0.003272265	down	down	continue	negative	O		TRUE		TRUE
	2006	92	0.006558047	-0.000273962	down	up	reversal	positive	O		FALSE		FALSE
	2006	94	-0.005537272	0.000816777	up	down	reversal	negative	O		TRUE		TRUE

Table 44. The Effects of Central Bank's Inflation Announcement on The Returns in ISE–Afternoon Session Return (Continue)

	Year	Event	Afternoon Session Return	Reference Average Afternoon Session Return	PM	CM	Previous versus Current	Market Feedback (Afternoon ><? Average)	Inflation Surprise	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback= Positive and Surprise = U	Market Feedback= Negative and Surprise = U
Next Day 14:00 Open to 16:00 Close Afternoon Session Return	2006	96	-0.001940029	-0.000604572	down	down	continue	negative	O		TRUE		TRUE
	2006	98	-0.006189218	0.002920512	up	down	reversal	negative	O		TRUE		TRUE
	2006	100	-0.001363865	-0.002935066	down	down	continue	positive	O		TRUE		FALSE
	2007	102	0.005241961	1.63671E-05	up	up	continue	positive	O		FALSE		FALSE
	2007	104	-0.001942273	0.001947687	up	down	reversal	negative	O		TRUE		TRUE
	2007	106	0.004554491	-0.003434488	down	up	reversal	positive	O		FALSE		FALSE
	2007	108	0.002457348	0.001042865	up	up	continue	positive	O		FALSE		FALSE
	2007	110	-0.008542789	0.000852704	up	down	reversal	negative	O		TRUE		TRUE
	2007	112	-0.010959432	0.000199228	up	down	reversal	negative	O		TRUE		TRUE
	2007	114	0.001411617	0.002378449	up	up	continue	negative	O		FALSE		TRUE
	2007	116	-0.008399276	0.00258401	up	down	reversal	negative	O		TRUE		TRUE
	2007	118	-0.019494881	0.00186418	up	down	reversal	negative	O		TRUE		TRUE
	2007	120	0.009268471	0.00159124	up	up	continue	positive	O		FALSE		FALSE
	2007	122	0.004293831	0.001136806	up	up	continue	positive	O		FALSE		FALSE
	2007	124	0.017997192	0.000214966	up	up	continue	positive	O		FALSE		FALSE

Table 45. The Effects of Central Bank's Inflation Rate Announcement on The Returns in Istanbul Stock Exchange – Daily Return

	Year	Event	Day Return	Reference Average Day Return	PM	CM	Previous versus Current	Market Feedback (Day ><? Average)	IS	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback =positive and Surprise = U	Market Feedback =negative and Surprise = O
09:00 Open to 16:00 Close Day Return	2002	1	-0.02248	-0.002891	down	down	continue	negative	O		TRUE		TRUE
	2002	3	0.01695	-0.006502	down	up	reversal	positive	O		FALSE		FALSE
	2002	5	0.04603	0.003927	up	up	continue	positive	O		FALSE		FALSE
	2002	8	-0.0019	0.004024	up	down	reversal	negative	O		TRUE		TRUE
	2002	9	0.00679	-0.004571	down	up	reversal	positive	O		FALSE		FALSE
	2002	10	0.00573	-0.003981	down	up	reversal	positive	O		FALSE		FALSE
	2002	11	-0.01318	0.008335	up	down	reversal	negative	O		TRUE		TRUE
	2002	13	0.01749	-0.005887	down	up	reversal	positive	O		FALSE		FALSE
	2002	14	0.00438	-0.002178	down	up	reversal	positive	U	TRUE		TRUE	
	2002	15	0.0614	0.007354	up	up	continue	positive	U	TRUE		TRUE	
	2002	17	0.00461	0.01438	up	up	continue	positive	U	TRUE		TRUE	
Next Day 09:00 Open to 16:00 Close Day Return	2003	18	-0.058362475	-0.011522368	down	down	continue	negative	O		TRUE		TRUE
	2003	19	0.000144488	0.003803997	up	up	continue	negative	O		FALSE		TRUE
	2003	20	0.018778971	-0.003092019	down	up	reversal	positive	O		FALSE		FALSE
	2003	21	0.031490098	-0.003986109	down	up	reversal	positive	O		FALSE		FALSE
	2003	23	-0.013426757	0.00231207	up	down	reversal	negative	O		TRUE		TRUE
	2003	24	0.004065976	0.002296265	up	up	continue	positive	O		FALSE		FALSE
	2003	26	-0.01438177	-0.00202829	down	down	continue	negative	O		TRUE		TRUE
	2003	28	0.034896131	0.003788842	up	up	continue	positive	O		FALSE		FALSE
	2003	30	-0.000403902	0.000496909	up	down	reversal	negative	O		TRUE		TRUE
	2003	32	-0.015079795	0.008195991	up	down	reversal	negative	O		TRUE		TRUE
	2003	34	0.008610637	0.000598013	up	up	continue	positive	U	TRUE		TRUE	
	2003	37	0.014315512	-0.002274917	down	up	reversal	positive	U	TRUE		TRUE	
	2004	38	-0.035332378	0.007239832	up	down	reversal	negative	O		TRUE		TRUE
	2004	39	-0.003610085	-0.008245368	down	down	continue	positive	O		TRUE		FALSE
	2004	41	0.007899884	0.00816785	up	up	continue	negative	U	TRUE		FALSE	
	2004	43	-0.002899877	0.003794644	up	down	reversal	negative	U	FALSE		FALSE	
	2004	44	0.001513861	-0.007615289	down	up	reversal	positive	U	TRUE		TRUE	
	2004	45	0.017626347	-0.003952844	down	up	reversal	positive	U	TRUE		TRUE	
	2004	46	-0.017095837	0.000934623	up	down	reversal	negative	U	FALSE		FALSE	

Table 45. The Effects of Central Bank's Inflation Rate Announcement on The Returns in ISE Change – Daily Return (Continue)

	Year	Event	Day Return	Reference Average Day Return	PM	CM	Previous versus Current	Market Feedback (Day ><? Average)	IS	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback =positive and Surprise = U	Market Feedback =negative and Surprise = O
Next Day 09:00 Open to 16:00 Close Day Return	2004	47	0.015158966	0.003340208	up	up	continue	positive	U	TRUE		TRUE	
	2004	48	0.012833572	0.003100382	up	up	continue	positive	U	TRUE		TRUE	
	2004	50	-0.017065874	0.001758129	up	down	reversal	negative	U	FALSE		FALSE	
	2004	51	0.008976476	0.003995858	up	up	continue	positive	U	TRUE		TRUE	
	2004	52	0.001950444	-0.001554916	down	up	reversal	positive	U	TRUE		TRUE	
	2005	54	-0.024720869	0.006221424	up	down	reversal	negative	O		TRUE		TRUE
	2005	56	0.013970365	0.007384317	up	up	continue	positive	O		FALSE		FALSE
	2005	58	0.004580089	-0.00008363	down	up	reversal	positive	U	TRUE		TRUE	
	2005	60	0.014420584	-0.004302687	down	up	reversal	positive	O		FALSE		FALSE
	2005	62	0.021972523	-0.003115074	down	up	reversal	positive	O		FALSE		FALSE
	2005	64	-0.002155636	0.001881786	up	down	reversal	negative	O		TRUE		TRUE
	2005	66	0.014822334	0.004685177	up	up	continue	positive	U	TRUE		TRUE	
	2005	68	-0.00591397	0.003696163	up	down	reversal	negative	U	FALSE		FALSE	
	2005	70	-0.001472736	0.005057252	up	down	reversal	negative	U	FALSE		FALSE	
	2005	72	-0.023835088	0.00195033	up	down	reversal	negative	U	FALSE		FALSE	
	2005	74	-0.002384563	-0.002828948	down	down	continue	positive	U	FALSE		TRUE	
	2005	76	-0.005440992	0.006672585	up	down	reversal	negative	U	FALSE		FALSE	
	2006	78	0.00870185	0.001385741	up	up	continue	positive	O		FALSE		FALSE
	2006	80	-0.00451783	0.002580541	up	down	reversal	negative	O		TRUE		TRUE
	2006	82	-0.045814223	0.000994452	up	down	reversal	negative	O		TRUE		TRUE
	2006	84	0.000400491	-0.000254608	down	up	reversal	positive	O		FALSE		FALSE
	2006	86	-0.001606227	0.001575101	up	down	reversal	negative	O		TRUE		TRUE
	2006	88	-0.013159825	-0.013765722	down	down	continue	positive	O		TRUE		FALSE
	2006	90	-0.030048603	-0.002739824	down	down	continue	negative	O		TRUE		TRUE
	2006	92	-0.005311728	-0.001276385	down	down	continue	negative	O		TRUE		TRUE
	2006	94	-0.012902569	0.004244294	up	down	reversal	negative	O		TRUE		TRUE
	2006	96	0.014499974	-0.00338664	down	up	reversal	positive	O		FALSE		FALSE
	2006	98	0.012295893	0.003426212	up	up	continue	positive	O		FALSE		FALSE
	2006	100	0.000569399	-0.003582315	down	up	reversal	positive	O		FALSE		FALSE
	2007	102	-0.015691366	0.002029927	up	down	reversal	negative	O		TRUE		TRUE

Table 45. The Effects of Central Bank's Inflation Rate Announcement on The Returns in ISE Change – Daily Return (Continue)

	Year	Event	Day Return	Reference Average Day Return	PM	CM	Previous versus Current	Market Feedback (Day ><? Average)	IS	Current = Up and Surprise = U	Current = Down and Surprise = O	Market Feedback =positive and Surprise = U	Market Feedback =negative and Surprise = O
Next Day 09:00 Open to 16:00 Close Day Return	2007	104	-0.009751871	0.001854447	up	down	reversal	negative	O		TRUE		TRUE
	2007	106	-0.002875322	-0.004598718	down	down	continue	positive	O		TRUE		FALSE
	2007	108	0.019765999	0.00217911	up	up	continue	positive	O		FALSE		FALSE
	2007	110	-0.009557932	0.00024425	up	down	reversal	negative	O		TRUE		TRUE
	2007	112	-0.01296589	-0.000261492	down	down	continue	negative	O		TRUE		TRUE
	2007	114	0.001619266	0.002163748	up	up	continue	negative	O		FALSE		TRUE
	2007	116	-0.008706912	0.001905678	up	down	reversal	negative	O		TRUE		TRUE
	2007	118	-0.013777593	0.004912576	up	down	reversal	negative	O		TRUE		TRUE
	2007	120	0.026539141	0.001174836	up	up	continue	positive	O		FALSE		FALSE
	2007	122	0.005413467	0.003729737	up	up	continue	positive	O		FALSE		FALSE
	2007	124	0.020521006	-0.003369737	down	up	reversal	positive	O		FALSE		FALSE

Table 46. The Effects of Central Bank's Inflation Rate Announcement on The Returns in ISE – Summary of the Results

	Hourly Return Observation - Inflation RateSurprises		Morning Session Return Observation-Inflation Rate Surprises		Afternoon Session Return Observation - Inflation Rate Surprises		Next day Return Observation - Inflation Rate Surprises	
	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007
Number of Undershoot that is expected to happen /Number of Overshoot that is expected to happen (**TRUE**/Current=Up and Surprise=Undershoot, Current= Down and Surprise = Overshoot)	**20**	**8**	**26**	**12**	**26**	**14**	**26**	**14**
	10 undershoot	0 undershoot	14 undershoot	0 undershoot	14 undershoot	0 undershoot	14 undershoot	0 undershoot
	10 overshoot	8 overshoot	12 overshoot	12 overshoot	12 overshoot	14 overshoot	12 overshoot	14 overshoot
Number of Undershoot that is not expected to happen/Number of Overshoot that is not expected to happen (**FALSE**/Current = Down and Surprise = Undershoot, Current = Up and Surprise = Overshoot)	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007
	27	**16**	**21**	**12**	**21**	**10**	**21**	**10**
	12 undershoot	0 undershoot	8 undershoot	0 undershoot	8 undershoot	0 undershoot	8 undershoot	0 undershoot
	15 overshoot	16 overshoot	13 overshoot	12 overshoot	13 overshoot	10 overshoot	13 overshoot	10 overshoot
The percent of "Market reaction to the announcement"	**43%**	**33%**	**55%**	**50%**	**55%**	**58%**	**55%**	**58%**
Number of Undershoot that is expected to happen / Number of Overshoot that is expected to happen (**TRUE** / Market feedback = positive and Surprise = Undershoot, Market feedback = negative and Surprise = Overshoot	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007
	22	**9**	**25**	**12**	**26**	**15**	**26**	**13**
	12 undershoot	0 undershoot	12 undershoot	0 undershoot	14 undershoot	0 undershoot	14 undershoot	0 undershoot
	10 overshoot	9 overshoot	13 overshoot	12 overshoot	12 overshoot	15 overshoot	12 overshoot	13 overshoot
Number of Undershoot that is not expected to happen/Number of Overshoot that is not expected to happen (**FALSE**/Current = Down and Surprise = Undershoot, Current = Up and Surprise = Overshoot)	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007	2002-2005	2006-2007
	25	**15**	**22**	**12**	**21**	**9**	**21**	**11**
	10 undershoot	0 undershoot	10 undershoot	0 undershoot	8 undershoot	0 undershoot	8 undershoot	0 undershoot
	15 overshoot	15 overshoot	12 overshoot	12 overshoot	13 overshoot	9 overshoot	13 overshoot	11 overshoot
The percent of "Market reaction to the announcement"	**47%**	**38%**	**53%**	**50%**	**55%**	**63%**	**55%**	**54%**