İSTANBUL BİLGİ UNIVERSITY

INSTITUTE OF SOCIAL SCIENCES

FINANCIAL ECONOMICS MASTER'S DEGREE PROGRAM

# THE IMPACT OF CREDIT RATING ANNOUNCEMENTS ON THE BONDS YIELD SPREADS OF COMPANIES: A REVIEW OF TURKISH COMPANIES

HAKAN COŞKUN

115620009

ASSOC. PROF. SERDA SELİN ÖZTÜRK

İSTANBUL

2018

THE IMPACT OF CREDIT RATING ANNOUNCEMENTS ON THE BONDS YIELD SPREADS OF COMPANIES: A REVIEW OF TURKISH COMPANIES

KREDİ DERECELENDİRME ANONSLARININ ŞİRKETLERİN TAHVİL GETİRİ SPREAD'LERİ ÜZERİNDEKİ ETKİSİ: TÜRK ŞİRKETLERİ HAKKINDA YAPILAN İNCELEME

Hakan COŞKUN

115620009

**Tez Danışmanı :** Doç. Dr. Serda Selin ÖZTÜRK .....
İstanbul Bilgi Üniversitesi

**Jüri Üyeleri :** Doç. Dr. Ender DEMİR .....
İstanbul Medeniyet Üniversitesi

Dr. Öğr. Üyesi Fatma DİDİN SÖNMEZ .....
İstanbul Bilgi Üniversitesi

Tezin Onaylandığı Tarih : 12.06.2018

Toplam Sayfa Sayısı: 93

Anahtar Kelimeler

1) Kredi Derecelendirme Kuruluşları
2) Eurobond
3) OLS Regresyon
4) Logit Regresyon
5) Probit Regresyon

Keywords

1) Credit Rating Agencies
2) Eurobond
3) OLS Regression
4) Logit Regression
5) Probit Regression

## CONTENTS

## LIST OF ABBREVIATIONS

| | |
|---|---|
| CRA | Credit Rating Agency |
| S&P | Standard and Poors |
| OLS | Ordinary Least Squares |
| CDS | Credit Default Swaps |

## LIST OF TABLES

## ABSTRACT

The Impact Of Credit Rating Announcements on the Bonds Yield Spreads of Companies: A Review of Turkish Companies

Credit rating agencies make rating announcements as a result of reviews of countries or companies. These rating announcements are evaluated when investment decisions are taken by a large number of investors or companies on the market. Over the past several years, numerous studies have been undertaken that focus on measuring the impact of rating announcements made by credit rating agencies on bond yield spreads or bond prices issued by countries or companies. In this thesis, whether the rating announcements made by credit rating agencies have an effect on bond yield spreads has been examined by considering the Eurobonds issued by six Turkish companies. In our study, the effects of rating announcements on bond yield spreads between September 2012 and February 2018 were examined using Ordinary Least Suares (OLS) regression theory, Logit Regression Theory and Probit Regression Theory. According to the findings of our study, it was seen that the rating announcements did not have a significant effect on bond yield spreads in our analyzes using Logit Regression and Probit Regression models. However, in our analyzes using the OLS Regression model, it was found that both positive and negative rating announcements had statistically significant effect on bond yield spreads.



Keywords: Credit Rating Agencies, Eurobond, OLS Regression, Logit Regression, Probit Regression

# ÖZET

Kredi Derecelendirme Anonslarının Şirketlerin Tahvil Getiri Spread'leri Üzerindeki Etkisi: Türk Şirketleri Hakkında Yapılan İnceleme

Kredi derecelendirme kuruluşları, ülkeler veya şirketler hakkında gerçekleştirdikleri incelemeler sonucunda rating anonsları yapmaktadırlar. Bu rating anonsları, piyasada bulunan çok sayıda yatırımcı veya şirket tarafından yatırım kararları alınırken değerlendirilmektedir. Geçtiğimiz yıllarda, kredi derecelendirme kuruluşları tarafından yapılan rating anonslarının ülkeler veya şirketler tarafından ihraç edilen tahvil spread'leri veya tahvil fiyatları üzerindeki etkisini ölçmeye yoğunlaşan çok sayıda araştırma yapılmıştır. Bu çalışmada, kredi derecelendirme kuruluşları tarafından yapılan rating anonslarının tahvil getiri spread'leri üzerinde etkili olup olmadığı, altı Türk şirketi tarafından ihraç edilen Eurobond'lar dikkate alınarak incelenmiştir. Çalışmamızda, Ordinary Least Suares (OLS) regresyon teorisi, Logit Regresyon Teorisi ve Probit Regresyon Teorisi kullanılarak, yapılan rating anonslarının şirketlerin Eylül 2012 - Şubat 2018 tarihleri arasındaki tahvil getiri spread'leri üzerindeki etkisi incelenmiştir. Çalışma sonucunda elde ettiğimiz bulgulara göre, Logit Regresyon ve Probit Regresyon modelleri kullanılarak gerçekleştirdiğimiz incelemelerde, rating anonslarının tahvil getiri spread'leri üzerinde anlamlı etki yaratmadığı görülmüştür. Ancak, OLS regresyon modelini kullanarak yaptığımız analizlerde, hem pozitif yönlü rating anonslarının hem de negatif yönlü rating anonslarının tahvil getiri spread'leri üzerinde anlamlı istatistiki etki yarattığı tespit edilmiştir.

Anahtar Kelimeler: Kredi Derecelendirme Kuruluşları, Eurobond, OLS Regresyon, Logit Regresyon, Probit Regresyon

# CHAPTER 1

## INTRODUCTION

Credit rating, in essence, consists of opinions about a borrower's credit risk. For example, Standard & Poor's (S&P) defines ratings as "Debtors' willingness to fulfill their financial obligations on time and repayment power". The issue of rating may be a state, a company or an exported financial asset.

Credit rating is a tool that investors can use to make more informed decisions about the investment they want to make. Rating assessments made by credit rating agencies are an independent opinion. Rating agencies' views and rating grades do not guarantee that an investment will be repaid or defaulted.

In rating announcements made by credit rating companies, each agency implements its own methodology and uses a specific rating scale. Accordingly, agencies use a variety of letter grades to convey their views on credit risk. For example, while S&P and Fitch use letter grades ranging from "AAA" to "D", Moody's uses letter grades ranging from "Aaa" to "C", unlike the other two rating agencies.

There are various beneficiaries of rating assessments made by credit rating agencies (CRA). Investors can use credit ratings to assess the risks they may face when making investment decisions. Intermediary institutions assist investors in securing cash flow for issuers of securities. In this context, they can use credit ratings during the execution of their intermediary activities. Issuers use creditworthiness and credit quality to independently view debt problems. Apart from these, businesses and financial institutions, especially in credit sensitive transactions, can use credit ratings to evaluate counterparty risk. This can help in determining the risk that the parties will be able to fulfill their obligations under the agreements (Guide to credit rating Essentials, S&P).

Credit rating agencies use various symbols to show the creditworthiness and credit quality of the company they are evaluating. Below is a summary table of the symbols used by Standard and Poors and their meanings.

**Table 1.1 Rating Symbols and Their Meanings**

| | | |
|---|---|---|
| Investment Grade | AAA | Extremely strong capacity to meet financial commitments. Highest rating |
| | AA | Very strong capacity to meet financial commitments |
| | A | Strong capacity to meet financial commitments, but somewhat susceptible to adverse economic conditions and changes in circumstances |
| | BBB | Adequate capacity to meet financial commitments, but more subject to adverse economic conditions |
| | BBB- | Considered lowest investment-grade by market participants |
| Speculative Grade | BB+ | Considered highest speculative-grade by market participants |
| | BB | Less vulnerable in the near-term but faces major ongoing uncertainties to adverse business, financial and economic conditions |
| | B | More vulnerable to adverse business, financial and economic conditions but currently has the capacity to meet financial commitments |
| | CCC | Currently vulnerable and dependent on favorable business, financial and economic conditions to meet financial commitments |
| | CC | Highly vulnerable; default has not yet occurred, but is expected to be a virtual certainty |
| | C | Currently highly vulnerable to non-payment, and ultimate recovery is expected to be lower than that of higher rated obligations |
| | D | Payment default on a financial commitment or breach of an imputed promise; also used when a bankruptcy petition has been filed or similar action taken |

Source: Guide to credit rating essentials, S&P

Investment grade level refers to bonds and other debt securities that are offered as eligible investments for bank regulators and financial institutions. This

term is used to indicate those with relatively high creditworthiness and credit quality. Conversely, speculative grade refers to securities with significant uncertainties, such as adverse financial conditions that often have an issuer's ability to repay, but may affect its creditworthiness.

As seen in the table above, the institutions with credit ratings of "BBB-" and above are rated at the investment grade level, while those with credit ratings lower than "BBB-" are classified as speculative grade.

Numerous studies have been undertaken that examine the rating announcements made by credit rating agencies impact on the bond yield spreads or bond price issued by countries or companies.

Cantor and Packer (1996), investigated the relationship between the grades of 35 countries rated by S&P and Moody's, and the relationship between the dollar-denominated most active Eurotahvillers and the US government bonds. They found that the rating announcements were much stronger on the spreads below the investment grade. Guillermo Larraín, Helmut Reisen and Julia von Maltzan (1997), assessed whether the leading two rating agencies have caused rating announcements to lead to market events. Positive rating events have been achieved as a result of the fact that they do not have a significant impact on dollar bond spreads. Amadou N. R. Sy (2001), show that credit rating agencies' rating changes on the spreads are inversely related, suggesting that the spreads rise is seen one month after the rating downgrades, while the spreads decrease is seen after three months from the rating note change. Stainer and Heinke (2001), have investigated that daily German Eurobond spreads whether related to watchlists and credit rating changes announced by Standard & Poor's and Moody's. In this study, it was observed that downgrade the rating or taking the negative ratings led to significant changes in the bond prices, while the increase in the rating grades or the positive watchlist did not cause a significant change in the bond price.

In our study, it was examined whether the rating announcements made by the three major credit rating agencies(Moody's, Standard and Poors, Fitch) had an effect on the bond yield spreads issued by the six companies.

Five of these companies are in the Turkish financial sector and one is in the telecommunications sector. The companies whose bond spreads are examined are listed below.

- Akbank
- Garanti Bankası
- Yapı ve Kredi Bankası
- Türkiye Vakıflar Bankası
- Türkiye İş Bankası
- Türk Telekom

In our work, corporates bonds with 10-year maturities issued by such companies were examined. Eurobonds were selected as the bond type. The reason for is that Eurobonds are securities issued to foreign investors. Another reason is that, Eurobonds are securities issued in foreign currency. Therefore, all rating announcements made by credit rating agencies were not taken into consideration for the companies we included in our sample. Instead, announcements made by rating agencies were analyzed taking into account only the foreign currency.

For each of the above listed companies, rating announcements made by credit rating agencies were taken into account and the effectiveness of the announcements on the spreads was measured. For this, it was assigned numeric values for the letters which use from credit rating agencies to the rating grades. Numerical values indicating rating grades and outlook changes are given below.

**Table 1.2 Numerical Rating Scale**

| Credit Rating | Numerical Value |
|---|---|
| AAA | 17 |
| AA+ | 16 |
| AA | 15 |
| AA- | 14 |
| A+ | 13 |
| A | 12 |
| A- | 11 |
| BBB+ | 10 |
| BBB | 9 |
| BBB- | 8 |
| BB+ | 7 |
| BB | 6 |
| BB- | 5 |
| B+ | 4 |
| B | 3 |
| B- | 2 |
| CCC+ to CCC- | 1 |
| Below CCC- | 0 |
| SD (Selective Default) | -1 |
| | |
| **Credit Outlook** | **Linear transformation** |
| Positive | 0,5 |
| Positive Watch | 0,25 |
| Stable | 0 |
| Negative Watch | -0,25 |
| Negative | -0,5 |

Source: Ismailescu and Kazemi, 2010

We provided the dataset for the bond yield spreads of the companies we included in our sample through Bloomberg. This dataset contains the spread values of companies between 07.09.2012 - 20.02.2018.

Three different regression models were used in our study. These are Logit Regression Model, Probit Regression Model and Ordinary Least Squares (OLS) Regression Model. First, a regression model was created by specifying one variable as the explanatory variable. Accordingly, we have used logit regression, probit regression, OLS regresion analysis, and have been investigated rating

announcements made for each company and whether a statistical effect on bond yield spreads. Secondly, a regression model was created by specifying two variable as the explanatory variable. As in the one variable model, we tried to analyze the results using logit regression, probit regression and OLS regression models in two variable models.

The regression models that we applied in our study, which are the logit regression and probit regression, we determined that the rating announcements made by the CRA's did not have statistical effect on the bond yield spreads. Logit and probit regression models did not give meaningful results in both one-variable and two-variable models as explanatory variables. However, in the analyzes that we have used the OLS regression model, we found that in the models where the explanatory variable was both one variable and two variable, rating announcements are statistically significant effect on bond yield spreads. This impact was seen when some rating agencies were upgrade the rating grades, and also some rating agencies were downgrade the rating grades.

Unlike other studies, this study has been conducted on bonds issued by companies operating in Turkey. When examined other studies on Turkey, it is observed mostly investigated the impact of credit rating announcements on government bonds. Since there is no study to measure the effect of credit rating announcements on the bond yield spreads issued by Turkish companies, with our work we think we can contribute in addition to other studies in the literature.

The next sections of the thesis are as follows. The literature summary of past studies on the relationship between rating announcements made by credit rating agencies and bond spreads is explained in Chapter 2. Data and regression models created about analysis are in the Chapter 3 of the study. The results of the analyzes using probit regression model, logit regression model and OLS regression model are presented in Chapter 4 of our study. In Chapter 5, there is information about the interpretation of the findings we have obtained as a result of the study.

# CHAPTER 2

# LİTERATURE REVİEW

This section contains a summary of the literature that measures the impact of rating announcements made by credit rating agencies on bond yields.

Cantor and Packer (1996), investigated the relationship between the rating grades of 35 countries rated by S&P and Moody's, and the relationship between the dollar-denominated most active Eurotahvillers and the US government bonds of the same term. According to the results of the panel data analysis, the rating yield of the rating grades was found to be 92%. They found that the rating note announcements were much stronger on the spreads below the investment note.

They show that country grades effectively summarize and add to the information contained in macroeconomic indicators and are therefore strongly associated with market-determined credit spreads.

Guillermo Larraín, Helmut Reisen and Julia von Maltzan (1997), assessed whether the leading two rating agencies have caused rating announcements to lead to market events. In this context, the daily response of government bond spreads to announcing rating changes is examined and the ratings between 1987 and 1996 are taken into account. Negative rating announcements were seen to be effective after the rating change, as investors had a tendency to redirect portfolios. Positive rating events have been achieved as a result of the fact that they do not have a significant impact on dollar bond spreads.

Amadou N. R. Sy (2001), has been following the market and rating agencies' views on emerging markets and using rating data for 17 emerging market countries. According to this, credit rating agencies' rating changes on the spreads are inversely related, suggesting that the spreads rise is seen one month after the rating note drops, while the spreads decrease is seen after three months from the rating note change.

Andrea Resti and Andrea Simon (2005), investigated that the 7.232 Eurobond spreads issued between 1991 and 2003 in order to estimate the spread and assess the risk rating relationship. According to this, when the credit rating grade is downgraded, the rating grade and spreads relation are very strong.

Stainer and Heinke (2001), have investigated that daily German Eurobond spreads whether related to watchlists and credit rating changes announced by Standard & Poor's and Moody's. In this study, it was observed that downgrade the rating or negative watchlist led to significant changes in the bond prices, while the increase in the rating grades or the positive watchlist did not cause a significant change in the bond price. After the credit rating downgrade, it was seen that institutional investors caused stronger price reactions if Eurobond went below the investment grade.

Grier and Katz (1976), investigated that the semistrong efficient of the bond market. He had been conducted event-oriented analyzes to test the conformity of bond price behavior to the standards recommended by the semistrong effective market hypothesis. According to Grier and Katz, productive information is instantaneously absorbed in a market. Bond grade exchange also has an important place in new information. Accordingly, they show that new information is not absorbed momentarily, but that grading is a gradual and continuous adjustment for a significant period of time after the change. This is because, in the case of industrial bonds, it is more pronounced than in public utility bonds.

Hand, Holthausen and Leftwich (1992), examined the effects of bond rating changes, explained by S&P and Moody's, on bond price and stock return. In this study, two types of rating announcements were examined. They examined the S&P 250 credit monitoring announcement and the approximately 1,100 bond rating announcement by Moody's and S&P. Asymmetric results have been seen according to whether the credit rating grade has downgrade or upgrade. For example, after the credit rating downgrade, excess negative bond and stock returns occurred. However, after the announcement of a positive rating change, weaker excess bonds

and stocks returns were occurred. In spite of these inconsistencies, generally seen that, credit rating changes were effect to both on bond yield and stock return.

Wansley, Glascock and Clauretie (1992), has examined that the price effect on bond issues included in the Merrill Lynch Institutional Bond Pricing Service re-rated by Standard and Poor's between January 1982 and December 1984. In the aforementioned study, the bonds had a strong negative return reaction against the credit rating downgrades. Although the reaction was negative by three weeks before the announcement made by Standard and Poor's, it was seen that the grading was on the change week. The downgrade in bonds ratings came to the conclusion that if the bond falls below the non-investment class, it was affected the price of the bond. In addition, it has been determined that there is no change in the bond price against the increase in the bond rating scale in the study.

Steven Katz (1974), tested the effectiveness of the bond market by developing an event-oriented procedure. The price adjustment process has been examined according to the classification grades of the bonds. According to this, it is determined that there is no expectation before the announcement of the reclassification to the public, and after the classification after the credit rating announcement, the price correction is performed completely within 6-8 weeks.

Kliger and Sarig (2000) examined the bond, stock and option prices observed before and after the Moody's credit rating change, and found that the credit rating information is valuable. After Moody's exchange of notes, bond prices have been adjusted to new information. It also showed that stock prices of fine-rated firms are moving in line with credit rating changes.

Anthony D. May (2008) had investigated the impact of the credit rating changes on the bond market using transaction data from over the counter corporate bond market. In current studies, event windows are changing from one week to one month, while two-day event window is used in the study. Previous studies have been made on the stock market, only the credit rating agencies have an impact on the stock price of his note downgrade. However, in this study, both downgrades and

upgrades credit rating changes have affected the corporate bond market. The fact that there was a negative bond yields before the note downgrades had occurred showed that the market expectation was in this direction and reacted poorly to note exchange. In addition, bond prices of companies with low credit rating scores reported a stronger reaction to downgrades. Besides, it has been determined that firms with credit ratings below the investment grade have a strong reaction to the bond price if the rating grade is raised to an investment grade.

Afonso, Furceri and Gomes (2011), conducted a review of the reaction of government bond yield spreads before and after announcements made by credit rating agencies using European Union government bond yields. In this paper, they was conducted an activity study on bond yields and CDS (Credit Default Swaps) spreads between 1995-2010. Accordingly, rating notices of the three major credit rating agencies are taken into consideration. In this context, both the credit rating notations and outlook changes were found to have a significant impact on the government bond yield spreads. Additionally, the negative impact of rating announcements on return spreads was determined to be stronger than positive ratings announcements. In addition, although it is not predictable 1 or 2 months before the credit rating announcements, it is seen that there is a bi-directional causality between the sovereign rating and spreads in the 1-2 week period.

Helmut Reisen and Julia von Maltzan (1999), investigated the relationship between sovereign ratings and bond yields. In this study, the impact of bond rating announcements of three major rating agencies (Moody's, S&P, Fitch) on the bond yield between 1989-1997 was evaluated. They used the Granger-casuality test to determine the degree of change in the credit rating grades caused by the spreads. Accordingly, it was seen that the upgrades made by the three rating agencies and the downgrades had a significant effect on bond yield spreads.

Gande and Parsley (2003), examined the impact of sovereign ratings on the bond yield spreads of countries between 1991-2000. The main aim of the study is to measure the impact of countries' credit rating changes on markets. It has been seen that the change in the credit rating of an individual country has a significant

effect on the credit spreads of other countries. It has been determined that this effect is asymmetrical. Positive ratings announcements have been observed to have no effect on the return spreads of other countries. However, findings have been obtained that negative rating announcements increase the bonds return spreads of other countries. As a result, when a rating note of a government bond downgrade one percentage point, while bond yield spreads of the other countries increased by an average of 12 basis point.

Hite-Warga (1997), examined the price change response on industrial bonds Moody's and S&P's credit rating changes. In this study, the changes between 1985-1995 were analyzed. Accordingly, price changes that occurred within 12 months and 12 months after the announcement date of the rating agencies were evaluated. Companies with credit rating grades downgrade had seen significant effect to announcements both during the month and before the months the announcements were made. These effects were determined to be stronger, as the credit rating scale progressed from the investment grade to the non-investment grade. Nevertheless, it has been determined that the increase in the credit rating grade has a weak impact on bond price changes.

Kaminsky and Schmukler (2002) investigated the cross-country and cross-security spillover effects of credit rating agencies' rating announcements. In this context, they have examined 16 emerging economies. In this study, it was observed that a downgrade in the credit rating grade or outlook, bond yield spreads increased by an average of 2 percentage points, and stock prices decreased by 1 percentage point. Outlook changes have been found to be at least as effective as credit rating changes. However, a change in the bond rating of a developing country has been found to affect bond yield spreads and changes in stock returns of other emerging economies.

# CHAPTER 3

# DATA AND METHODOLOGY

## 3.1. DATA

In this study, analyzes were conducted in order to determine whether rating announcements made by credit rating agencies on Turkish companies affect the yield spreads of Eurobonds issued by companies. Within the scope of implementation, six companies of ten-year Eurobonds were examined. These companies are, respectively:

Akbank

Garanti Bankası

Türkiye İş Bankası

Yapı ve Kredi Bankası

Türkiye Vakıflar Bankası

Türk Telekom

Only one of the Eurobonds issued by the listed companies has been included in the dataset. In other words, six Eurobonds yield spreads issued by six companies in total were examined. Because of Eurobonds are offered to international investors, we have been chosen this corporate bonds in order to support our work.

The dataset for daily changes in Eurobond yield spreads were obtained from the Bloomberg data pool. When the dataset was created, the spreadsheet information between September/2012 and February/2018 dates was examined. We have composed 6 Eurobonds issued by the corporates in the dataset. Among the corporate bonds which we constructed the data; Akbank, Garanti Bankası, Türkiye Vakıflar Bankası, Yapı ve Kredi Bankası and Türkiye İş Bankası eurobonds had been issued in 2012 while Türk Telekom' eurobond were issued in 2014. All

eurobonds of companies we have selected to examine spreads have been issued with a maturity of 10 years.

In this study, analyzing bond yield spreads, the spread value for the day when the credit rating announcement was made(t time) and the spread values for the day before the credit rating announcement(t-1 time) were taken into account.

When the dataset is generated, all daily return spreads between 07.09.2012-20.02.2018 are converted to logarithmic returns. Return series are calculated as specified in the formula below.

$$Ret = ln\frac{Pt}{Pt-1}$$

where: $P_t$ denotes the bond spreads at the end of day t

The reason for using return data instead of spread data is to determine the direction of spread movements. According to this, if the return value is positive, the value of the dependent variable is defined as 1. If the return value is equal to 0 or negative, the value of the dependent variable is defined as 0.

Thus, we attempted to analyze the value change realized in the bond returns spreads on the day of the announcement, and the day before the announcement day of the rating organization by the values we determined (0,1).

After converting the bond return spreads to the logarithmic return series, the three rating agencies assigned a value to the dataset according to the rating announcement that each company made. If credit rating agencies have changed the rating grade or outlook of a company's foreign currency rating, an equivalent value assignment was made to the dataset. The S&P, Moody's and Fitch rating announcements are independently processed in the dataset so that each rating agency's ratings announcement can be evaluated separately. Accordingly, if there is no rating announcement for a company, the data set is assigned a value of 0 for that day. If there is a rating announcement, and a rating change or a change of outlook is made in this announcement, the rating change for that day is assigned according to the rating table.

Apart from that, in order to evaluate simultaneously, whether each rating announcement has a positive or negative effect on the bond yield spreads, the value of the bond yield spreads has been defined, according to the increase or decrease in the credit rating of the rating announcement.

The points given in the rating grades of the credit rating agencies are mentioned in the introduction part of the study. S&P, Moody's and Fitch can either change the credit rating of the company as a result of their work on the company or change the rating not only to positive or negative outlook. In our work, examples of how value measurement is done if the rating announcement is a resultant rating change or an outlook change have below.

- If credit rating agencies (Fitch) downgrade the credit rating for a company specified in foreign currency from "BBB +" to "BBB", the rating score is 1 point lower.
- If the foreign currency denominated credit rating "BBB +" and the outlook of a stable company is changed from a stable to a positive or negative stance by keeping the credit rating the same, the rating value is increased or decreased by 0.5 points, respectively.

We have taken into consideration the rating announcements by credit rating agencies made between 2012 and 2018 for each of the companies we have included in our sample. In the date interval, only Fitch and Moody's have been evaluated for Akbank and only Fitch and S&P have been evaluated for Turk Telekom. For the companies outside it, it is seen that three rating agencies have also evaluated.

All rating announcements by credit rating agencies about companies are not included in our data. It was included in our data solely the rating announcements of corporates about long-term foreign currency credit/issuer default ratings or outlook. Thus, we think that for Eurobonds issued in foreign currencies, we can estimate whether or not the rating changes are significant.

The summary information on credit rating announcements made by Moody's, S&P and Fitch between 2012-2018 is given below.

### 3.1.1. Garanti Bankası Credit Rating Announcements:

**Table 3.1 Rating Announcements of Garanti Bankası**

| Corp. | Date | Change Rating/Outlook |
|---|---|---|
| S&P | 22.09.2017 | The long-term foreign currency debt rating affirmed at BB, outlook changed to negative from stable. |
| Fitch | 8.06.2017 | The long term foreign currency issuer default ratings at "BBB-" and outlook at stable affirmed. |
| Moodys | 20.03.2017 | The long-term foreign currency debt rating affirmed at "Ba2", the outlook changed to negative from stable. |
| Fitch | 02.02.2017 | The long term foreign currency issuer default ratings downgrade from "BBB" to "BBB-", the outlook changed to stable from negative |
| S&P | 31.01.2017 | The long-term foreign currency debt rating affirmed at BB, the outlook to negative from stable. |
| S&P | 4.11.2016 | The long-term foreign currency debt rating affirmed at BB, the outlook to stable from negative. |
| Moodys | 26.09.2016 | The long-term foreign currency debt rating downgraded to Ba1 from Baa3, with a stable outlook. |
| Fitch | 25.08.2016 | The long-term foreign currency debt rating affirmed at BBB, the outlook to negative from stable. |
| S&P | 20.07.2016 | The long-term foreign currency debt rating downgraded to BB from BB+, the outlook to negative from stable. |
| Moodys | 19.07.2016 | Negative watch list. |
| Fitch | 08.06.2016 | The long-term foreign currency debt rating affirmed at BBB and the outlook stable. |
| Moodys | 10.05.2016 | There is no change. |
| S&P | 6.05.2016 | The long-term foreign currency debt rating affirmed at BB+, the outlook to stable from negative. |
| Moodys | 28.09.2015 | The long-term foreign currency debt rating affirmed at Baa3. |
| S&P | 07.08.2015 | The long-term foreign currency debt rating affirmed at BB+ and the outlook negative. |
| Fitch | 31.07.2015 | The long-term foreign currency debt rating upgrade to BBB from BBB-. |
| Fitch | 16.06.2015 | The long-term foreign currency debt rating affirmed at BBB-. |
| Fitch | 01.12.2014 | The long term foreign currency issuer default rating taken the positive watchlist. |
| Fitch | 24.06.2014 | The long-term foreign currency debt rating downgrade to BBB- from BBB. The outlook affirmed stable. |
| Moodys | 3.06.2014 | The long-term foreign currency debt rating affirmed at Baa3. The outlook change to negative from stable. |

**Table 3.1 Continued**

| | | |
|---|---|---|
| Moodys | 18.03.2014 | Negative watch list. |
| S&P | 11.02.2014 | The outlook to negative from stable. |
| Moodys | 16.05.2013 | The long-term foreign currency debt rating upgrade to Baa3 from Ba2. |
| S&P | 5.04.2013 | The long-term foreign currency debt rating upgrade to BB+ from BB. The outlook affirmed stable. |
| Fitch | 14.12.2012 | The long-term foreign currency debt rating upgrade to BBB from BBB-. |

When credit rating agencies had reviewed about Garanti Bankası, it is observed that they had made 25 announcements. In these announcements indicate that the credit ratings of the company were upgraded in 4 times, and the credit ratings were downgraded in 4 times, and the outlook of 12 times was changed to negative or positive.

As a result of the review of the rating announcements, the company credit rating was once reduced to the non-investment grade level, and once increased from the non-investment grade level to the investment grade level. In other announcements, rating changes have been made within the same investment level.

### 3.1.2. Akbank Credit Rating Announcements:

**Table 3.2 Rating Announcements of Akbank**

| Corp. | Date | Change Rating/Outlook |
|---|---|---|
| Fitch | 08.06.2017 | Grades affirmed. |
| Moodys | 17.03.2017 | The long-term foreign currency debt rating affirm at Ba2. The outlook changed to negative from stable. |
| Fitch | 02.02.2017 | The long-term foreign currency debt rating downgrade to BB+ from BBB-. |
| Moodys | 26.09.2016 | Grades affirmed. |
| Moodys | 26.09.2016 | The long-term foreign currency debt rating downgrade to Ba2 from Baa3. The outlook affirmed stable. |
| Fitch | 25.08.2016 | The outlook changed to negative from stable. |
| Fitch | 05.08.2016 | Grades affirmed. |
| Moodys | 19.07.2016 | Grades affirmed. |

**Table 3.2 Continued**

| | | |
|---|---|---|
| Moodys | 19.07.2016 | Negative watchlist. |
| Fitch | 10.06.2016 | Grades affirmed. |
| Fitch | 15.10.2015 | Grades affirmed. |
| Moodys | 02.10.2015 | Grades affirmed. |
| Fitch | 16.06.2015 | Grades affirmed. |
| Fitch | 28.11.2014 | Grades affirmed. |
| Fitch | 24.06.2014 | The long-term foreign currency debt rating downgrade to BBB- from BBB. |
| Moodys | 3.06.2014 | The long-term foreign currency debt rating affirmed at Baa3. The outlook changed to negative from stable. |
| Moodys | 18.03.2014 | Negative watchlist. |
| Moodys | 20.05.2013 | The long-term foreign currency debt rating upgrade to Baa3 from Ba2. |
| Fitch | 14.12.2012 | The long-term foreign currency debt rating upgrade to BBB from BBB-. |
| Moodys | 03.07.2012 | The long-term foreign currency debt rating downgrade to Ba2 from Ba3. |
| Fitch | 24.11.2011 | The long-term foreign currency debt rating outlook to stable from positive. |

When credit rating agencies are examined by their rating announcements about Akbank, it is observed that it has made 21 announcements. These announcements indicate that 2 times credit rating grades have been upgraded, and 4 times credit rating grades have been downgraded, and the outlook of 6 times of them was changed to negative or positive.

As a result of the review of the rating announcements, Akbank credit rating grade has been downgraded to the level of the investment grade twice, and once increased from the non-investment grade level to the investment grade level. In other announcements, rating changes have been made within the same investment level.

### 3.1.3. Türkiye Vakıflar Bankası Credit Rating Announcements:

**Table 3.3 Rating Announcements of Türkiye Vakıflar Bankası**

| Corp. | Date | Change Rating/Outlook |
|---|---|---|
| Fitch | 04.10.2017 | Grades affirmed. |
| Fitch | 04.10.2017 | Grades affirmed. |
| Moodys | 20.03.2017 | The outlook changed to negative from stable. |
| S&P | 31.01.2017 | The outlook changed to negative from stable. |
| Fitch | 02.02.2017 | The long-term foreign currency debt rating downgrade to BB+ from BBB-. |
| Moodys | 26.09.2016 | The long-term foreign currency debt rating downgrade to Ba1 from Baa3. |
| S&P | 22.07.2016 | The long-term foreign currency debt rating downgrade to BB from BB+. The outlook changed to negative from stable. |
| Moodys | 19.07.2016 | Negative watchlist. |
| Fitch | 5.01.2015 | Grades affirmed. |
| Moodys | 3.06.2014 | The outlook changed to negative from stable. |
| Moodys | 18.03.2014 | Negative watchlist. |
| Fitch | 12.11.2013 | Grades affirmed. |
| S&P | 5.04.2013 | The long-term foreign currency debt rating upgrade to BB+from BB. |
| Fitch | 13.11.2012 | The long-term foreign currency debt rating upgrade to BBB- from BB+. |

When the rating announcements of the credit rating agencies about Türkiye Vakıflar Bankası were examined, 14 announcements were observed. The announcements indicate that the company credit rating grades were upgraded 2 times, and the credit rating grades were downgraded 3 times, and 6 times the outlook was changed to negative or positive.

As a result of the review of the rating announcements, the Türkiye Vakıflar Bankası credit rating grade was once downgraded below the investment grade level, and once upgraded from the non-investment grade level to the investment grade level. In other announcements, rating changes have been made within the same investment level.

### 3.1.4. Yapı ve Kredi Bankası Credit Rating Announcements:

**Table 3.4 Rating Announcements of Yapı ve Kredi Bankası**

| Corp. | Date | Change Rating/Outlook |
|---|---|---|
| Fitch | 08.06.2017 | Grades affirmed. |
| Moodys | 20.03.2017 | The outlook change to negative from stable. |
| Fitch | 02.02.2017 | The long term foreign currency issuer default ratings downgraded to BBB- from BBB. The outlook change to stable from negative. |
| S&P | 31.01.2017 | The outlook change to negative from stable. |
| S&P | 09.11.2016 | The outlook change to stable from negative. |
| Moodys | 26.09.2016 | The long-term foreign currency debt rating downgraded Ba1 from Baa3. The outlook is stable. |
| S&P | 20.07.2016 | The long-term foreign currency debt rating downgraded to BB from BB+. The outlook change to negative from stable. |
| Moodys | 19.07.2016 | Negative watchlist. |
| Fitch | 08.06.2016 | Grades affirmed. |
| S&P | 10.05.2016 | The long-term foreign currency debt rating affirmed at BB+. The outlook change to stable from negative. |
| Fitch | 31.03.2016 | The long-term foreign currency debt rating affirmed at BBB. The outlook change to negative from stable. |
| Fitch | 1.04.2015 | The long-term foreign currency debt rating affirmed at BBB. The outlook change to stable from negative. |
| Fitch | 24.06.2014 | The long-term foreign currency debt rating affirmed at BBB. The outlook change to negative from stable. |
| Moodys | 3.06.2014 | The outlook change to negative. |
| Moodys | 28.03.2014 | Senior Unsecured Debt rating was downgraded to Baa3 from Baa2 |
| Moodys | 18.03.2014 | Negative watchlist. |
| S&P | 11.02.2014 | The outlook change to negative from stable. |
| Moodys | 20.05.2013 | Grades affirmed. |
| Moodys | 2.05.2013 | Grades affirmed. |
| S&P | 5.04.2013 | Grades affirmed. |
| Fitch | 14.12.2012 | The outlook change to stable from negative. |
| Fitch | 13.11.2012 | The long-term foreign currency debt rating upgraded to BBB from BBB-. The outlook change to negative from stable. |

When credit rating agencies review their rating announcements about the Yapı ve Kredi Bankası, 22 announcements were made. The announcements indicate that once the credit rating grades has been upgraded, the credit rating grades are

downgraded by 4 times, and the outlook of 15 times has been changed to negative or positive.

All of the notes changes that have been made as a result of rating announcements by credit rating agencies about Yapı ve Kredi Bankası, the rating grades remain at the same investment level.

### 3.1.5. Türkiye İş Bankası Credit Rating Announcements:

**Table 3.5 Rating Announcements of Türkiye İş Bankası**

| Corp. | Date | Change Rating/Outlook |
|---|---|---|
| Fitch | 08.06.2017 | Grades affirmed. |
| Moodys | 20.03.2017 | The outlook change to negative from stable. |
| Fitch | 02.02.2017 | The long-term foreign currency debt rating downgraded to BBB- from BB+. The outlook change to stable from negative. |
| S&P | 31.01.2017 | The outlook change to negative from stable. |
| S&P | 08.11.2016 | The outlook change to stable from negative. |
| Moodys | 26.09.2016 | The long term foreign currency issuer default ratings downgraded to Ba1 from Baa3. The outlook change to stable. |
| Fitch | 25.08.2016 | The outlook change to negative from stable. |
| S&P | 22.07.2016 | The long-term foreign currency debt rating downgraded to BB from BB+. |
| Moodys | 19.07.2016 | Negative watchlist. |
| Moodys | 29.09.2015 | Grades affirmed. |
| Fitch | 01.12.2014 | Grades affirmed. |
| Fitch | 24.06.2014 | The long-term foreign currency debt rating downgraded to BBB- from BBB. |
| Moodys | 03.06.2014 | The long term foreign currency issuer default ratings downgraded to Baa3 from Baa2. The outlook change to negative. |
| Moodys | 18.03.2014 | Negative watchlist. |
| S&P | 11.02.2014 | The outlook change to negative from stable. |
| Moodys | 20.05.2013 | Grades affirmed. |
| S&P | 05.04.2013 | The long-term foreign currency debt rating upgraded to BB+ from BB. |
| Fitch | 14.12.2012 | The long-term foreign currency debt rating upgraded to BBB from BBB-. |

When credit rating agencies had reviewed about Türkiye İş Bankası, it is observed that they had made 18 announcements. The announcements indicate that the credit rating grade was upgraded twice, and the credit ratings were downgraded in 5 times, and the outlook of 10 times was changed to negative or positive.

As a result of the review of the rating announcements, the Türkiye İş Bankası credit rating grades was once reduced below the investment grade level. In other announcements, rating changes have been made within the same investment level.

### 3.1.6. Türk Telekom Credit Rating Announcements:

**Table 3.6 Rating Announcements of Türk Telekom**

| Corp. | Date | Change Rating/Outlook |
|---|---|---|
| S&P | 22.12.2017 | Grades affirmed. |
| Fitch | 10.08.2017 | Grades affirmed. |
| S&P | 10.08.2017 | Grades affirmed. |
| Fitch | 01.02.2017 | Grades affirmed. |
| S&P | 01.02.2017 | The outlook change to negative from stable. |
| S&P | 10.11.2016 | The outlook change to stable from negative. |
| Fitch | 25.08.2016 | The outlook change to negative from stable. |
| S&P | 19.08.2016 | Grades affirmed. |
| S&P | 22.07.2016 | The outlook change to negative from stable. |
| Fitch | 27.06.2016 | Grades affirmed. |
| S&P | 11.05.2016 | The outlook change to stable from negative. |
| S&P | 10.08.2015 | Grades affirmed. |
| Fitch | 30.06.2015 | Grades affirmed. |
| Fitch | 13.11.2014 | Grades affirmed. |
| S&P | 24.07.2014 | The long-term foreign currency debt rating upgraded to BBB- from BB+. The outlook is negative. |

When the rating announcements made by credit rating agencies about Türk Telekom were examined, it is observed that 15 announcements were made. The announcements indicate that once a credit rating grades have upgraded, the outlook has changed to negative or positive for 5 times.

As a result of the review of the rating announcements, the Türk Telekom credit rating grade was once increased from the non-investment grade level to the investment grade level. In other announcements, note changes have been made within the same investment level.

## 3.2. METHODOLOGY

### 3.2.1. Theoretical Logit Model

Logit model, is a regression type where the dependent variable is categorical. According to this; output can only take two values. The logit model is used to estimate the probability of a binary response based on one or more interpreter variables. The model is a probability model, not a classifier.

In logistic regression analysis, which is a nonparametric statistical method, the dependent variable is always used as the least significant binary variable. However, the independent variables in the model are mostly continuous. When the logit regression dependent variable is categorically observed in the binary and triple categories, the cause-effect relationship is determined by explanatory variables. By using this method, the effects of the explanatory variables on the dependent variable are calculated as probabilities. (Ege ve Bayrakdaroğlu, 2009)

The Logit model is derived as follows;

$$P_i = E(Y = 1)(X_i) = \frac{1}{1 + e - (\beta_0 + \beta_1 X_i)}$$

### 3.2.2. Theoretical Probit Model

Probit model, is a regression type in which the dependent variable can only take two defined values. The purpose of the model is a binary classification model that estimates the likelihood of an observation having certain characteristics to enter a certain part of the categories and classifies observations according to predicted probabilities.

Probit model is based on utility theory and rational choice theory. The model benefits from cumulative normal distribution function. (Cebeci, İpek, 2009) Assuming that x has normal distribution with μ average and σ² variance, the cumulative normal distribution function for that variable is expressed as follows:

$$F(x) = \int_{-\infty}^{x_0} \frac{1}{\sqrt{2\pi\sigma}} e^{-(x-\mu)\frac{2}{2\sigma^2}}$$

In this formula, $x_0$ is defined as a specific value of x.

The probit model assumes that the y-dependent variable is not normally distributed into two values, whereas the logit model assumes that this variable is based on logistic curves. From these models, the logit model is more widen than the probit model of the logistic cumulative distribution function. (Cebeci, İpek, 2009)

### 3.2.3. Theoritical Ordinary Least Squares Model

Ordinary least squares regression model is a widely used linear model analysis with its use in various forms (correlation, multiple regression, etc.). If the dependent variable has a binary result, an analyst may choose to use OLS, logistic, or probit regression. OLS and logistic regression are among the most used models for the analysis of binary outcomes. The logistic regression estimates the probability of a result being realized. Value assignments are made to indicate the occurrence of a result. Accordingly, a value of 1 is assigned when a result occurs, and a value of 0 is assigned if the result does not occur. OLS is able to provide the predicted values beyond the specified value range. However, the analysis can still be helpful for classification and hypothesis testing. (Pohlmen and Leitner, 2003)

Ordinary least squares model shows the relationship between dependent variables and independent variables. The value of the dependent variable is defined as a linear combination of the independent variable and an additional error term.

The OLS procedure minimizes the sum of squared residuals. The theoretical regression model;

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \cdots + \beta_k X_{ip} + \mathcal{E}_i$$

In the equation, where $Y_i$ is case i's value on the outcome variable, $\beta_0$ is the regression constant, $X_{ij}$ is case i's score on the jth of p predictor variables in the model, $\beta_j$ is predictor j's partial regression weight, and $\varepsilon_i$ is the error for case i. (Hayes and CAI, 2007) Using this matrix, the equation can be represented as,

$$y = X\beta + \varepsilon$$

Y is an n × 1 vector of outcome observations, X is an n × (p + 1) matrix of predictor variable values, and Ɛ is an n × 1 vector of errors where n is the sample size and p is the number of predictor variables. The p partial regression coefficients in β provide information about each predictor variable's unique or partial relationship with the outcome variable. Analysts are frequently interested in testing the null hypothesis that a certain element in β is zero or composing a confidence interval for this element using a sample-derived estimate combined with an estimate of the sampling variance of the estimate. (Hayes and CAI, 2007)

### 3.2.4. Models

We used three types of regression method in our study. These are; The Ordinary Least Squares (OLS) method, Probit Regression and Logit Regression method. The theoretical features of these models are summarized above, and in this section of the paper we will specify the equations we have created based on these models.

In this work, separate equations were created to measure the impact of announcements made by S&P, Moody's and Fitch on the bond yield spreads. Accordingly, in response to announcements made by S&P, Moody's and Fitch, it was measured whether the bond yield spreads of companies had a change in the value at the time "t" and the value at the time "t-1". Thus, the effect of each rating agency's announcement was measured by associating it with the company's bond yield spreads included in our sample.

In this context of the regression models, we have created our methodology with two options. Accordingly, we first determined the regression equation by considering one variable as the explanatory variable. Thus, we created a separate equation for the probit and logit regression models, and a separate equation for the OLS regression model.

Secondly, we have created a different regression model by considering two variables as explanatory variables. Then, we created a separate equation for the probit and logit regression models, and a separate equation for the OLS regression model.

In our methodology, we will analyze the impact of announcements made by credit rating agencies on the bond return spreads, taking into account both the spread value of the day the rating announcement was made, and the spread value of the day before the rating announcement was made. Therefore, we have prepared the regression equations separately to measure this distinction.

In the ongoing part of the work, first, one variable regression models, then two variables regression equations will be explained.

#### 3.2.4.1. One Variable Regression Models

We used a binary dependent variable, logit and probit models to examine bond yield spreads. According to this, it is tested whether there is an effect on the bond yield spreads according to whether credit rating announcements are positive or negative. To measure this, the following formula has been established.

$$Z_t = \alpha + \beta_1 Change_t + u_t$$

$$P_t = f(Z_t)$$

$$Z_t = \begin{cases} 1 \; if \; return \; at \; time \; t > 0 \\ 0 \; otherwise \end{cases}$$

$$Change_t = Upgrade \; or \; downgrade \; in \; credit \; rating \; grade \; or \; outlook$$

$$u_t = iid \; disturbance \; term$$

Using this formula above, it is measured which way the bond spreads are affected by whether the announcements made by credit rating agencies are positive or negative. Accordingly, we were examined the bond spreads at time t, when the rating announcement was made, and were examined the bond spreads at time t-1, when the day before the rating announcement.

Another model that uses one variable as explanatory variable in our study is the OLS regression model. According to this, OLS regression analysis was performed using the values of bond yield spreads both at time t and time t-1. The bond spread values are converted into a logarithmic return. The OLS regression formula that we use as one of the explanatory variables is shown below.

$$Y_t = \alpha + \beta_1 Change_t + u_t$$

$$Y_t = Return\ value\ of\ spreads\ at\ time\ t$$

$$Change_t = Upgrade\ or\ downgrade\ in\ credit\ rating\ grade\ or\ outlook$$

$$u_t = iid\ disturbance\ term$$

### 3.2.4.2. Two Variable Regression Models

While creating two variables models as the explanatory variable, the rating announcements made by credit rating agencies are evaluated on the same equation in the positive or negative direction. Accordingly, the rating announcement made by credit rating agencies is aimed to measure which one is more effective on the bond return spreads if a corporate rating grade has downgraded or upgraded.

The OLS regression model, which takes into account two variables as explanatory variable, is given below.

$$Y_t = \alpha + \beta_1 ChangePositive_t + \beta_2 ChangeNegative_t + u_t$$

$$ChangePositive_t = Upgrade\ in\ credit\ rating\ grade\ or\ outlook$$

$$ChangeNegative_t = Downgrade\ in\ credit\ rating\ grade\ or\ outlook$$

$$u_t = iid\ disturbance\ term$$

As we can see from the formula above, we tested how effective the rating announcements made by credit rating agencies were on the yield spreads. First, regression results were observed considering the bond yield spread value of the day of the rating announcement and secondly, taking into account the bond yield spread value one day before the day of the rating announcement. In the two variable regression model as the explanatory variable, the spread values were converted to logarithmic return to perform the OLS regression analysis.

Another regression model using two variable regression model as explanatory variable are logit and probit regression model. As in the OLS regression, in the logit and probit regression model, we tried to measure which way the bond yield spreads were affected by the rating announcements, whether the upgraded or downgraded the credit ratings. Accordingly, a separate analysis was conducted taking into account the values of the bond yield spreads of the day when the rating announcement was made, and a separate analysis was conducted taking into account the value of the bond yield spreads one day before the day of the rating announcement.

However, in the logit and probit regression models we used as two explanatory variables, we did not get any meaningful results in the regression analysis we conducted to measure the effect of rating announcements made by credit rating agencies on bond yield spreads.

# CHAPTER 4

# RESULTS

In this thesis, it was tested whether the rating changes made by credit rating agencies had an effect on the return spreads of Eurobonds issued by six companies. Accordingly, the return spread data for each company was obtained from Bloomberg, and credit rating agencies' rating announcements about the companies were prepared and the effect on rating spreads of ratings announcements was measured using the formulas specified in the methodology section.

In this section, the test results for each company will be interpreted separately. First of all, using one variable as the explanatory variable we will interpret the information that we have obtained for each company result of the OLS regression, logit regression and probit regression that we apply separately for the "t" time and the "t-1" time.

Second, using two variable as the explanatory variable we will interpret the information that we have obtained for each company result of the OLS regression, logit regression and probit regression that we apply separately for the "t" time and the "t-1" time.

## 4.1. Ordinary Least Squares (OLS) Regression Analysis

### 4.1.1. One Variable Regression Results The Day of Rating Announcement Was Made

The following table shows the regression result information prepared by credit rating agencies regarding the rating announcements made about the companies we have examined, taking into account the return spreads of the companies at the time of t (the day of the event).

**Table 4.1.a OLS Regression Results Using One Variable**

| Corporate | Cmood Coef. | Cmood Pv | Csnp Coef. | Csnp Pv. | Cfitch Coef. | Cfitch Pv |
|---|---|---|---|---|---|---|
| **Akbank** | -0.014 | 0.010 | | | -0.003 | 0.709 |
| **Garanti** | -0.037 | 0.001 | -0.007 | 0.359 | -0.000 | 0.944 |
| **Yapıkredi** | -0.017 | 0.155 | 0.009 | 0.280 | 0.017 | 0.206 |
| **Vakıfbank** | -0.062 | 0.000002 | 0.026 | 0.001 | 0.010 | 0.327 |
| **İş Bankası** | -0.027 | 0.011 | 0.022 | 0.018 | 0.00009 | 0.992 |
| **Türk Telekom** | | | 0.021 | 0.090 | 0.00005 | 0.998 |

*Significant level at %10.

#### 4.1.1.1. Regression Results of Akbank

When the results of the regression for Akbank are examined; it is seen that the coefficient between rating announcements made by Moody's and bond yield spreads is -0.014 and p value is 0.010. So, it is seen that the rating announcements, which have increased the rating grades, decreased the bond yield spread, and the rating announcements, in which the rating grades were downgraded, increased the bond yield spread.

Accordingly, rating announcements made by credit rating agencies are inversely related to Akbank's bond return spreads. Moreover, it is seen that the rating announcements are effected on the return spread and the p value of the regression gives meaningful results at the 10% significance level.

However, by examining the results of the equations prepared to measure the effect of rating announcements made by Fitch on Akbank's return spreads, it is seen that the coefficient is -0.003, the p value is determined as 0.709 and not significant at the 10% significance level.

#### 4.1.1.2. Regression Results of Garanti Bankası

When the results of the regression for Garanti Bankası are examined; It is seen that the coefficient between rating announcements made by Moody's and bond yield spreads is -0.037 and p value is 0.001. So, it is seen that the rating

announcements, which have upgraded the rating grades, decreased the bond yield spreads, and the rating announcements, in which the rating grades were downgraded, increased the bond yield spreads.

Accordingly, rating announcements made by credit rating agencies are inversely related to Garanti Bankası return spreads. Besides, it is seen that the rating announcements are effected on the yield spreads and the p value of the equation gives significant results at the 10% significance level.

As seen in the table above, the coefficient value which enables us to measure the effect of the relationship between the rating announcements about Garanti Bank and the bond yield spreads made by S&P and Fitch is negative, but the p value is not significant at the 10% significance level.

#### 4.1.1.3. Regression Results of Yapı ve Kredi Bankası

As can be seen from the coefficients on the table where the regression results are included, the relationship between rating announcements made by Moody's and the return spreads of Yapı ve Kredi Bankası is negative, and the rating announcements made by S&P and Fitch are positive. Moreover, the effect of the announcements made by the three rating agencies on the Yapi ve Kredi Bankası bond yield spreads does not seem to be significant at the 10% significance level.

#### 4.1.1.4. Regression Results of Türkiye Vakıflar Bankası

When the results of the regression for Türkiye Vakıflar Bankası are examined; it is seen that the coefficient between rating announcements made by Moody's and bond yield spreads is -0.062 and p value is 0.000002. So, it is seen that the rating announcements, which have increased the rating grades, decreased the bond yield spreads, and the rating announcements, which the rating grades were downgraded, increased the bond yield spreads.

Accordingly, rating announcements made by Moody’s are inversely related to Türkiye Vakıflar Bankası 's return spreads. Moreover, it is seen that the rating

announcements are effected on the return spreads and the p value of the regression gives significant results at the 10% significance level.

Also, the coefficient between rating announcements made by S&P and bond yield spreads is 0.026 and p value is 0.001. According to this, rating announcements made by S&P's are positively related to Türkiye Vakıflar Bankası 's return spreads. Furthermore, it is seen that the rating announcements are effected on the return spreads and the p value of the regression gives significant results at the 10% significance level.

As in the table, the relationship between the Fitch rating announcements and the Türkiye Vakıflar Bankası return spreads is positive, but the p value is not significant at the 10% significance level.

#### 4.1.1.5. Regression Results of Türkiye İş Bankası

According to the regression results, rating announcements made by Moody's seem to have a negative correlation with bond yield spreads to the Türkiye İş Bankası. Along with that, the results of rating announcements and return spreads are significant at 10% significance level.

As a result of the regression, it is seen that the coefficient value is -0.027 and the p value is 0.011. This means, if Moody's upgrade Türkiye İş Bankası credit rating, the bond yield spreads decrease and if the rating grade downgrade, bond yield spreads increase.

Other than this, there is a positive correlation between rating announcements made by S&P and Türkiye İş Bankası bond yield spreads, and the regression results show that rating announcements and bond yield spreads are significant at 10% significance level.

In this regression, it is seen that the coefficient value is 0.022 and the p value is 0.018. Accordingly, in the rating announcement made by S&P, if the credit rating of Türkiye İş Bankası has been downgraded, bond yield spreads have also

decreased, and if credit rating of Türkiye İş Bankası has been upgraded, bond yield spreads have also increased.

#### 4.1.1.6. Regression Results of Türk Telekom

When the regression results are analyzed, it is seen that there is a positive correlation between rating announcements made by S&P and Türk Telekom bond yield spreads, and the results about rating announcements and yield spreads are significant at 10% significance level.

In this regression, it is seen that the coefficient formed by taking the S&P rating announcements is 0.021 and the p value is 0.090. Accordingly, in the rating announcement made by S&P, if the credit rating of Türk Telekom has been downgraded, bond yield spreads have also decreased, and if credit rating of Türk Telekom has been upgraded, bond yield spreads have also increased too.

### 4.1.2. One Variable Regression Results Previous Day of Rating Announcement Was Made

The following table shows the results of the regression made by considering the bond yield spreads of the previous day from rating announcements made by credit rating agencies.

**Table 4.1.b OLS Regression Results Using One Variable**

| Corporate | Cmood Coef. | Cmood Pv | Csnp Coef. | Csnp Pv. | Cfitch Coef. | Cfitch Pv |
|---|---|---|---|---|---|---|
| **Akbank** | 0.002 | 0.611 | | | 0.006 | 0.539 |
| **Garanti** | -0.020 | 0.091 | -0.010 | 0.211 | 0.003 | 0.744 |
| **Yapıkredi** | 0.015 | 0.211 | -0.012 | 0.158 | -0.002 | 0.832 |
| **Vakıfbank** | -0.013 | 0.293 | 0.015 | 0.068 | -0.006 | 0.538 |
| **İş Bankası** | -0.006 | 0.550 | 0.017 | 0.07 | 0.0006 | 0.948 |
| **Türk Telekom** | | | 0.049 | 0.0001 | 0.00009 | 0.997 |

*Significant level at %10.

#### 4.1.2.1. Regression Results of Akbank

We have examined the results of regression for Akbank; it is seen that there is a positive correlation between the rating announcements and bond yield spreads. That is to say if rating announcements made by rating agencies Akbank credit rating has upgraded the bond yield spreads has increased, in the opposite case has decreased the bond yield spreads.

However, as a result of the regression made considering the value of bond yield spreads at time t-1, the effect of rating announcements made by credit rating agencies on bond yield spreads was not significant at the 10% significance level.

#### 4.1.2.2. Regression Results of Garanti Bankası

It has been determined that the regression results, Garanti Bankası bond yield spreads are affected by the Moody's rating announcements, and gives significant results at 10% significance level.

When the regression results for Garanti Bankası are examined, it is seen that there is a negative correlation between rating announcements and bond yield spreads. According to this, the regression coefficient value is -0.020, p value is 0.091.

This means that there is an inverse relationship between Garanti Bankası' bond yield spreads and ratings announcements made by Moody's. That is, if the credit rating of the Garanti Bankası is downgraded as a result of the rating announcement made by Moody's, bond yield spreads are adversely affected and increased. In the same way, it has been found that bond yield spreads have decreased if the rating grade has upgraded.

#### 4.1.2.3. Regression Results of Yapı ve Kredi Bankası

According to the regression results, it is seen that rating announcements made by Moody's are in a positive correlation with the bond yield spreads of Yapı ve Kredi Bankası, and rating announcements made by S&P and Fitch are in a negative correlation with the bond yield spreads of Yapı ve Kredi Bankası.

However, we did not achieve a significant result at the 10% significance level in the regression that we performed by considering rating announcements and bond yield spreads.

#### 4.1.2.4. Regression Results of Türkiye Vakıflar Bankası

When the regression results are analyzed, it is seen that there is a positive correlation between rating announcements made by S&P and Türkiye Vakıflar Bankası bond yield spreads, and the results about rating announcements and return spreads are significant at 10% significance level.

In the previous section, while the coefficient value of considering t time is 0.026, it is seen that the relationship between rating announcements and bond yield spreads is weakened in the regression results which are taken into account of time t-1. In this regression, that is, taking into account the time t-1, it is seen that the coefficient value formed by taking the S&P rating announcements is 0.015 and the p value is 0.068. Accordingly, in the rating announcement made by S&P, if the credit rating of Türkiye Vakıflar Bankası has been downgraded, bond yield spreads have also decreased, and if credit rating of Türkiye Vakıflar Bankası has been upgraded, bond yield spreads have also increased too.

Apart from this, it was determined that there was a negative correlation between rating announcements made by Moody's and Fitch, and Türkiye Vakıflar Bankası bond yield spreads, and not significant results at 10% significance level.

#### 4.1.2.5. Regression Results of Türkiye İş Bankası

As seen in the regression results table, it is seen that there is a positive correlation between the rating announcements made by S&P and the bond yield spreads of the Türkiye İş Bankası, and there are significant results at the 10% significance level between the rating announcements and the bond yield spreads.

In the previous section, while the coefficient value of considering t time is 0.022, it is seen that the relationship between rating announcements and bond yield spreads is weakened in the regression results which are taken into account of time

t-1. In this regression, a relationship between the bond spreads and rating announcements made by S&P, which spreads value of taking into account the time t-1, it is seen that the coefficient is 0.017 and the p value is 0.07. Accordingly, in the rating announcement made by S&P, if the credit rating of Türkiye İş Bankası has been upgraded, bond yield spreads have also increased, and if credit rating of Türkiye İş Bankası has been downgraded, bond yield spreads have also decreased too.

We have also stated that the rating announcements made by Moody's in the regression results based on t-time are negatively correlated with the Türkiye İş Bankası 's bond yield spreads. However, the negative correlation between rating announcements made by Moody's and yield spreads appears to weaken in the regression results generated by typing t-1 time. As can be seen, it was determined that no significant results were produced at the 10% significance level for the time t-1 in the results of taking into account Moody's rating announcements.

#### 4.1.2.6. Regression Results of Türk Telekom

According to the results of the regression, there is a positive correlation between rating announcements made by S&P and Turk Telekom bond yield spreads, and there are significant results at the 10% significance level between the rating announcements and the spreads.

In the previous section, the correlation coefficient of the regression result, which is formed by considering the time t, is determined as 0.021. However, as a result of the regression made by considering the time t-1, the correlation between ratings announcements and bond yield spreads has become even stronger. In this regression, that is, taking into account the time t-1, it is seen that the coefficient value formed by taking the S&P rating announcements is 0.049 and the p value is 0,0001.

Accordingly, in the rating announcement made by S&P, if the credit rating of Turk Telekom has been upgraded, bond yield spreads have also increased, and if

credit rating of Turk Telekom has been downgraded, bond yield spreads have also decreased also.

### 4.1.3. Two Variable Regression Results The Day of Rating Announcement Was Made

In the first part of our study, we examined OLS regression analysis to see how rating announcements made by credit rating agencies were influential on bond return spreads of companies.

In this section, how rating announcements made by credit rating agencies affected the bond yield spreads of the companies will be examined. Accordingly, the rating announcement will be included in the regression equation at the same time, depending on whether there is an upgrade or downgrade. Thus, we will measure the effect of the positive or negative rating announcements on bond yield spreads.

The summary tables on the results of the regression that we examined the effect of rating announcements made by Moody's, Standard and Poors and Fitch on bond yield spreads are respectively given below.

Two different equations were created in order to be able to measure the effect of rating announcements on spreads. Accordingly, firstly, the results were evaluated taking into consideration the bond yield spreads of the day when the rating announcement was made, and secondly, the results were observed considering the bond yield spreads one day prior to the day of the rating announcement.

The following analysis shows the OLS regression result information prepared by credit rating agencies regarding the rating announcements made about the companies we have examined, taking into account the return spreads of the companies at the time of t (the day of the event).

#### 4.1.3.1. Moody's Rating Announcements and Two Variable Regression Results

The table below shows the results of the regression we observed on the bond yield spreads of positive and negative rating announcements made by Moody's.

**Table 4.1.c OLS Regresyon Results Using Two Variable**

| Corporate | Cmood Upgrade Coef. | Cmood Downgrade Coef. | Cmood Upgrade Pvalue | Cmood Downgrade Pvalue |
|---|---|---|---|---|
| **Akbank** | 0.007 | -0.034 | 0.364 | 0 |
| **Garanti** | 0.0001 | -0.075 | 0.994 | 0 |
| **Yapıkredi** | | | | |
| **Vakıfbank** | | | | |
| **İş Bankası** | | | | |
| **Türk Telekom** | | | | |

*Significant level at %10.

When the results of regression are examined; it can be seen that only results obtained for Akbank and Garanti Bankası. Accordingly, it is seen that the rating upgrades made by Moody's are in a positive correlation with the bond yield spreads, and the downgrades are in negative correlation with the bond yield spreads.

According to the results of regression in which positive and negative rating announcements made by Moody's were evaluated at the same time, no significant result was obtained at the 10% significance level.

#### 4.1.3.2. Standard and Poors Announcements and Two Variable Regression Results

The table below shows the results of the regression we observed on the bond yield spreads of positive and negative rating announcements made by S&P.

**Table 4.1.d OLS Regresyon Results Using Two Variable**

| Corporate | Csnp Upgrade Coef. | Csnp Downgrade Coef. | Csnp Upgrade Pvalue | Csnp Downgrade Pvalue |
|---|---|---|---|---|
| **Akbank** | | | | |
| **Garanti** | -0.007 | -0.007 | 0.574 | 0.470 |
| **Yapıkredi** | 0.008 | -0.012 | 0.715 | 0.183 |

**Table 4.1.d Continued**

| | | | | |
|---|---|---|---|---|
| **Vakıfbank** | -0.015 | 0.043 | 0.314 | 0 |
| **İş Bankası** | -0.005 | 0.046 | 0.705 | 0.0004 |
| **Türk Telekom** | 0.030 | 0.010 | 0.074 | 0.57 |

*Significant level at %10.

According to the regression results in the table, significant results can only be obtained at the 10% significance level for Türkiye İş Bankası and Türk Telekom from rating announcements made by S&P.

As a consequence of the regression, it was determined that downgrade the Türkiye İş Bankası rating grades by S&P were positively correlated with bond yield spreads. As seen in the table, it has been found that the coefficient value for the downgrade for credit rating is 0.046 and the corresponding p value is 0.0004. This means that only the downgrades made by S&P have an impact on Türkiye İş Bankası 's bond yield spreads. In other words, if S&P downgrade Türkiye İş Bankası credit rating, the bond yield spreads also responded in the same direction, so the spreads decreased in the same way as the rating grades.

Nevertheless, if Türkiye İş Bankası rating grade was upgraded as a result of the rating announcement made by S&P, it was determined that there was no significant effect at %10 significance level on bond yield spreads.

On the examination the effect of rating announcements made by S&P on Türk Telekom bond yield spreads, it was seen that there was a positive correlation between rating upgrades and bond yield spreads. Accordingly, it has been found that the coefficient value for the rating downgrade is 0.030 and p value is 0.074. This means that only upgrades made by S&P have an impact on Türk Telekom 's bond yield spreads. In other words, if Türk Telekom's credit rating was upgraded by S&P in the rating announcement, bond yield spreads responded in the same way, that is, increased in the same direction as the credit rating grade.

Nevertheless, if Türk Telekom's rating grade has downgraded as a result of the rating announcement made by S&P, it has been determined that there is no significant effect at the %10 significance level on bond yield spreads.

### 4.1.3.3. Fitch Rating Announcements and Two Variable Regression Results

The table below shows the results of the regression we observed on the bond yield spreads of positive and negative rating announcements made by Fitch.

**Table 4.1.e OLS Regresyon Results Using Two Variable**

| Corporate | Cfitch Upgrade Coef. | Cfitch Downgrade Coef. | Cfitch Upgrade Pvalue | Cfitch Downgrade Pvalue |
|---|---|---|---|---|
| **Akbank** | -0.006 | -0.001 | 0.675 | 0.889 |
| **Garanti** | -0.009 | 0.009 | 0.458 | 0.502 |
| **Yapıkredi** | -0.010 | 0.036 | 0.638 | 0.043 |
| **Vakıfbank** | -0.008 | 0.030 | 0.576 | 0.052 |
| **İş Bankası** | -0.011 | 0.008 | 0.458 | 0.536 |
| **Türk Telekom** | | | | |

*Significant level at %10.

According to the regression results in the table, significant results can only be obtained at the 10% significance level for Yapı ve Kredi Bankası and Türkiye Vakıflar Bankası from rating announcements made by Fitch.

As a consequence of the regression, it was determined that downgraded credit rating grades of Yapı ve Kredi Bankası by Fitch, were positively correlated with bond yield spreads. As seen in the table, it has been found that the coefficient value for the rating downgrade is 0.036 and p value is 0.043. This means that only downgrades made by Fitch have an impact on Yapı ve Kredi Bankası 's bond yield spreads. In other words, if Fitch downgraded Yapı ve Kredi Bankası credit rating, the bond yield spreads had also responded in the same direction, thence the spreads had decreased in the same way as the rating grade.

However, if Yapı ve Kredi Bankası rating grade was upgraded as a result of the rating announcement made by Fitch, it was determined that there was no significant effect at %10 significance level on bond yield spreads.

As a consequence of the regression, it was determined that the rating grades downgraded by Fitch were positively correlated with Türkiye Vakıflar Bankası bond yield spreads. As seen in the table, it has been found that the coefficient value

for the rating downgrade is 0.030 and p value is 0.052. This means that only the downgrades made by Fitch have an impact on Türkiye Vakıflar Bankası 's bond yield spreads. In other words, if Fitch downgraded Türkiye Vakıflar Bankası credit rating, the bond yield spreads also responded in the same direction, thence the spreads decreased in the same way as the rating grade.

However, if Türkiye Vakıflar Bankası rating grade was upgraded as a result of the rating announcement made by Fitch, it was determined that there was no significant effect at %10 significance level on bond yield spreads.

### 4.1.4. Two Variable Regression Results Previous Day of Rating Announcement Was Made

In order to determine whether the rating announcements made by credit rating agencies have an impact on bond yield spreads, we tested the first part taking into account the bond yield spread of the day of the rating change.

In addition, according to the regression equation we have established, rating announcements made by credit rating agencies have been tested for the effect of rating announcements on the return spreads, taking into account the bond yield spreads from the day before the announcement.

However, as in the previous section, rating announcements made by credit rating agencies, both positively and negatively, will be interpreted on the same equation and as a consequence of how bond yield spreads are affected.

The following tables show the results of the OLS regression made by considering the bond yield spreads of the previous day from rating announcements made by credit rating agencies.

#### 4.1.4.1. Moody’s Rating Announcements and Two Variable Regression Results

The table below shows the results of the regression on the bond yield spreads of positive and negative rating announcements made by Moody's.

**Table 4.1.f OLS Regresyon Results Using Two Variable**

| Corporate | Cmood Upgrade Coef. | Cmood Downgrade Coef. | Cmood Upgrade Pvalue | Cmood Downgrade Pvalue |
|---|---|---|---|---|
| **Akbank** | 0.007 | -0.001 | 0.370 | 0.879 |
| **Garanti** | -0.034 | -0.005 | 0.039 | 0.742 |
| **Yapıkredi** | | | | |
| **Vakıfbank** | | | | |
| **İş Bankası** | | | | |
| **Türk Telekom** | | | | |

*Significant level at %10.

According to the table, significant results can only be obtained at the 10% significance level for Garanti Bankası from rating announcements made by Moody's.

With reference to, there is a negative correlation between the rating upgrades made by Moody's and the Garanti Bankası bond yield spreads. Looking at the table, it can be seen that for the rating upgrades made by Moody's, the coefficient is -0.034 and the p value is 0.039.

This means that only upgrades from the rating changes made by Moody's have an impact on the Garanti Bankası bond yield spreads. In other words, if Garanti Bankası 's credit rating is upgraded by Moody's, bond yield spreads are seen to decrease in the opposite direction of the rating change.

However, if Garanti Bankası rating grade was downgraded as a result of the rating announcement made by Moody's, it was determined that there was no significant effect at %10 significance level on bond yield spreads.

### 4.1.4.2. Standard and Poors (S&P) Rating Announcements and Two Variable Regression Results

The table below shows the results of the regression we observed on the bond yield spreads of positive and negative rating announcements made by S&P.

**Table 4.1.g OLS Regresyon Results Using Two Variable**

| Corporate | Csnp Upgrade Coef. | Csnp Downgrade Coef. | Csnp Upgrade Pvalue | Csnp Downgrade Pvalue |
|---|---|---|---|---|
| **Akbank** | | | | |
| **Garanti** | -0.017 | -0.006 | 0.195 | 0.550 |
| **Yapıkredi** | 0.023 | -0.018 | 0.296 | 0.047 |
| **Vakıfbank** | -0.002 | 0.022 | 0.875 | 0.024 |
| **İş Bankası** | 0.010 | 0.023 | 0.474 | 0.072 |
| **Türk Telekom** | 0.035 | 0.065 | 0.036 | 0.0003 |

*Significant level at %10.

According to the results of the regression, rating announcements made by S & P were found to produce meaningful results at 10% significance level over bond yield spreads of the four companies. These companies are; Yapı ve Kredi Bankası, Türkiye İş Bankası, Türkiye Vakıflar Bankası and Turk Telekom.

With reference to, there is a negative correlation between the rating downgrades made by S&P and the Yapı ve Kredi Bankası bond yield spreads. Looking at the table, it can be seen that for the rating downgrades made by S&P, the coefficient is -0.018 and the p value is 0.047.

Accordingly, in the rating announcements made by S&P, bond yield spreads were seen to increase after the change, if Yapı ve Kredi Bankası rating grade was downgraded. That is, it was determined that only the rating downgrades were effective on the bond yield spreads. Nevertheless, it was seen that if the rating grade of Yapı ve Kredi Bankası was upgraded, bond yield spreads was not affected by that.

When the rating announcements made by S&P are examined on the Türkiye Vakıflar Bankası bond yield spreads, there is a positive correlation between the rating downgrades made by S&P and the Türkiye Vakıflar Bankası bond yield spreads. In the table, it can be seen that for the rating downgrades made by S&P, the coefficient is 0.022 and the p value is 0.024.

Accordingly, when rating announcements made by S&P, if Türkiye Vakıflar Bankası rating grade was downgraded, bond yield spreads were seen to decrease after the change. That is, it was determined that only the rating downgrades were effective on the bond yield spreads. Nonetheless, it was seen that if the rating grade of Türkiye Vakıflar Bankası was upgraded, bond yield spreads were not affected by that.

When the rating announcements made by S&P are examined on the Türkiye İş Bankası bond yield spreads, there is a positive correlation between the rating downgrades made by S&P and the Türkiye İş Bankası bond yield spreads. Looking at the information in the table, it can be seen that for the rating downgrades made by S&P, the coefficient is 0.023 and the p value is 0.072.

Accordingly, in the rating announcements made by S&P, bond yield spreads were seen to decrease after the change, if Türkiye İş Bankası rating grade was downgraded. That is, it was determined that only the rating downgrades were effective on the bond yield spreads. Nevertheless, it was seen that if the rating grade of Türkiye İş Bankası was upgraded, bond yield spreads were not affected by that.

As a result of the regression, it can be seen that the rating announcements made by S&P about the Türk Telekom, both credit rating upgrades and credit rating downgrade announcements impact on bond yield spreads. Accordingly, it is observed that there is a positive correlation between the spreads and the announcement if the rating grade is upgraded. Likewise, when the rating grade is downgraded, it is also found that there is a positive correlation between the spreads and the announcement.

Looking at the table, it can be seen that for the rating upgrades made by S&P, the coefficient is 0.035, and the p value is 0.036, rating downgrades made by S&P, the coefficient is 0.065 and the p value is 0.0003.

As can be understood from the above values, if Türk Telekom's credit rating grades was downgraded in the rating announcement made by S&P, bond yield spreads decreased in the same direction as rating change. In the event that Türk

Telekom's credit rating was upgraded in the rating announcement made by S&P, bond yield spreads increased in the same direction as rating changes.

#### 4.1.4.3. Fitch Rating Announcements and Two Variable Regression Results

The table below shows the results of the regression we observed on the bond yield spreads of positive and negative rating announcements made by Fitch.

**Table 4.1.h OLS Regresyon Results Using Two Variable**

| Corporate | Cfitch Upgrade Coef. | Cfitch Downgrade Coef. | Cfitch Upgrade Pvalue | Cfitch Downgrade Pvalue |
|---|---|---|---|---|
| **Akbank** | 0.006 | 0.006 | 0.681 | 0.648 |
| **Garanti** | 0.003 | 0.003 | 0.814 | 0.822 |
| **Yapıkredi** | -0.019 | 0.008 | 0.373 | 0.65 |
| **Vakıfbank** | -0.029 | 0.015 | 0.063 | 0.323 |
| **İş Bankası** | 0.00006 | 0.001 | 0.996 | 0.930 |
| **Türk Telekom** | | | | |

*Significant level at %10.

According to the regression results in the table, significant results can only be obtained at the 10% significance level for Türkiye Vakıflar Bankası from rating announcements made by Fitch.

On the examination of the effect of rating announcements made by Fitch on Türkiye Vakıflar Bankası return spreads, it was seen that there was a positive correlation between rating upgrades and bond yield spreads. Accordingly, it has been found that the coefficient value for the rating downgrade is -0.029 and p value is 0.063. This means that only the upgrades made by Fitch have an impact on Türkiye Vakıflar Bankası bond yield spreads. In other words, if Türkiye Vakıflar Bankası credit rating was upgraded by Fitch in the rating announcement, bond yield spreads responded in the same way, that is, increased in the same direction as the credit rating increase.

Nevertheless, if Türkiye Vakıflar Bankası rating grade is downgraded as a result of the rating announcement made by Fitch, it has been determined that there is no significant effect on bond yield spreads.

## 4.2. Probit and Logit Regression Analysis

In this chapter, where we examined our regression results, we tried to measure the relationship between the rating announcements and bond yield spreads by means of the OLS regression analysis, which was using one variable as the explanatory variable and the using two variable as the explanatory variable. Finally, probit and logit regression models will be used to examine whether there is a relationship between rating announcements and bond yield spreads.

In the probit and logit regression analysis, we will evaluate the results in terms of whether they are significant at the 10% significance level, as we did in OLS regression analysis.

Here, we will not examine each company separately as we did in the OLS regression analyzes. Instead, an overall assessment will be made on each company.

### 4.2.1. Probit Regression Analysis

The table below shows the results of the regression analysis taking into account the bond yield spreads at time t (the day of the event), to measure the effect of ratings announcements made by credit rating agencies on bond yield spreads.

**Table 4.1.i One Variable Probit Regression Results**

| Corporate | Cmood Coef. | Cmood Pv | Csnp Coef. | Csnp Pv. | Cfitch Coef. | Cfitch Pv |
|---|---|---|---|---|---|---|
| **Akbank** | -0.012 | 0.974 | | | -0.75 | 0.41 |
| **Garanti** | -1.578 | 0.148 | -0.541 | 0.402 | 0 | 0.999 |
| **Yapıkredi** | -0.437 | 0.643 | -0.733 | 0.368 | 0.471 | 0.686 |
| **Vakıfbank** | -3.502 | 0.145 | -0.083 | 0.904 | 0 | 1 |
| **İş Bankası** | -1.363 | 0.220 | 0.730 | 0.379 | 0.434 | 0.614 |
| **Türk Telekom** | | | -0.229 | 0.851 | | |

*Significant level at %10.

Looking at the values in the table, it appears that the rating announcements made by credit rating agencies have an effect on bond yield spreads. This effect indicates that bond yield spreads are in a positive correlation relationship with

announcements from some rating agencies and negative correlation with announcements from some rating agencies.

However, as a result of the regression, no significant results were obtained between bond yield spreads and rating announcements made by CRA's about any company at 10% significance level.

The following tables show the results of the regression made by considering the bond yield spreads of the previous day from rating announcements made by credit rating agencies.

**Table 4.1.j One Variable Probit Regression Results (T-1)**

| Corporate | Cmood Coef. | Cmood Pv | Csnp Coef. | Csnp Pv. | Cfitch Coef. | Cfitch Pv |
|---|---|---|---|---|---|---|
| **Akbank** | 0.958 | 0.264 | | | | |
| **Garanti** | -0.226 | 0.814 | -1.728 | 0.138 | 0.708 | 0.364 |
| **Yapıkredi** | 0.806 | 0.482 | -0.271 | 0.705 | -0.594 | 0.607 |
| **Vakıfbank** | -0.211 | 0.840 | 0.334 | 0.656 | 0 | 1 |
| **İş Bankası** | -0.932 | 0.334 | 0.186 | 0.814 | -0.742 | 0.414 |
| **Türk Telekom** | | | -0.228 | 0.851 | | |

*Significant level at %10.

Looking at the table, it appears that the rating announcements made by credit rating agencies have an effect on bond yield spreads. This effect indicates that bond yield spreads are in a positive correlation relationship with announcements from some rating agencies and negative correlation with announcements from some rating agencies.

However, as a result of the regression, no significant results were obtained between bond yield spreads and rating announcements made by CRA's about any company at 10% significance level.

### 4.2.2. Logit Regression Analysis

The results of the regression made by considering the bond yield spreads of the day when the rating announcement was made are listed below(the day of the event).

**Table 4.1.k One Variable Logit Regression Results**

| Corporate | Cmood Coef. | Cmood Pv | Csnp Coef. | Csnp Pv. | Cfitch Coef. | Cfitch Pv |
|---|---|---|---|---|---|---|
| **Akbank** | -0.0241 | 0.9731 | | | -1.167 | 0.4183 |
| **Garanti** | -2.5389 | 0.1531 | -0.8611 | 0.4029 | 0 | 0.9999 |
| **Yapıkredi** | -0.7149 | 0.6482 | -1.1577 | 0.3836 | 0.7213 | 0.6949 |
| **Vakıfbank** | -5.7069 | 0.1588 | -0.1269 | 0.907 | 0 | 1 |
| **İş Bankası** | -2.164 | 0.2421 | 1.151 | 0.409 | 0.653 | 0.634 |
| **Türk Telekom** | | | -0.3791 | 0.8504 | | |

*Significant level at %10.

As can be seen in the table, there is a positive correlation between rating announcements made by some rating agencies and bond return spreads of companies, and some rating agencies have a negative correlation relationship with rating announcements.

Nevertheless, as a result of the regression, no significant results were obtained between bond yield spreads and rating announcements of any company at 10% significance level.

The following tables show the results of the regression made by considering the bond yield spreads of the previous day from rating announcements made by credit rating agencies.

**Table 4.1.l One Variable Logit Regression Results (T-1)**

| Corporate | Cmood Coef. | Cmood Pv | Csnp Coef. | Csnp Pv. | Cfitch Coef. | Cfitch Pv |
|---|---|---|---|---|---|---|
| **Akbank** | 1.571 | 0.300 | | | | |
| **Garanti** | -0.339 | 0.822 | -2.819 | 0.161 | 1.108 | 0.387 |
| **Yapıkredi** | 1.242 | 0.498 | -0.430 | 0.703 | -0.926 | 0.614 |

**Table 4.1.l Continued**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Vakıfbank** | -0.332 | 0.842 | 0.503 | 0.671 | 0 | 1 |
| **İş Bankası** | -1.456 | 0.344 | 0.289 | 0.818 | -1.150 | 0.423 |
| **Türk Telekom** | | | -0.378 | 0.850 | | |

*Significant level at %10.

Looking at the table, it appears that the rating announcements made by credit rating agencies have an effect on bond yield spreads. This effect indicates that bond yield spreads are in a positive correlation relationship with announcements from some rating agencies and negative correlation with announcements from some rating agencies.

However, as a result of the regression, no significant results were obtained between bond yield spreads and rating announcements of any company at 10% significance level.

# CHAPTER 5

# CONCLUSION

Previous searches have been carried out to measure the impact of rating announcements made by credit rating agencies on bond yield spreads issued by countries or companies. However, when examining those made about Turkey from such works, it is not examined whether the bonds issued by the Turkish company's, instead, seems to focus on bonds issued by the state.

The bonds issued by private sector companies operating in Turkey has intensified in recent years. Therefore, the maturity starting dates of the issued of the companies examined in our study are starting as early as 2012.

In this paper, we have examined Eurobonds issued by companies, where in Turkey operating in the banking sector, which these are Akbank, Garanti Bankası, Turkey Vakıflar Bankası, Yapı ve Kredi Bankası, Türkiye İş Bankası. In addition, we have examined Eurobond issued by Türk Telekom, which operates in the telecommunications sector in Turkey.

In this thesis, Eurobonds were chosen as the issuing securities. Because Eurobonds are issued to foreign investors and foreign currencies. Therefore, when we analyzing rating announcements made by the credit rating agencies about companies we have focused on corporates foreign currency credit ratings. The reason for is that foreign investors are concerned that the information about the status of Eurobonds issued by companies may be measured by announcements about foreign currency denominated credit ratings of companies by credit rating agencies.

Two different regression models were used to measure the impact of rating announcements made by credit rating agencies on bond yield spreads.

Firstly, the model formed by considering one variable as the explanatory variable. According to this model, it is desired to measure the regression results using logit and probit regression models as well as the OLS regression model.

Regression analyzes using logit and probit regression models show that rating announcements made about companies do not have significant statistical effects on bond yield spreads considering neither the spread on the rating announcement day nor the spread one day before the rating announcement day. However, we observed that the analysis using the OLS regression model had a statistical effect on bond yield spreads of rating announcements made by credit rating agencies.

According to this, in the regression analysis which takes into account the bond yield spreads on the date when the credit rating announcement was made(t time), it is seen that there is a negative correlation relation between the announcements made by Moody's and the bond return spreads of the companies. That is, as a result of a rating announcement made by Moody's, if a company's rating grade is downgraded, the bond yield spread has increased in the opposite direction. However, as a result of the regression made considering the time t, it has been determined that there is a positive correlation between the bond yield spreads and rating announcements made by the S&P, and the rating announcements have a statistically significant effect on the bond yield spreads of some companies. So, the rating announcement made by S&P is the result, if a company's rating grade is upgraded, the value of the bond yield spreads is seen to increase in the same direction.

In order to measure the effect of rating announcements made by Moody's on bond yield spreads, it was observed that rating announcements only had a statistically significant effect on Garanti Bankası spreads in the regression analysis taking into account the spread value one day before the rating announcement day(t-1). According to this, it is observed that there is a negative correlation between rating announcements made by Moody's and Garanti Bankası bond yield spreads, that is, if Moody's downgraded the rating of Garanti Bankası, the bond yield spreads

increased in the opposite direction. However, as a result of the regression made considering the bond yield spreads one day prior to the announcement date(t-1), there was a positive correlation relation between rating announcements made by S&P and spreads of some companies. So, when the rating announcement made by S&P, if a company's rating grade is upgraded, the value of the bond yield spreads is seen to increase in the same direction.

Secondly, the model formed by considering two variable as the explanatory variable. According to this model, it is desired to measure the regression results using logit and probit regression models as well as the OLS regression model. Here, the effect of the rating announcement made by the credit rating agencies on the bond yield spreads was tried to measure that which way to change the bond yield spreads were affected, as a result of the rating announcement being upgraded or downgraded. Regression analyzes using logit and probit regression models show that rating announcements made about companies do not have significant statistical effects on bond yield spreads considering neither the spreads on the rating announcement day nor the spreads one day before the rating announcement day. However, we observed that the analysis using the OLS regression model had a statistical effect on bond yield spreads of rating announcements made by credit rating agencies.

In order to examine the effect of rating announcements made by credit rating agencies on bond yield spreads, according to OLS regression results, taking into account the bond yield spreads of the day of the rating announcement(t time); the rating announcements made by S&P were found to have statistical effect on the bond yield spreads of Türkiye İş Bankası and Türk Telekom. Accordingly, S&P announcements were found to have a positive correlation between the bond yield spreads of both companies. However, statistically significant results were obtained in the event that Türkiye İş Bankası 's rating grade is downgraded and Türk Telekom's rating grade is upgraded. Another finding that we have made as a result of the regression made in consideration of t time is that the positive rating changes made by Fitch have a significant statistical effect on Yapı ve Kredi Bankası and

Türkiye İş Bankası bond yield spreads. Here, it has been determined from the rating changes made by Fitch that only rating downgrades have a significant effect on bond spreads, and that, there is a positive correlation between rating downgrades and spreads.

In order to examine the effect of rating announcements made by credit rating agencies on bond yield spreads, according to OLS regression results, taking into account the bond yield spreads of the previous day of the rating announcement(t-1); it is seen that the rating upgrades from rating changes made by Moody's have significant statistical effects on Garanti Bankası bond yield spreads. There is a positive correlation between them. Apart from this, when the rating announcements made by S&P were examined, it was determined that rating downgrades made by S&P that statistically significant effect on Yapı ve Kredi Bankası, Türkiye Vakıflar Bankası, and Türkiye İş Bankası bond yield spreads. That is, bond yield spreads of these companies have also decreased as a result of the downgrade in rating. The rating announcements made by S&P were found to have a statistically significant effect on Türk Telekom's bond yield spreads, both in rating downgrades and rating upgrades. There is also a positive correlation relationship for both grade changes. That is, Türk Telekom bond yield spreads has decreased after rating downgrade made by S&P. Finally, it is determined that the rating grade increases made by Fitch have a statistically significant effect on Türkiye Vakıflar Bankası 's bond yield spreads, and there is a negative correlation between them. Accordingly, if Fitch upgrades Türkiye Vakıflar Bankası 's rating grade, it was found that bond yield spreads decreased in the opposite direction.

As a result, using OLS regression analysis, we determined that rating announcements made by the three major credit rating agencies had a significant effect on bond yield spreads. However, it has been seen that this effect has arisen as a consequence of the downgrade the rating grades of some companies, or as a result of upgrading the rating grades of some companies. The number of bonds issued by companies has limited to little numbers, due to the short time interval that we examined in our work. In recent years, it seems that the method of issuing bonds

by companies, using more and more has been applied to create resources. However, thanks to the increasing bond issuance by the companies, we think that in the further studies, new findings can be produced in addition to the which obtained in this thesis too.

## REFERENCES


Afonso, A., Gomes, P., Furceri, D. (2011). Sovereign Credit Ratings and Financial Markets Linkages Application to European Data. European Central Bank Working Papers 1347.

Cantor, R., Packer, F. (1996). Determinans and Impact of Sovereign Ratings. FRBNY Economic Policy Review/October (1996): 37-54.

Cebeci, İpek (2009). Krizleri İncelemede Kullanılan Nitel Tercih Modelleri: Türkiye İçin Bir Probit Model Uygulaması: (1988-2009). İstanbul Üniversitesi İktisat Fakültesi Mecmuası 2012,62(1):127-146.

Gande, A. and Parsley, D. (2003). News Spillovers In The Sovereign Debt Market. Journal of Financial Economics.

Grier, P. and Katz, S., 1976. The Differential Effects of Bond Rating Changes Among Industrial and Public Utility Bonds by Maturity, Journal of Business, 49, April, 226-239.

Hand, J. R., Holthausen, R. W., & Leftwich, R. W. (1992). The effect of bond rating agency announcements on bond and stock prices. The Journal of Finance 47 (2), 733–752.

Hayes, A.F., Cai, Li. (2007). Using Heteroskedasticity-Consistent Standard Error Estimators in OLS Regression: An Introduction and Software Implementation. Behavior Research Methods, 2007, 39 (4), 709-722.

Hite, G. and Warga, A., 1997. The Effect of Bond-Rating Changes on Bond Price Performance, Financial Analysts Journal, May-June, 35-51.

Ismailescu, I., & Kazemi, H. (2010). The Reaction of Emerging Market Credit Default Swap Spreads to Sovereign Credit Rating Changes. Journal of Banking & Finance 34, 2861–2873.

Kaminsky, Graciela, and Sergio L. Schmukler. Emerging Market Instability: Do Sovereign Ratings Affect Country Risk and Stock Returns?. The World Bank

Economic Review16.2 (2002): 171-195.

Katz, S., 1974, The Price and Adjustment Process of Bonds to Rating Reclassifications: A Test of Bond Market efficiency, Journal of Finance, 29, 551-559.

Kliger, D., Sarig, O. (2000). The Information Value of Bond Ratings. The Journal Of Fınance * Vol. LV, No. 6 * Dec.

Larrain, G., H. Reisen, and J. Von Maltzan. (1997). Emerging Market Risk and Sovereign Credit Rating. OECD Development Centre Technical Paper 124.

Pohlman, J., Leitner, D. (2003). A Comparison of Ordinary Least Squares and Logistik Regression. The Ohio Journal of Science. v103, n5 (December, 2003), 118-125

Reisen, H., Maltzan, J. (1999). Boom and Bust and Sovereign Ratings. International Finance 2:2 Papers 273-293.

Resti, A., Sironi, A. (2005). The Basel Committee approach to risk - weights and external ratings: what do we learn from bond spreads? Economic Working Papers.

Steiner, M., & Heinke, V. G. (2001). Event Study Concerning International Bond Price Effects of Credit Rating Actions. International Journal of Finance and Economics 6, 139–157.

S&P, Guide To Credit Rating Essentials (2014). What Are Credit Ratings and How Do They Work? Version 1.5.

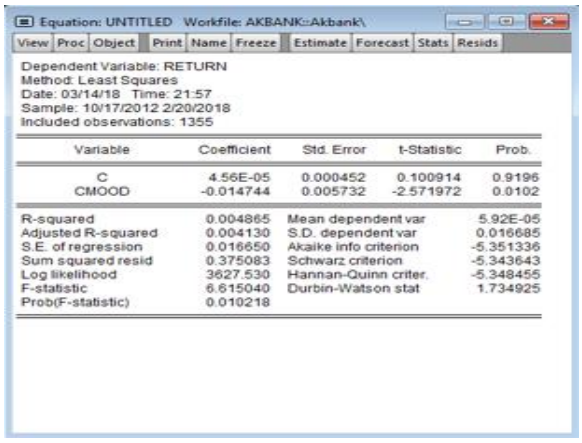
Sy, A. (2001). Emerging Market Bond Spreads and Sovereign Credit Ratings: Reconciling Market Views with Economic Fundamentals. IMF Working Paper WP/01/65.

Wansley, J., Glascock, J. L., & Clauretie, T. M. (1992). Institutional bond pricing and information arrival: The case of bond rating changes. Journal of Business Finance and Accounting, 19, 733-750.

## APPENDIX

### A. Regression Result of Akbank

OLS Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: AKBANK::Akbank\

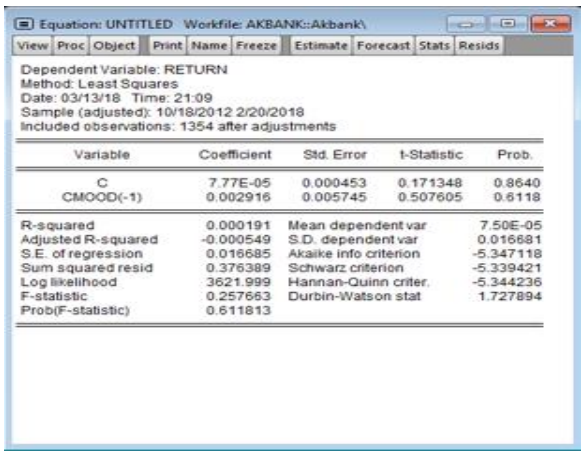
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 21:57
Sample: 10/17/2012 2/20/2018
Included observations: 1355

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 4.56E-05 | 0.000452 | 0.100914 | 0.9196 |
| CMOOD | -0.014744 | 0.005732 | -2.571972 | 0.0102 |

| | | | |
|---|---|---|---|
| R-squared | 0.004865 | Mean dependent var | 5.92E-05 |
| Adjusted R-squared | 0.004130 | S.D. dependent var | 0.016685 |
| S.E. of regression | 0.016650 | Akaike info criterion | -5.351336 |
| Sum squared resid | 0.375083 | Schwarz criterion | -5.343643 |
| Log likelihood | 3627.530 | Hannan-Quinn criter. | -5.348455 |
| F-statistic | 6.615040 | Durbin-Watson stat | 1.734925 |
| Prob(F-statistic) | 0.010218 | | |

OLS Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: AKBANK::Akbank\

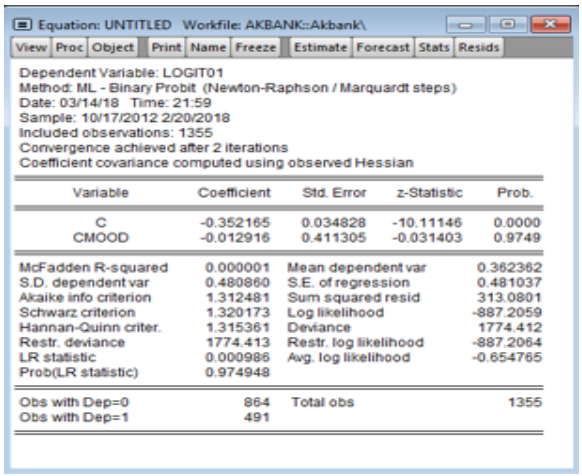
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 21:09
Sample (adjusted): 10/18/2012 2/20/2018
Included observations: 1354 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 7.77E-05 | 0.000453 | 0.171348 | 0.8640 |
| CMOOD(-1) | 0.002916 | 0.005745 | 0.507605 | 0.6118 |

| | | | |
|---|---|---|---|
| R-squared | 0.000191 | Mean dependent var | 7.50E-05 |
| Adjusted R-squared | -0.000549 | S.D. dependent var | 0.016681 |
| S.E. of regression | 0.016685 | Akaike info criterion | -5.347118 |
| Sum squared resid | 0.376389 | Schwarz criterion | -5.339421 |
| Log likelihood | 3621.999 | Hannan-Quinn criter. | -5.344236 |
| F-statistic | 0.257663 | Durbin-Watson stat | 1.727894 |
| Prob(F-statistic) | 0.611813 | | |

Probit Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: AKBANK::Akbank\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

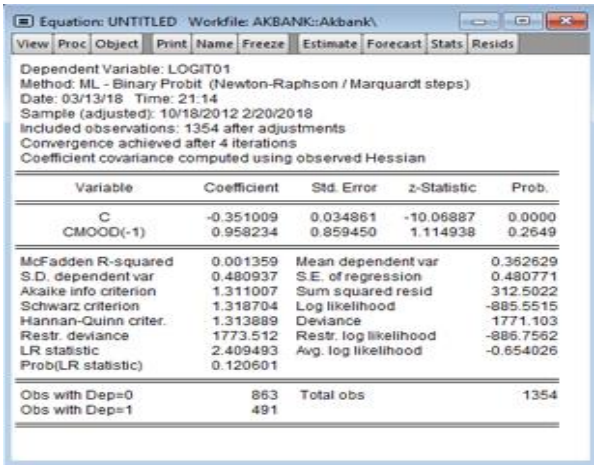
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 21:59
Sample: 10/17/2012 2/20/2018
Included observations: 1355
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.352165 | 0.034828 | -10.11146 | 0.0000 |
| CMOOD | -0.012916 | 0.411305 | -0.031403 | 0.9749 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000001 | Mean dependent var | 0.362362 |
| S.D. dependent var | 0.480860 | S.E. of regression | 0.481037 |
| Akaike info criterion | 1.312481 | Sum squared resid | 313.0801 |
| Schwarz criterion | 1.320173 | Log likelihood | -887.2059 |
| Hannan-Quinn criter. | 1.315361 | Deviance | 1774.412 |
| Restr. deviance | 1774.413 | Restr. log likelihood | -887.2064 |
| LR statistic | 0.000986 | Avg. log likelihood | -0.654765 |
| Prob(LR statistic) | 0.974948 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 864 | Total obs | 1355 |
| Obs with Dep=1 | 491 | | |

Probit Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: AKBANK::Akbank\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

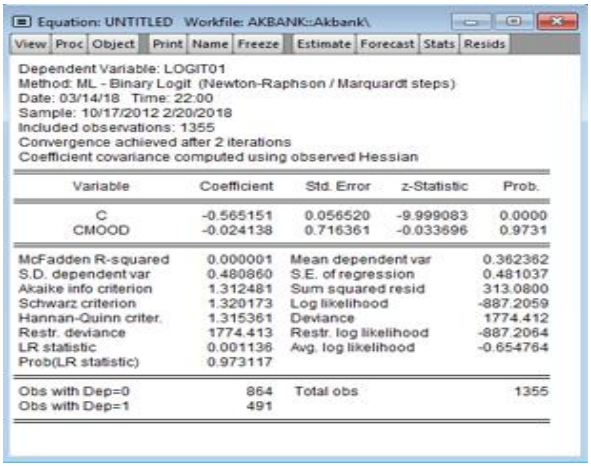
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 21:14
Sample (adjusted): 10/18/2012 2/20/2018
Included observations: 1354 after adjustments
Convergence achieved after 4 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.351009 | 0.034861 | -10.06887 | 0.0000 |
| CMOOD(-1) | 0.958234 | 0.859450 | 1.114938 | 0.2649 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.001359 | Mean dependent var | 0.362629 |
| S.D. dependent var | 0.480937 | S.E. of regression | 0.480771 |
| Akaike info criterion | 1.311007 | Sum squared resid | 312.5022 |
| Schwarz criterion | 1.318704 | Log likelihood | -885.5515 |
| Hannan-Quinn criter. | 1.313889 | Deviance | 1771.103 |
| Restr. deviance | 1773.512 | Restr. log likelihood | -886.7562 |
| LR statistic | 2.409493 | Avg. log likelihood | -0.654026 |
| Prob(LR statistic) | 0.120601 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 863 | Total obs | 1354 |
| Obs with Dep=1 | 491 | | |

Logit Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: AKBANK::Akbank\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

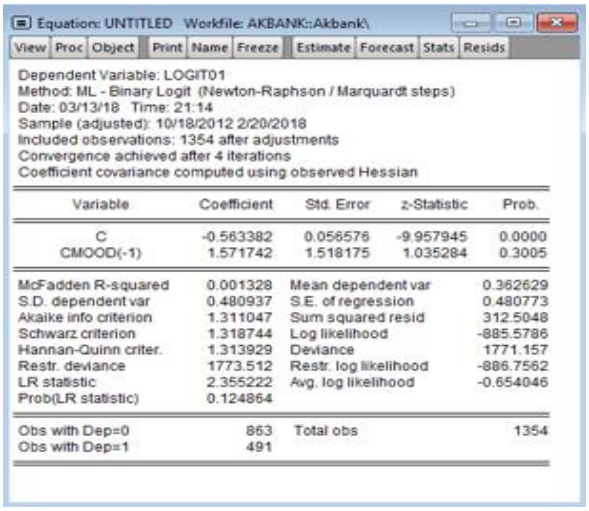
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:00
Sample: 10/17/2012 2/20/2018
Included observations: 1355
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.565151 | 0.056520 | -9.999083 | 0.0000 |
| CMOOD | -0.024138 | 0.716361 | -0.033696 | 0.9731 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000001 | Mean dependent var | 0.362362 |
| S.D. dependent var | 0.480860 | S.E. of regression | 0.481037 |
| Akaike info criterion | 1.312481 | Sum squared resid | 313.0800 |
| Schwarz criterion | 1.320173 | Log likelihood | -887.2059 |
| Hannan-Quinn criter. | 1.315361 | Deviance | 1774.412 |
| Restr. deviance | 1774.413 | Restr. log likelihood | -887.2064 |
| LR statistic | 0.001136 | Avg. log likelihood | -0.654764 |
| Prob(LR statistic) | 0.973117 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 864 | Total obs | 1355 |
| Obs with Dep=1 | 491 | | |

Logit Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: AKBANK::Akbank\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

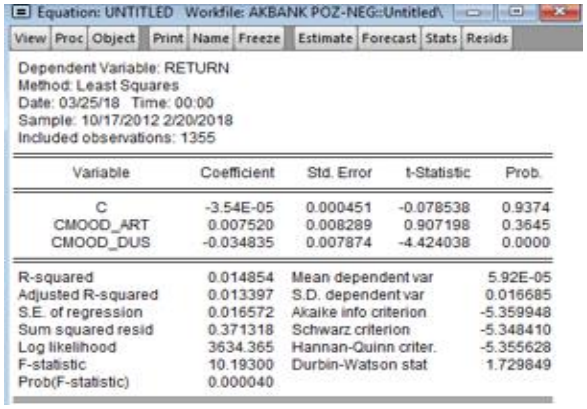
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 21:14
Sample (adjusted): 10/18/2012 2/20/2018
Included observations: 1354 after adjustments
Convergence achieved after 4 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.563382 | 0.056576 | -9.957945 | 0.0000 |
| CMOOD(-1) | 1.571742 | 1.518175 | 1.035284 | 0.3005 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.001328 | Mean dependent var | 0.362629 |
| S.D. dependent var | 0.480937 | S.E. of regression | 0.480773 |
| Akaike info criterion | 1.311047 | Sum squared resid | 312.5048 |
| Schwarz criterion | 1.318744 | Log likelihood | -885.5786 |
| Hannan-Quinn criter. | 1.313929 | Deviance | 1771.157 |
| Restr. deviance | 1773.512 | Restr. log likelihood | -886.7562 |
| LR statistic | 2.355222 | Avg. log likelihood | -0.654046 |
| Prob(LR statistic) | 0.124864 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 863 | Total obs | 1354 |
| Obs with Dep=1 | 491 | | |

OLS Regression Two Variable Results – Moody's



Equation: UNTITLED Workfile: AKBANK POZ-NEG::Untitled\

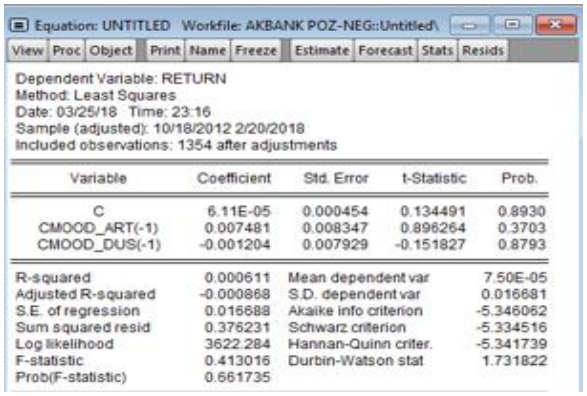
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 00:00
Sample: 10/17/2012 2/20/2018
Included observations: 1355

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -3.54E-05 | 0.000451 | -0.078538 | 0.9374 |
| CMOOD_ART | 0.007520 | 0.008289 | 0.907198 | 0.3645 |
| CMOOD_DUS | -0.034835 | 0.007874 | -4.424038 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.014854 | Mean dependent var | 5.92E-05 |
| Adjusted R-squared | 0.013397 | S.D. dependent var | 0.016685 |
| S.E. of regression | 0.016572 | Akaike info criterion | -5.359948 |
| Sum squared resid | 0.371318 | Schwarz criterion | -5.348410 |
| Log likelihood | 3634.365 | Hannan-Quinn criter. | -5.355628 |
| F-statistic | 10.19300 | Durbin-Watson stat | 1.729849 |
| Prob(F-statistic) | 0.000040 | | |

OLS Regression Two Variable Results – Moody's



Equation: UNTITLED Workfile: AKBANK POZ-NEG::Untitled\

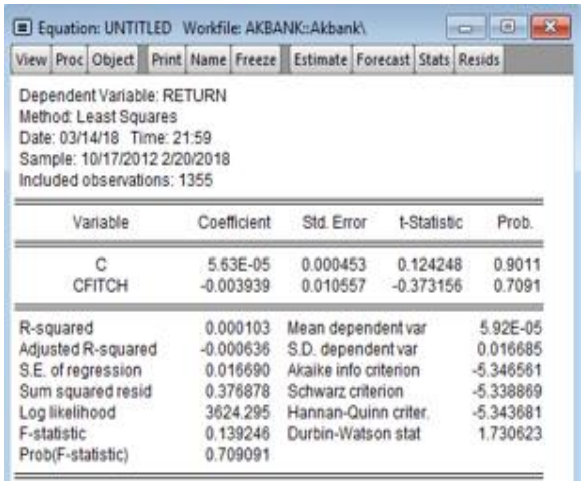
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:16
Sample (adjusted): 10/18/2012 2/20/2018
Included observations: 1354 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 6.11E-05 | 0.000454 | 0.134491 | 0.8930 |
| CMOOD_ART(-1) | 0.007481 | 0.008347 | 0.896264 | 0.3703 |
| CMOOD_DUS(-1) | -0.001204 | 0.007929 | -0.151827 | 0.8793 |

| | | | |
|---|---|---|---|
| R-squared | 0.000611 | Mean dependent var | 7.50E-05 |
| Adjusted R-squared | -0.000868 | S.D. dependent var | 0.016681 |
| S.E. of regression | 0.016688 | Akaike info criterion | -5.346062 |
| Sum squared resid | 0.376231 | Schwarz criterion | -5.334516 |
| Log likelihood | 3622.284 | Hannan-Quinn criter. | -5.341739 |
| F-statistic | 0.413016 | Durbin-Watson stat | 1.731822 |
| Prob(F-statistic) | 0.661735 | | |

OLS Regression One Variable Results - Fitch



Equation: UNTITLED Workfile: AKBANK::Akbank\

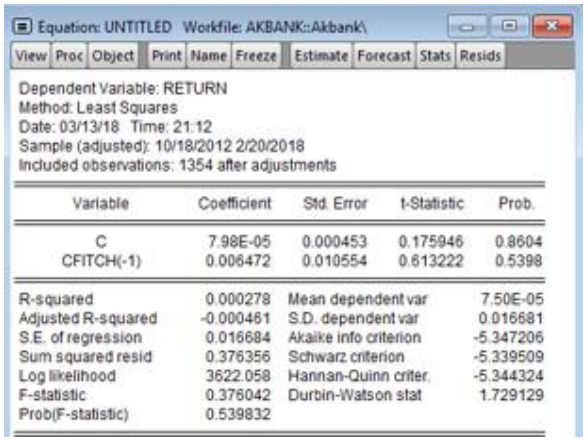
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 21:59
Sample: 10/17/2012 2/20/2018
Included observations: 1355

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 5.63E-05 | 0.000453 | 0.124248 | 0.9011 |
| CFITCH | -0.003939 | 0.010557 | -0.373156 | 0.7091 |

| | | | |
|---|---|---|---|
| R-squared | 0.000103 | Mean dependent var | 5.92E-05 |
| Adjusted R-squared | -0.000636 | S.D. dependent var | 0.016685 |
| S.E. of regression | 0.016690 | Akaike info criterion | -5.346561 |
| Sum squared resid | 0.376878 | Schwarz criterion | -5.338869 |
| Log likelihood | 3624.295 | Hannan-Quinn criter. | -5.343681 |
| F-statistic | 0.139246 | Durbin-Watson stat | 1.730623 |
| Prob(F-statistic) | 0.709091 | | |

OLS Regression One Variable Results - Fitch



Equation: UNTITLED Workfile: AKBANK::Akbank\

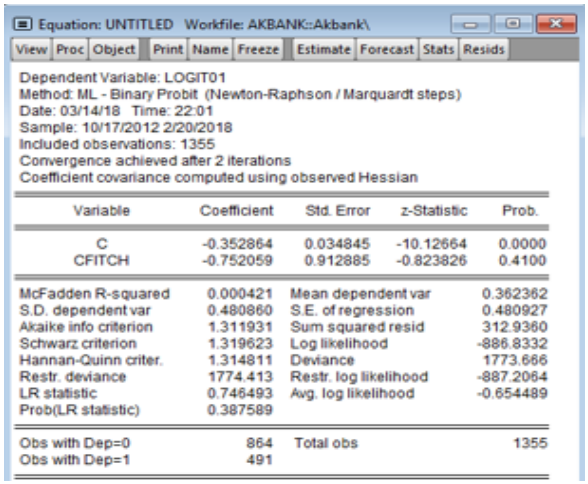
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 21:12
Sample (adjusted): 10/18/2012 2/20/2018
Included observations: 1354 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 7.98E-05 | 0.000453 | 0.175946 | 0.8604 |
| CFITCH(-1) | 0.006472 | 0.010554 | 0.613222 | 0.5398 |

| | | | |
|---|---|---|---|
| R-squared | 0.000278 | Mean dependent var | 7.50E-05 |
| Adjusted R-squared | -0.000461 | S.D. dependent var | 0.016681 |
| S.E. of regression | 0.016684 | Akaike info criterion | -5.347206 |
| Sum squared resid | 0.376356 | Schwarz criterion | -5.339509 |
| Log likelihood | 3622.058 | Hannan-Quinn criter. | -5.344324 |
| F-statistic | 0.376042 | Durbin-Watson stat | 1.729129 |
| Prob(F-statistic) | 0.539832 | | |

Probit Regression One Variable Results - Fitch



Equation: UNTITLED Workfile: AKBANK::Akbank\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

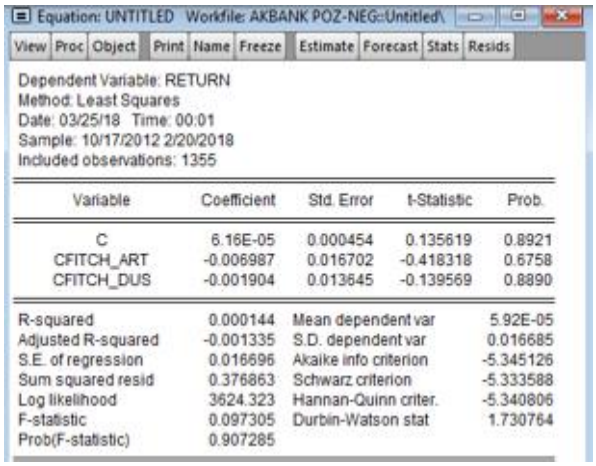
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:01
Sample: 10/17/2012 2/20/2018
Included observations: 1355
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.352864 | 0.034845 | -10.12664 | 0.0000 |
| CFITCH | -0.752059 | 0.912885 | -0.823826 | 0.4100 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000421 | Mean dependent var | 0.362362 |
| S.D. dependent var | 0.480860 | S.E. of regression | 0.480927 |
| Akaike info criterion | 1.311931 | Sum squared resid | 312.9360 |
| Schwarz criterion | 1.319623 | Log likelihood | -886.8332 |
| Hannan-Quinn criter. | 1.314811 | Deviance | 1773.666 |
| Restr. deviance | 1774.413 | Restr. log likelihood | -887.2064 |
| LR statistic | 0.746493 | Avg. log likelihood | -0.654489 |
| Prob(LR statistic) | 0.387589 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 864 | Total obs | 1355 |
| Obs with Dep=1 | 491 | | |

OLS Regression Two Variable Results - Fitch



Equation: UNTITLED Workfile: AKBANK POZ-NEG::Untitled\

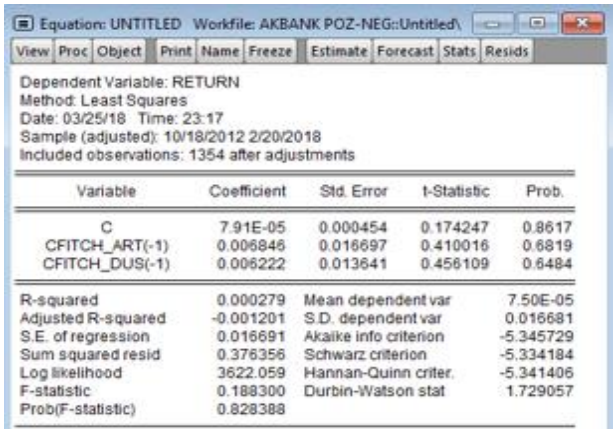
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 00:01
Sample: 10/17/2012 2/20/2018
Included observations: 1355

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 6.16E-05 | 0.000454 | 0.135619 | 0.8921 |
| CFITCH_ART | -0.006987 | 0.016702 | -0.418318 | 0.6758 |
| CFITCH_DUS | -0.001904 | 0.013645 | -0.139569 | 0.8890 |

| | | | |
|---|---|---|---|
| R-squared | 0.000144 | Mean dependent var | 5.92E-05 |
| Adjusted R-squared | -0.001335 | S.D. dependent var | 0.016685 |
| S.E. of regression | 0.016696 | Akaike info criterion | -5.345126 |
| Sum squared resid | 0.376863 | Schwarz criterion | -5.333588 |
| Log likelihood | 3624.323 | Hannan-Quinn criter. | -5.340806 |
| F-statistic | 0.097305 | Durbin-Watson stat | 1.730764 |
| Prob(F-statistic) | 0.907285 | | |

OLS Regression Two Variable Results - Fitch



Equation: UNTITLED Workfile: AKBANK POZ-NEG::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

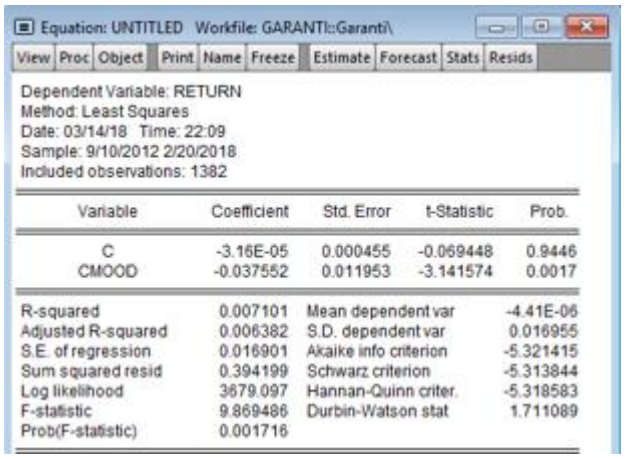
Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:17
Sample (adjusted): 10/18/2012 2/20/2018
Included observations: 1354 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 7.91E-05 | 0.000454 | 0.174247 | 0.8617 |
| CFITCH_ART(-1) | 0.006846 | 0.016697 | 0.410016 | 0.6819 |
| CFITCH_DUS(-1) | 0.006222 | 0.013641 | 0.456109 | 0.6484 |

| | | | |
|---|---|---|---|
| R-squared | 0.000279 | Mean dependent var | 7.50E-05 |
| Adjusted R-squared | -0.001201 | S.D. dependent var | 0.016681 |
| S.E. of regression | 0.016691 | Akaike info criterion | -5.345729 |
| Sum squared resid | 0.376356 | Schwarz criterion | -5.334184 |
| Log likelihood | 3622.059 | Hannan-Quinn criter. | -5.341406 |
| F-statistic | 0.188300 | Durbin-Watson stat | 1.729057 |
| Prob(F-statistic) | 0.828388 | | |

**B. Regression Result of Garanti Bankası**

OLS Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: GARANTI::Garanti\

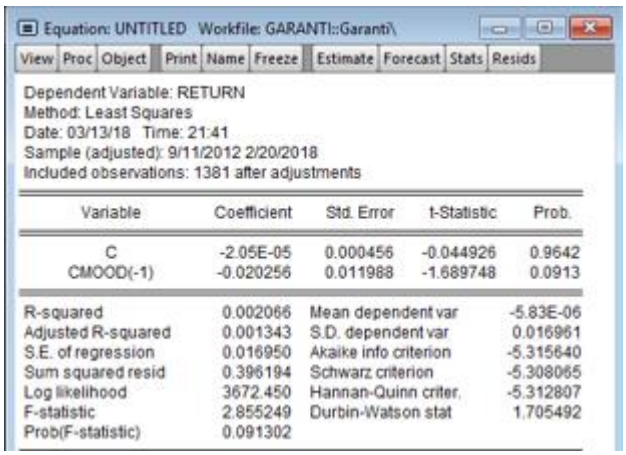
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:09
Sample: 9/10/2012 2/20/2018
Included observations: 1382

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -3.16E-05 | 0.000455 | -0.069448 | 0.9446 |
| CMOOD | -0.037552 | 0.011953 | -3.141574 | 0.0017 |

| | | | |
|---|---|---|---|
| R-squared | 0.007101 | Mean dependent var | -4.41E-06 |
| Adjusted R-squared | 0.006382 | S.D. dependent var | 0.016955 |
| S.E. of regression | 0.016901 | Akaike info criterion | -5.321415 |
| Sum squared resid | 0.394199 | Schwarz criterion | -5.313844 |
| Log likelihood | 3679.097 | Hannan-Quinn criter. | -5.318583 |
| F-statistic | 9.869486 | Durbin-Watson stat | 1.711089 |
| Prob(F-statistic) | 0.001716 | | |

OLS Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: GARANTI::Garanti\

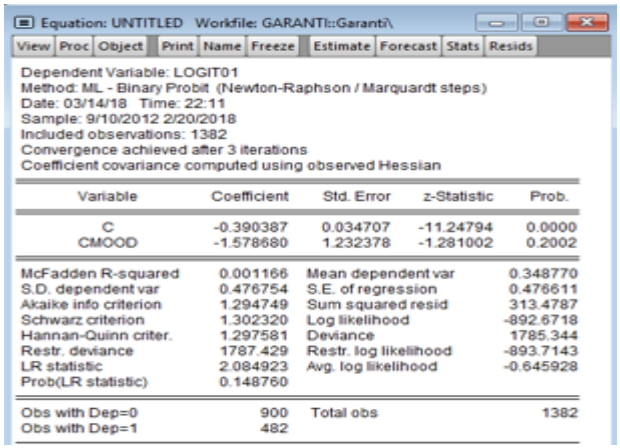
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 21:41
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -2.05E-05 | 0.000456 | -0.044926 | 0.9642 |
| CMOOD(-1) | -0.020256 | 0.011988 | -1.689748 | 0.0913 |

| | | | |
|---|---|---|---|
| R-squared | 0.002066 | Mean dependent var | -5.83E-06 |
| Adjusted R-squared | 0.001343 | S.D. dependent var | 0.016961 |
| S.E. of regression | 0.016950 | Akaike info criterion | -5.315640 |
| Sum squared resid | 0.396194 | Schwarz criterion | -5.308065 |
| Log likelihood | 3672.450 | Hannan-Quinn criter. | -5.312807 |
| F-statistic | 2.855249 | Durbin-Watson stat | 1.705492 |
| Prob(F-statistic) | 0.091302 | | |

Probit Regression One Variable – Moody's



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

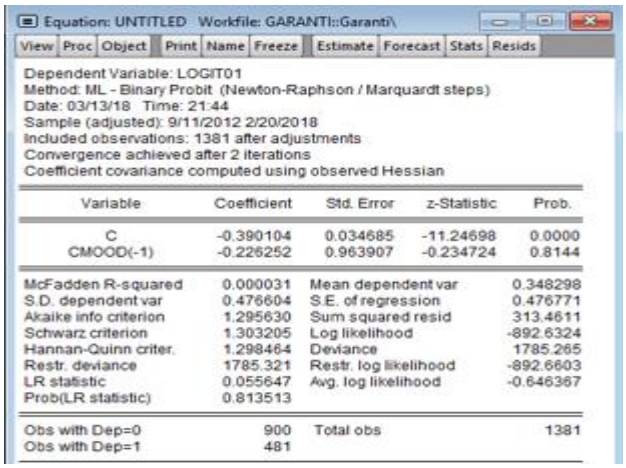
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:11
Sample: 9/10/2012 2/20/2018
Included observations: 1382
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.390387 | 0.034707 | -11.24794 | 0.0000 |
| CMOOD | -1.578680 | 1.232378 | -1.281002 | 0.2002 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.001166 | Mean dependent var | 0.348770 |
| S.D. dependent var | 0.476754 | S.E. of regression | 0.476611 |
| Akaike info criterion | 1.294749 | Sum squared resid | 313.4787 |
| Schwarz criterion | 1.302320 | Log likelihood | -892.6718 |
| Hannan-Quinn criter. | 1.297581 | Deviance | 1785.344 |
| Restr. deviance | 1787.429 | Restr. log likelihood | -893.7143 |
| LR statistic | 2.084923 | Avg. log likelihood | -0.645928 |
| Prob(LR statistic) | 0.148760 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1382 |
| Obs with Dep=1 | 482 | | |

Probit Regression One Variable – Moody's



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

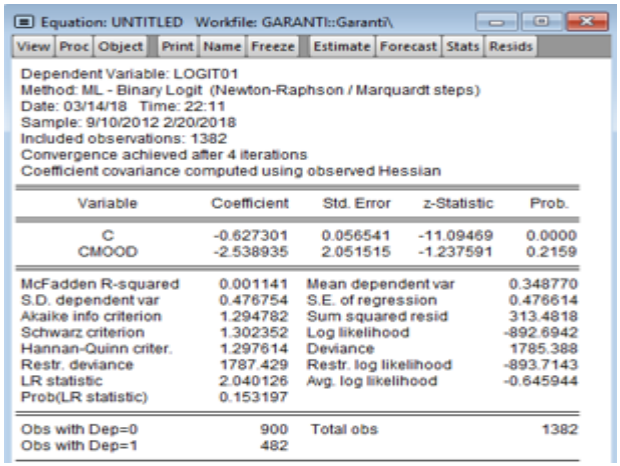
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 21:44
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.390104 | 0.034685 | -11.24698 | 0.0000 |
| CMOOD(-1) | -0.226252 | 0.963907 | -0.234724 | 0.8144 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000031 | Mean dependent var | 0.348298 |
| S.D. dependent var | 0.476604 | S.E. of regression | 0.476771 |
| Akaike info criterion | 1.295630 | Sum squared resid | 313.4611 |
| Schwarz criterion | 1.303205 | Log likelihood | -892.6324 |
| Hannan-Quinn criter. | 1.298464 | Deviance | 1785.265 |
| Restr. deviance | 1785.321 | Restr. log likelihood | -892.6603 |
| LR statistic | 0.055647 | Avg. log likelihood | -0.646367 |
| Prob(LR statistic) | 0.813513 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1381 |
| Obs with Dep=1 | 481 | | |

Logit Regression One Variable – Moody's



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

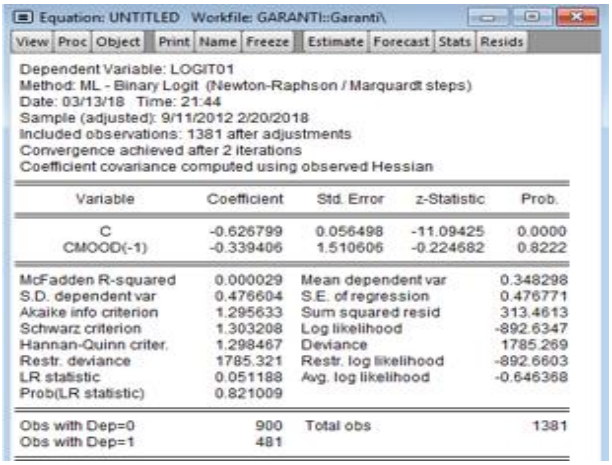
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:11
Sample: 9/10/2012 2/20/2018
Included observations: 1382
Convergence achieved after 4 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.627301 | 0.056541 | -11.09469 | 0.0000 |
| CMOOD | -2.538935 | 2.051515 | -1.237591 | 0.2159 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.001141 | Mean dependent var | 0.348770 |
| S.D. dependent var | 0.476754 | S.E. of regression | 0.476614 |
| Akaike info criterion | 1.294782 | Sum squared resid | 313.4818 |
| Schwarz criterion | 1.302352 | Log likelihood | -892.6942 |
| Hannan-Quinn criter. | 1.297614 | Deviance | 1785.388 |
| Restr. deviance | 1787.429 | Restr. log likelihood | -893.7143 |
| LR statistic | 2.040126 | Avg. log likelihood | -0.645944 |
| Prob(LR statistic) | 0.153197 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1382 |
| Obs with Dep=1 | 482 | | |

Logit Regression One Variable – Moody's



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

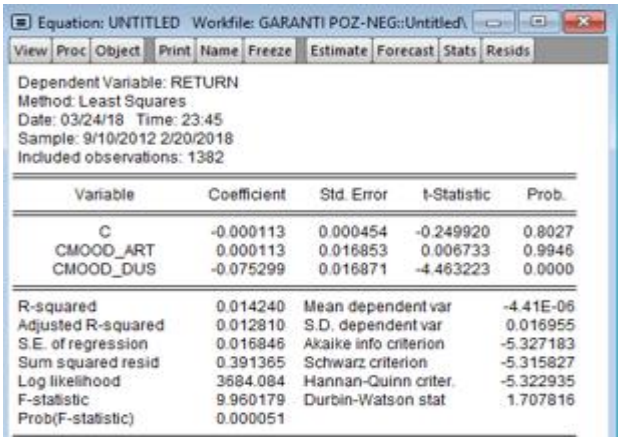
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 21:44
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.626799 | 0.056498 | -11.09425 | 0.0000 |
| CMOOD(-1) | -0.339406 | 1.510606 | -0.224682 | 0.8222 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000029 | Mean dependent var | 0.348298 |
| S.D. dependent var | 0.476604 | S.E. of regression | 0.476771 |
| Akaike info criterion | 1.295633 | Sum squared resid | 313.4613 |
| Schwarz criterion | 1.303208 | Log likelihood | -892.6347 |
| Hannan-Quinn criter. | 1.298467 | Deviance | 1785.269 |
| Restr. deviance | 1785.321 | Restr. log likelihood | -892.6603 |
| LR statistic | 0.051188 | Avg. log likelihood | -0.646368 |
| Prob(LR statistic) | 0.821009 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1381 |
| Obs with Dep=1 | 481 | | |

OLS Regression Two Variable – Moody's



Equation: UNTITLED Workfile: GARANTI POZ-NEG::Untitled\

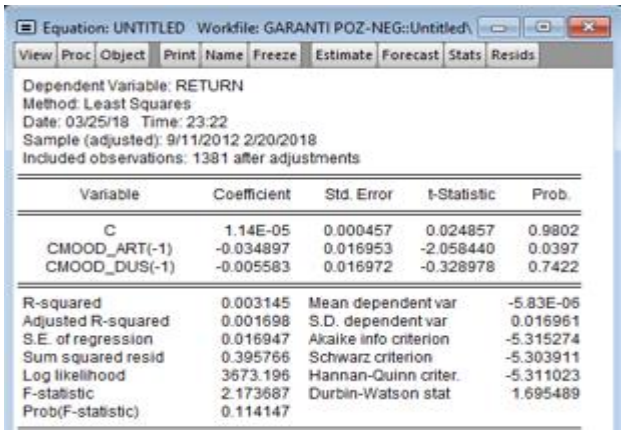
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/24/18 Time: 23:45
Sample: 9/10/2012 2/20/2018
Included observations: 1382

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.000113 | 0.000454 | -0.249920 | 0.8027 |
| CMOOD_ART | 0.000113 | 0.016853 | 0.006733 | 0.9946 |
| CMOOD_DUS | -0.075299 | 0.016871 | -4.463223 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.014240 | Mean dependent var | -4.41E-06 |
| Adjusted R-squared | 0.012810 | S.D. dependent var | 0.016955 |
| S.E. of regression | 0.016846 | Akaike info criterion | -5.327183 |
| Sum squared resid | 0.391365 | Schwarz criterion | -5.315827 |
| Log likelihood | 3684.084 | Hannan-Quinn criter. | -5.322935 |
| F-statistic | 9.960179 | Durbin-Watson stat | 1.707816 |
| Prob(F-statistic) | 0.000051 | | |

OLS Regression Two Variable – Moody's



Equation: UNTITLED Workfile: GARANTI POZ-NEG::Untitled\

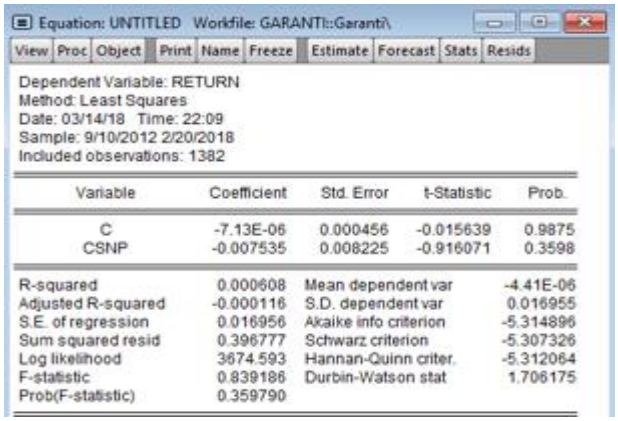
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:22
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 1.14E-05 | 0.000457 | 0.024857 | 0.9802 |
| CMOOD_ART(-1) | -0.034897 | 0.016953 | -2.058440 | 0.0397 |
| CMOOD_DUS(-1) | -0.005583 | 0.016972 | -0.328978 | 0.7422 |

| | | | |
|---|---|---|---|
| R-squared | 0.003145 | Mean dependent var | -5.83E-06 |
| Adjusted R-squared | 0.001698 | S.D. dependent var | 0.016961 |
| S.E. of regression | 0.016947 | Akaike info criterion | -5.315274 |
| Sum squared resid | 0.395766 | Schwarz criterion | -5.303911 |
| Log likelihood | 3673.196 | Hannan-Quinn criter. | -5.311023 |
| F-statistic | 2.173687 | Durbin-Watson stat | 1.695489 |
| Prob(F-statistic) | 0.114147 | | |

OLS Regression One Variable – S&P



Equation: UNTITLED Workfile: GARANTI::Garanti\

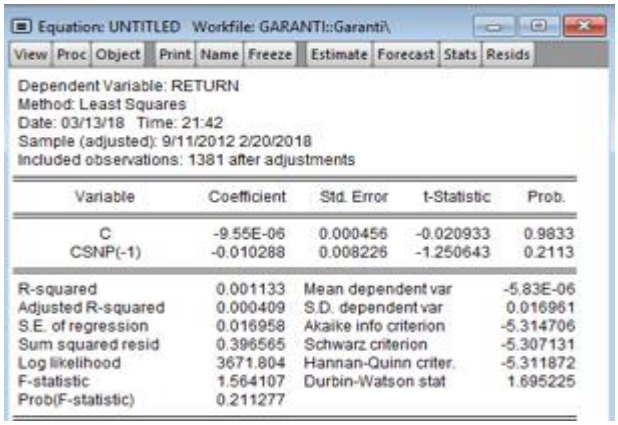
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:09
Sample: 9/10/2012 2/20/2018
Included observations: 1382

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -7.13E-06 | 0.000456 | -0.015639 | 0.9875 |
| CSNP | -0.007535 | 0.008225 | -0.916071 | 0.3598 |

| | | | |
|---|---|---|---|
| R-squared | 0.000608 | Mean dependent var | -4.41E-06 |
| Adjusted R-squared | -0.000116 | S.D. dependent var | 0.016955 |
| S.E. of regression | 0.016956 | Akaike info criterion | -5.314896 |
| Sum squared resid | 0.396777 | Schwarz criterion | -5.307326 |
| Log likelihood | 3674.593 | Hannan-Quinn criter. | -5.312064 |
| F-statistic | 0.839186 | Durbin-Watson stat | 1.706175 |
| Prob(F-statistic) | 0.359790 | | |

OLS Regression One Variable – S&P



Equation: UNTITLED Workfile: GARANTI::Garanti\

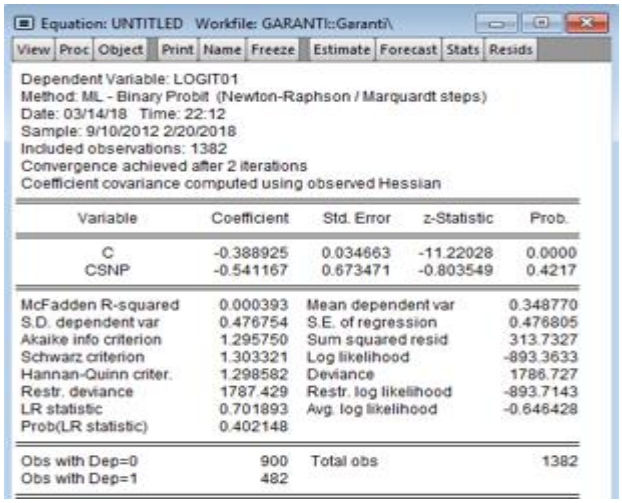
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 21:42
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -9.55E-06 | 0.000456 | -0.020933 | 0.9833 |
| CSNP(-1) | -0.010288 | 0.008226 | -1.250643 | 0.2113 |

| | | | |
|---|---|---|---|
| R-squared | 0.001133 | Mean dependent var | -5.83E-06 |
| Adjusted R-squared | 0.000409 | S.D. dependent var | 0.016961 |
| S.E. of regression | 0.016958 | Akaike info criterion | -5.314706 |
| Sum squared resid | 0.396565 | Schwarz criterion | -5.307131 |
| Log likelihood | 3671.804 | Hannan-Quinn criter. | -5.311872 |
| F-statistic | 1.564107 | Durbin-Watson stat | 1.695225 |
| Prob(F-statistic) | 0.211277 | | |

Probit Regression One Variable – S&P



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

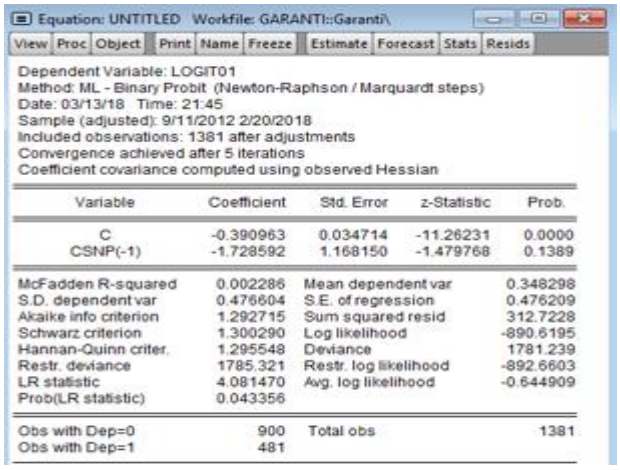
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:12
Sample: 9/10/2012 2/20/2018
Included observations: 1382
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.388925 | 0.034663 | -11.22028 | 0.0000 |
| CSNP | -0.541167 | 0.673471 | -0.803549 | 0.4217 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000393 | Mean dependent var | 0.348770 |
| S.D. dependent var | 0.476754 | S.E. of regression | 0.476805 |
| Akaike info criterion | 1.295750 | Sum squared resid | 313.7327 |
| Schwarz criterion | 1.303321 | Log likelihood | -893.3633 |
| Hannan-Quinn criter. | 1.298582 | Deviance | 1786.727 |
| Restr. deviance | 1787.429 | Restr. log likelihood | -893.7143 |
| LR statistic | 0.701893 | Avg. log likelihood | -0.646428 |
| Prob(LR statistic) | 0.402148 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1382 |
| Obs with Dep=1 | 482 | | |

Probit Regression One Variable – S&P



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

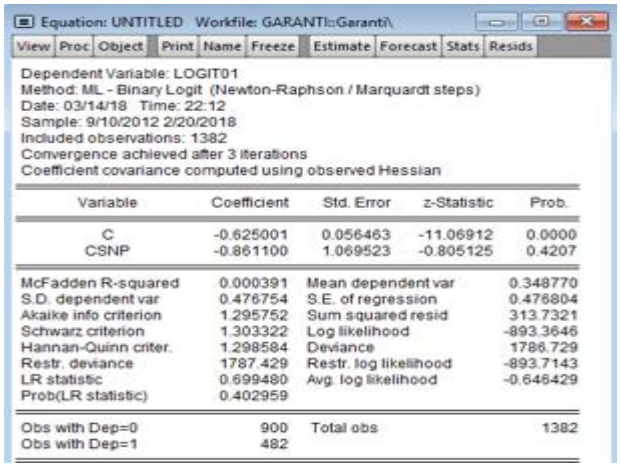
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 21:45
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments
Convergence achieved after 5 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.390963 | 0.034714 | -11.26231 | 0.0000 |
| CSNP(-1) | -1.728592 | 1.168150 | -1.479768 | 0.1389 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.002286 | Mean dependent var | 0.348298 |
| S.D. dependent var | 0.476604 | S.E. of regression | 0.476209 |
| Akaike info criterion | 1.292715 | Sum squared resid | 312.7228 |
| Schwarz criterion | 1.300290 | Log likelihood | -890.6195 |
| Hannan-Quinn criter. | 1.295548 | Deviance | 1781.239 |
| Restr. deviance | 1785.321 | Restr. log likelihood | -892.6603 |
| LR statistic | 4.081470 | Avg. log likelihood | -0.644909 |
| Prob(LR statistic) | 0.043356 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1381 |
| Obs with Dep=1 | 481 | | |

Logit Regression One Variable – S&P



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

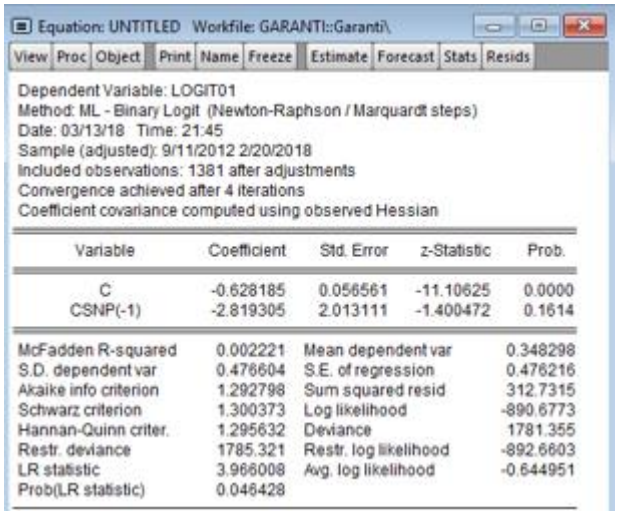
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:12
Sample: 9/10/2012 2/20/2018
Included observations: 1382
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.625001 | 0.056463 | -11.06912 | 0.0000 |
| CSNP | -0.861100 | 1.069523 | -0.805125 | 0.4207 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000391 | Mean dependent var | 0.348770 |
| S.D. dependent var | 0.476754 | S.E. of regression | 0.476804 |
| Akaike info criterion | 1.295752 | Sum squared resid | 313.7321 |
| Schwarz criterion | 1.303322 | Log likelihood | -893.3646 |
| Hannan-Quinn criter. | 1.298584 | Deviance | 1786.729 |
| Restr. deviance | 1787.429 | Restr. log likelihood | -893.7143 |
| LR statistic | 0.699480 | Avg. log likelihood | -0.646429 |
| Prob(LR statistic) | 0.402959 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1382 |
| Obs with Dep=1 | 482 | | |

Logit Regression One Variable – S&P



Equation: UNTITLED Workfile: GARANTI::Garanti\

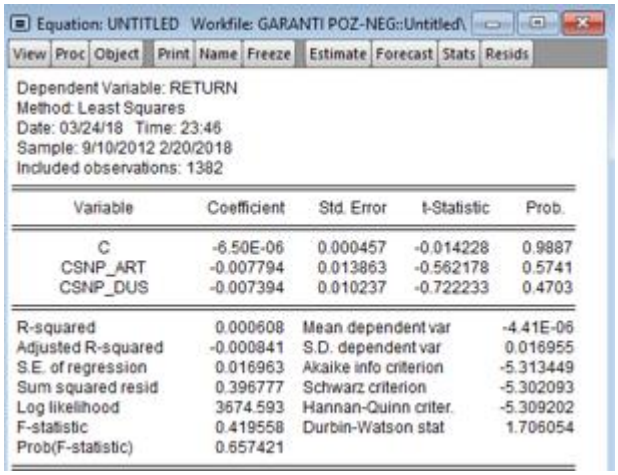
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 21:45
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments
Convergence achieved after 4 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.628185 | 0.056561 | -11.10625 | 0.0000 |
| CSNP(-1) | -2.819305 | 2.013111 | -1.400472 | 0.1614 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.002221 | Mean dependent var | 0.348298 |
| S.D. dependent var | 0.476604 | S.E. of regression | 0.476216 |
| Akaike info criterion | 1.292798 | Sum squared resid | 312.7315 |
| Schwarz criterion | 1.300373 | Log likelihood | -890.6773 |
| Hannan-Quinn criter. | 1.295632 | Deviance | 1781.355 |
| Restr. deviance | 1785.321 | Restr. log likelihood | -892.6603 |
| LR statistic | 3.966008 | Avg. log likelihood | -0.644951 |
| Prob(LR statistic) | 0.046428 | | |

OLS Regression Two Variable – S&P



Equation: UNTITLED Workfile: GARANTI POZ-NEG::Untitled\

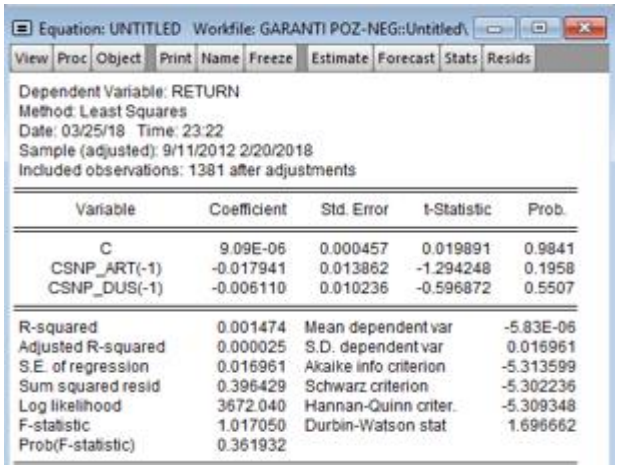
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/24/18 Time: 23:46
Sample: 9/10/2012 2/20/2018
Included observations: 1382

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -6.50E-06 | 0.000457 | -0.014228 | 0.9887 |
| CSNP_ART | -0.007794 | 0.013863 | -0.562178 | 0.5741 |
| CSNP_DUS | -0.007394 | 0.010237 | -0.722233 | 0.4703 |

| | | | |
|---|---|---|---|
| R-squared | 0.000608 | Mean dependent var | -4.41E-06 |
| Adjusted R-squared | -0.000841 | S.D. dependent var | 0.016955 |
| S.E. of regression | 0.016963 | Akaike info criterion | -5.313449 |
| Sum squared resid | 0.396777 | Schwarz criterion | -5.302093 |
| Log likelihood | 3674.593 | Hannan-Quinn criter. | -5.309202 |
| F-statistic | 0.419558 | Durbin-Watson stat | 1.706054 |
| Prob(F-statistic) | 0.657421 | | |

OLS Regression Two Variable – S&P



Equation: UNTITLED Workfile: GARANTI POZ-NEG::Untitled\

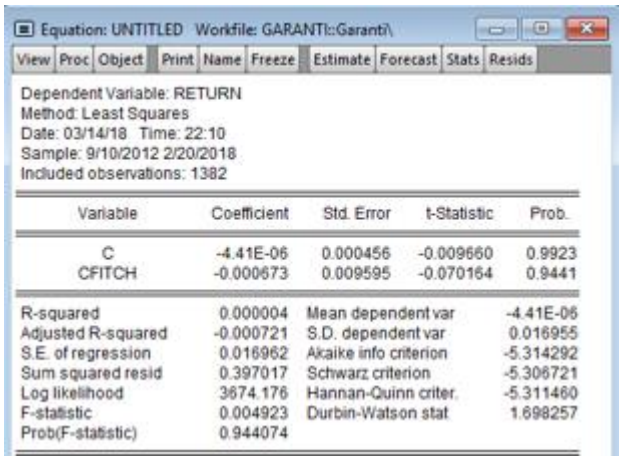
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:22
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 9.09E-06 | 0.000457 | 0.019891 | 0.9841 |
| CSNP_ART(-1) | -0.017941 | 0.013862 | -1.294248 | 0.1958 |
| CSNP_DUS(-1) | -0.006110 | 0.010236 | -0.596872 | 0.5507 |

| | | | |
|---|---|---|---|
| R-squared | 0.001474 | Mean dependent var | -5.83E-06 |
| Adjusted R-squared | 0.000025 | S.D. dependent var | 0.016961 |
| S.E. of regression | 0.016961 | Akaike info criterion | -5.313599 |
| Sum squared resid | 0.396429 | Schwarz criterion | -5.302236 |
| Log likelihood | 3672.040 | Hannan-Quinn criter. | -5.309348 |
| F-statistic | 1.017050 | Durbin-Watson stat | 1.696662 |
| Prob(F-statistic) | 0.361932 | | |

OLS Regression One Variable - Fitch



Equation: UNTITLED Workfile: GARANTI::Garanti\

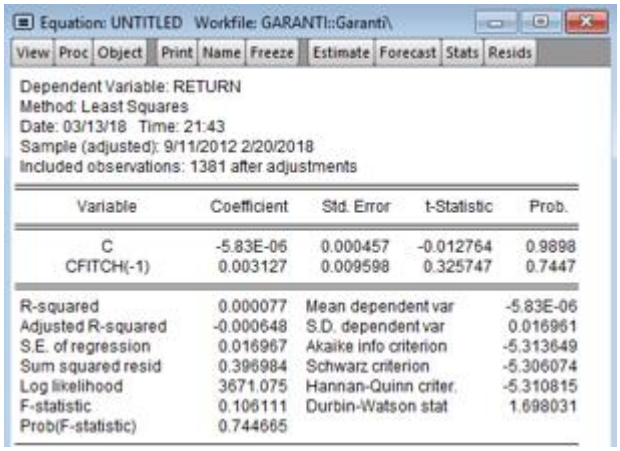
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:10
Sample: 9/10/2012 2/20/2018
Included observations: 1382

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -4.41E-06 | 0.000456 | -0.009660 | 0.9923 |
| CFITCH | -0.000673 | 0.009595 | -0.070164 | 0.9441 |

| | | | |
|---|---|---|---|
| R-squared | 0.000004 | Mean dependent var | -4.41E-06 |
| Adjusted R-squared | -0.000721 | S.D. dependent var | 0.016955 |
| S.E. of regression | 0.016962 | Akaike info criterion | -5.314292 |
| Sum squared resid | 0.397017 | Schwarz criterion | -5.306721 |
| Log likelihood | 3674.176 | Hannan-Quinn criter. | -5.311460 |
| F-statistic | 0.004923 | Durbin-Watson stat | 1.698257 |
| Prob(F-statistic) | 0.944074 | | |

OLS Regression One Variable - Fitch



Equation: UNTITLED Workfile: GARANTI::Garanti\

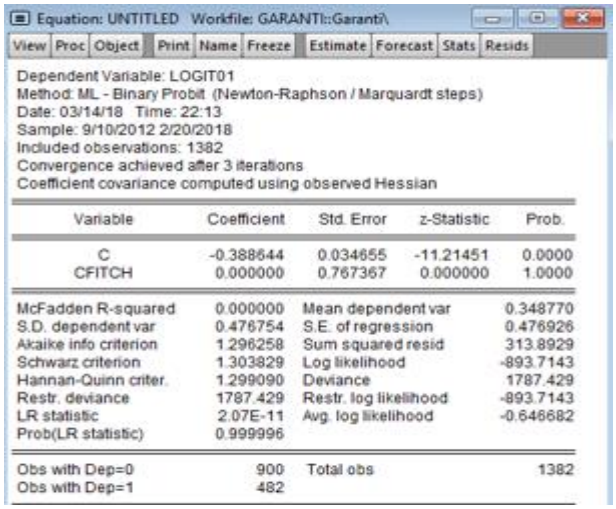
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 21:43
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -5.83E-06 | 0.000457 | -0.012764 | 0.9898 |
| CFITCH(-1) | 0.003127 | 0.009598 | 0.325747 | 0.7447 |

| | | | |
|---|---|---|---|
| R-squared | 0.000077 | Mean dependent var | -5.83E-06 |
| Adjusted R-squared | -0.000648 | S.D. dependent var | 0.016961 |
| S.E. of regression | 0.016967 | Akaike info criterion | -5.313649 |
| Sum squared resid | 0.396984 | Schwarz criterion | -5.306074 |
| Log likelihood | 3671.075 | Hannan-Quinn criter. | -5.310815 |
| F-statistic | 0.106111 | Durbin-Watson stat | 1.698031 |
| Prob(F-statistic) | 0.744665 | | |

Probit Regression One Variable - Fitch



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

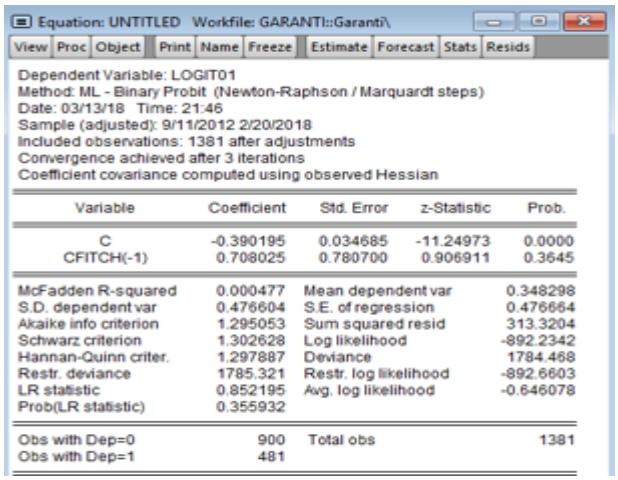
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:13
Sample: 9/10/2012 2/20/2018
Included observations: 1382
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.388644 | 0.034655 | -11.21451 | 0.0000 |
| CFITCH | 0.000000 | 0.767367 | 0.000000 | 1.0000 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000000 | Mean dependent var | 0.348770 |
| S.D. dependent var | 0.476754 | S.E. of regression | 0.476926 |
| Akaike info criterion | 1.296258 | Sum squared resid | 313.8929 |
| Schwarz criterion | 1.303829 | Log likelihood | -893.7143 |
| Hannan-Quinn criter. | 1.299090 | Deviance | 1787.429 |
| Restr. deviance | 1787.429 | Restr. log likelihood | -893.7143 |
| LR statistic | 2.07E-11 | Avg. log likelihood | -0.646682 |
| Prob(LR statistic) | 0.999996 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1382 |
| Obs with Dep=1 | 482 | | |

Probit Regression One Variable – Fitch



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

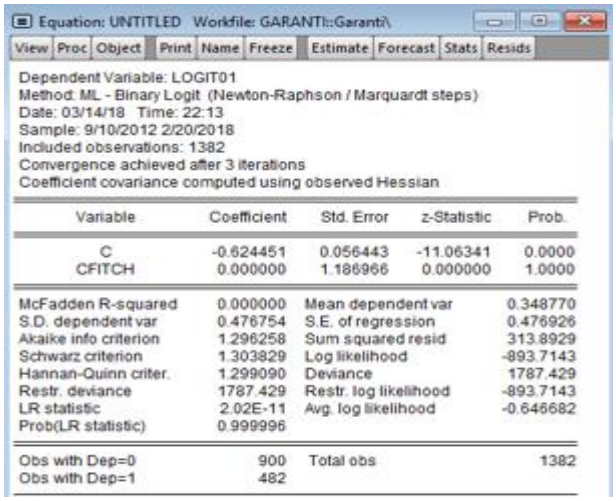
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 21:46
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.390195 | 0.034685 | -11.24973 | 0.0000 |
| CFITCH(-1) | 0.708025 | 0.780700 | 0.906911 | 0.3645 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000477 | Mean dependent var | 0.348298 |
| S.D. dependent var | 0.476604 | S.E. of regression | 0.476664 |
| Akaike info criterion | 1.295053 | Sum squared resid | 313.3204 |
| Schwarz criterion | 1.302628 | Log likelihood | -892.2342 |
| Hannan-Quinn criter. | 1.297887 | Deviance | 1784.468 |
| Restr. deviance | 1785.321 | Restr. log likelihood | -892.6603 |
| LR statistic | 0.852195 | Avg. log likelihood | -0.646078 |
| Prob(LR statistic) | 0.355932 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1381 |
| Obs with Dep=1 | 481 | | |

Probit Regression One Variable – Fitch



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

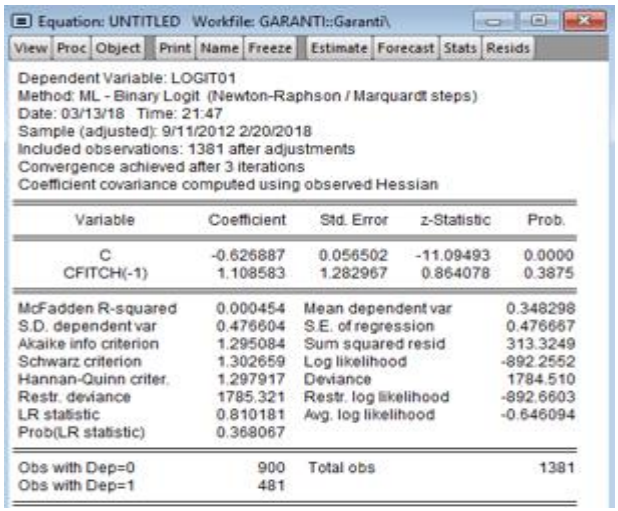
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:13
Sample: 9/10/2012 2/20/2018
Included observations: 1382
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.624451 | 0.056443 | -11.06341 | 0.0000 |
| CFITCH | 0.000000 | 1.186966 | 0.000000 | 1.0000 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000000 | Mean dependent var | 0.348770 |
| S.D. dependent var | 0.476754 | S.E. of regression | 0.476926 |
| Akaike info criterion | 1.296258 | Sum squared resid | 313.8929 |
| Schwarz criterion | 1.303829 | Log likelihood | -893.7143 |
| Hannan-Quinn criter. | 1.299090 | Deviance | 1787.429 |
| Restr. deviance | 1787.429 | Restr. log likelihood | -893.7143 |
| LR statistic | 2.02E-11 | Avg. log likelihood | -0.646682 |
| Prob(LR statistic) | 0.999996 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1382 |
| Obs with Dep=1 | 482 | | |

Probit Regression One Variable – Fitch



Equation: UNTITLED Workfile: GARANTI::Garanti\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

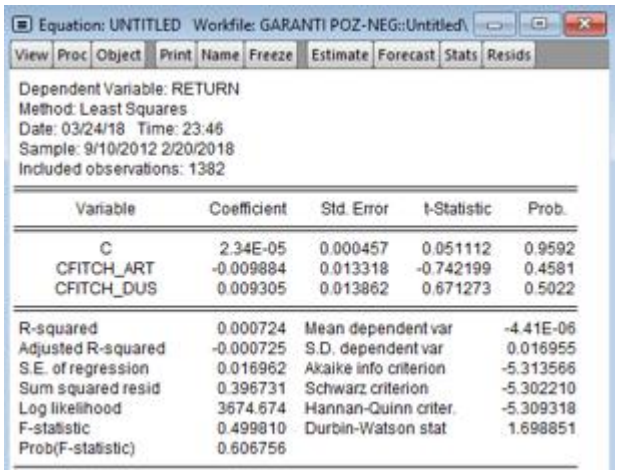
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 21:47
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.626887 | 0.056502 | -11.09493 | 0.0000 |
| CFITCH(-1) | 1.108583 | 1.282967 | 0.864078 | 0.3875 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000454 | Mean dependent var | 0.348298 |
| S.D. dependent var | 0.476604 | S.E. of regression | 0.476667 |
| Akaike info criterion | 1.295084 | Sum squared resid | 313.3249 |
| Schwarz criterion | 1.302659 | Log likelihood | -892.2552 |
| Hannan-Quinn criter. | 1.297917 | Deviance | 1784.510 |
| Restr. deviance | 1785.321 | Restr. log likelihood | -892.6603 |
| LR statistic | 0.810181 | Avg. log likelihood | -0.646094 |
| Prob(LR statistic) | 0.368067 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 900 | Total obs | 1381 |
| Obs with Dep=1 | 481 | | |

OLS Regression Two Variable - Fitch



Equation: UNTITLED Workfile: GARANTI POZ-NEG::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/24/18 Time: 23:46
Sample: 9/10/2012 2/20/2018
Included observations: 1382

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 2.34E-05 | 0.000457 | 0.051112 | 0.9592 |
| CFITCH_ART | -0.009884 | 0.013318 | -0.742199 | 0.4581 |
| CFITCH_DUS | 0.009305 | 0.013862 | 0.671273 | 0.5022 |

| | | | |
|---|---|---|---|
| R-squared | 0.000724 | Mean dependent var | -4.41E-06 |
| Adjusted R-squared | -0.000725 | S.D. dependent var | 0.016955 |
| S.E. of regression | 0.016962 | Akaike info criterion | -5.313566 |
| Sum squared resid | 0.396731 | Schwarz criterion | -5.302210 |
| Log likelihood | 3674.674 | Hannan-Quinn criter. | -5.309318 |
| F-statistic | 0.499810 | Durbin-Watson stat | 1.698851 |
| Prob(F-statistic) | 0.606756 | | |

OLS Regression Two Variable - Fitch

Equation: UNTITLED Workfile: GARANTI POZ-NEG::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:23
Sample (adjusted): 9/11/2012 2/20/2018
Included observations: 1381 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -5.84E-06 | 0.000458 | -0.012762 | 0.9898 |
| CFITCH_ART(-1) | 0.003131 | 0.013327 | 0.234909 | 0.8143 |
| CFITCH_DUS(-1) | 0.003122 | 0.013872 | 0.225068 | 0.8220 |

| | | | |
|---|---|---|---|
| R-squared | 0.000077 | Mean dependent var | -5.83E-06 |
| Adjusted R-squared | -0.001374 | S.D. dependent var | 0.016961 |
| S.E. of regression | 0.016973 | Akaike info criterion | -5.312201 |
| Sum squared resid | 0.396984 | Schwarz criterion | -5.300838 |
| Log likelihood | 3671.075 | Hannan-Quinn criter. | -5.307950 |
| F-statistic | 0.053017 | Durbin-Watson stat | 1.698029 |
| Prob(F-statistic) | 0.948366 | | |

## C. Regression Result of Yapı ve Kredi Bankası

OLS Regression One Variable – Moody's

Equation: UNTITLED Workfile: YAPıKREDİ::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:52
Sample: 12/03/2012 2/20/2018
Included observations: 1322

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 6.96E-05 | 0.000434 | 0.160434 | 0.8726 |
| CMOOD | -0.017251 | 0.012150 | -1.419771 | 0.1559 |

| | | | |
|---|---|---|---|
| R-squared | 0.001525 | Mean dependent var | 0.000106 |
| Adjusted R-squared | 0.000768 | S.D. dependent var | 0.015763 |
| S.E. of regression | 0.015757 | Akaike info criterion | -5.461566 |
| Sum squared resid | 0.327729 | Schwarz criterion | -5.453718 |
| Log likelihood | 3612.095 | Hannan-Quinn criter. | -5.458624 |
| F-statistic | 2.015750 | Durbin-Watson stat | 1.652788 |
| Prob(F-statistic) | 0.155910 | | |

OLS Regression One Variable – Moody's

Equation: UNTITLED Workfile: YAPıKREDİ::Untitled\

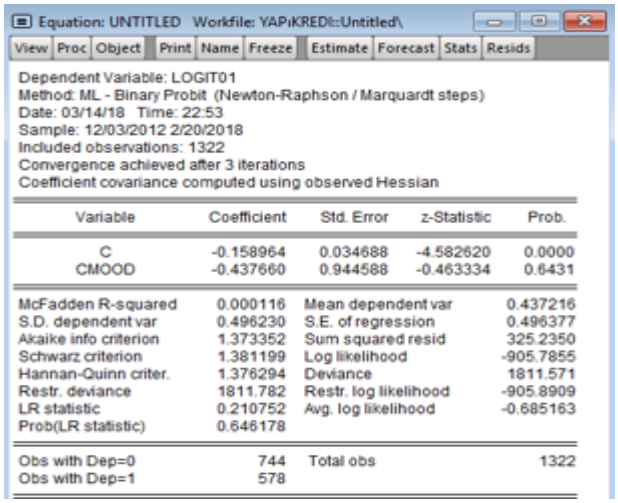
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 20:23
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.000130 | 0.000434 | 0.299961 | 0.7643 |
| CMOOD(-1) | 0.015193 | 0.012155 | 1.249896 | 0.2116 |

| | | | |
|---|---|---|---|
| R-squared | 0.001183 | Mean dependent var | 9.87E-05 |
| Adjusted R-squared | 0.000426 | S.D. dependent var | 0.015767 |
| S.E. of regression | 0.015764 | Akaike info criterion | -5.460713 |
| Sum squared resid | 0.327760 | Schwarz criterion | -5.452861 |
| Log likelihood | 3608.801 | Hannan-Quinn criter. | -5.457769 |
| F-statistic | 1.562239 | Durbin-Watson stat | 1.653169 |
| Prob(F-statistic) | 0.211559 | | |

Probit Regression One Variable – Moody's



Equation: UNTITLED Workfile: YAPsKRED\::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

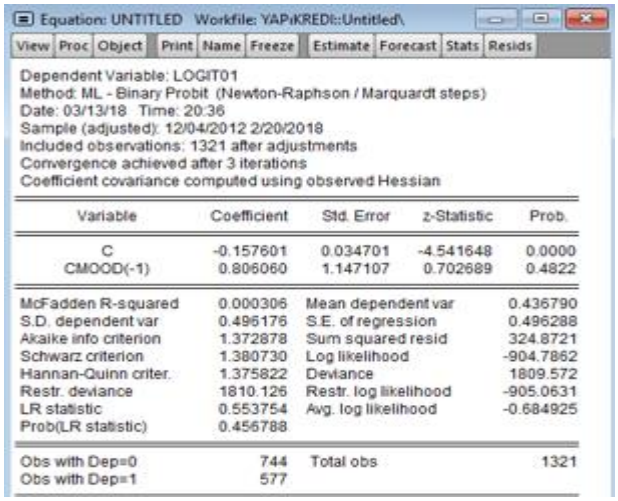
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:53
Sample: 12/03/2012 2/20/2018
Included observations: 1322
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.158964 | 0.034688 | -4.582620 | 0.0000 |
| CMOOD | -0.437660 | 0.944588 | -0.463334 | 0.6431 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000116 | Mean dependent var | 0.437216 |
| S.D. dependent var | 0.496230 | S.E. of regression | 0.496377 |
| Akaike info criterion | 1.373352 | Sum squared resid | 325.2350 |
| Schwarz criterion | 1.381199 | Log likelihood | -905.7855 |
| Hannan-Quinn criter. | 1.376294 | Deviance | 1811.571 |
| Restr. deviance | 1811.782 | Restr. log likelihood | -905.8909 |
| LR statistic | 0.210752 | Avg. log likelihood | -0.685163 |
| Prob(LR statistic) | 0.646178 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1322 |
| Obs with Dep=1 | 578 | | |

Probit Regression One Variable – Moody's



Equation: UNTITLED Workfile: YAPsKRED\::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

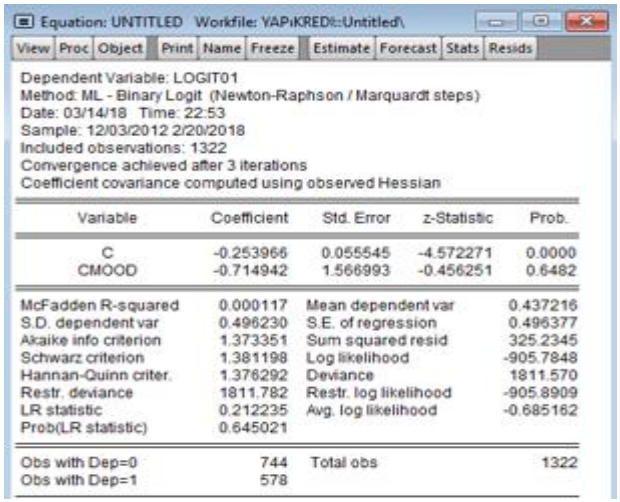
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 20:36
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.157601 | 0.034701 | -4.541648 | 0.0000 |
| CMOOD(-1) | 0.806060 | 1.147107 | 0.702689 | 0.4822 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000306 | Mean dependent var | 0.436790 |
| S.D. dependent var | 0.496176 | S.E. of regression | 0.496288 |
| Akaike info criterion | 1.372878 | Sum squared resid | 324.8721 |
| Schwarz criterion | 1.380730 | Log likelihood | -904.7862 |
| Hannan-Quinn criter. | 1.375822 | Deviance | 1809.572 |
| Restr. deviance | 1810.126 | Restr. log likelihood | -905.0631 |
| LR statistic | 0.553754 | Avg. log likelihood | -0.684925 |
| Prob(LR statistic) | 0.456788 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1321 |
| Obs with Dep=1 | 577 | | |

Logit Regression One Variable – Moody's



Equation: UNTITLED Workfile: YAPsKRED\::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

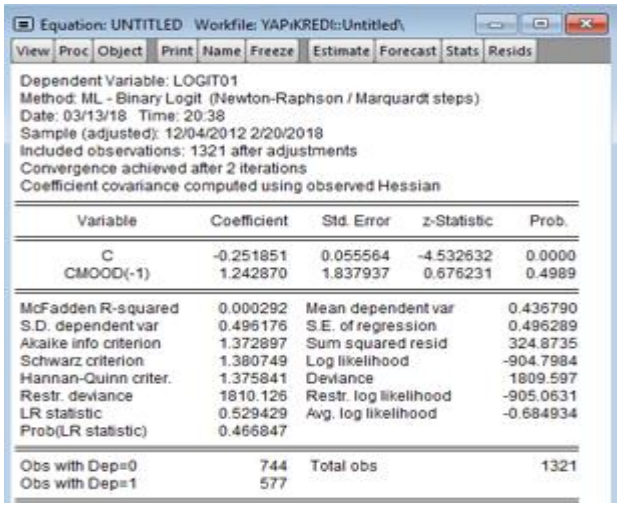
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:53
Sample: 12/03/2012 2/20/2018
Included observations: 1322
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.253966 | 0.055545 | -4.572271 | 0.0000 |
| CMOOD | -0.714942 | 1.566993 | -0.456251 | 0.6482 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000117 | Mean dependent var | 0.437216 |
| S.D. dependent var | 0.496230 | S.E. of regression | 0.496377 |
| Akaike info criterion | 1.373351 | Sum squared resid | 325.2345 |
| Schwarz criterion | 1.381198 | Log likelihood | -905.7848 |
| Hannan-Quinn criter. | 1.376292 | Deviance | 1811.570 |
| Restr. deviance | 1811.782 | Restr. log likelihood | -905.8909 |
| LR statistic | 0.212235 | Avg. log likelihood | -0.685162 |
| Prob(LR statistic) | 0.645021 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1322 |
| Obs with Dep=1 | 578 | | |

Logit Regression One Variable – Moody's



Equation: UNTITLED Workfile: YAPsKRED\::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

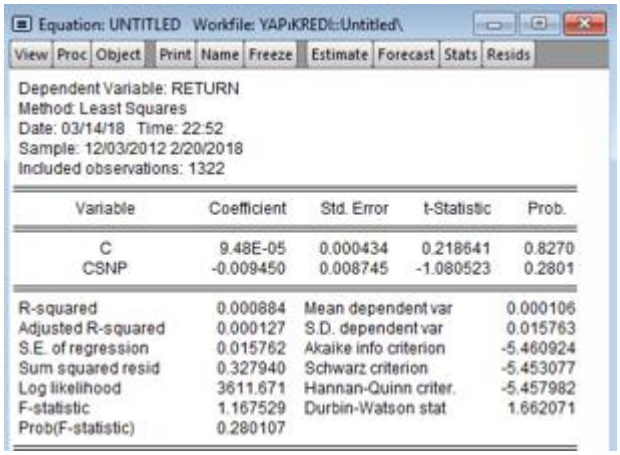
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 20:38
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.251851 | 0.055564 | -4.532632 | 0.0000 |
| CMOOD(-1) | 1.242870 | 1.837937 | 0.676231 | 0.4989 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000292 | Mean dependent var | 0.436790 |
| S.D. dependent var | 0.496176 | S.E. of regression | 0.496289 |
| Akaike info criterion | 1.372897 | Sum squared resid | 324.8735 |
| Schwarz criterion | 1.380749 | Log likelihood | -904.7984 |
| Hannan-Quinn criter. | 1.375841 | Deviance | 1809.597 |
| Restr. deviance | 1810.126 | Restr. log likelihood | -905.0631 |
| LR statistic | 0.529429 | Avg. log likelihood | -0.684934 |
| Prob(LR statistic) | 0.466847 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1321 |
| Obs with Dep=1 | 577 | | |

OLS Regression One Variable – S&P



Equation: UNTITLED Workfile: YAPsKRED\::Untitled\

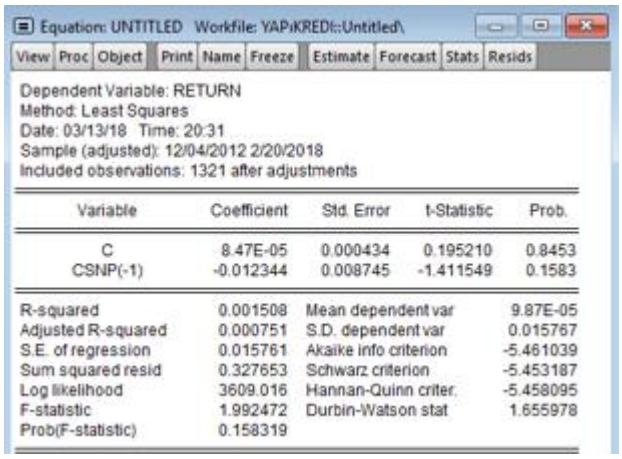
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:52
Sample: 12/03/2012 2/20/2018
Included observations: 1322

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 9.48E-05 | 0.000434 | 0.218641 | 0.8270 |
| CSNP | -0.009450 | 0.008745 | -1.080523 | 0.2801 |

| | | | |
|---|---|---|---|
| R-squared | 0.000884 | Mean dependent var | 0.000106 |
| Adjusted R-squared | 0.000127 | S.D. dependent var | 0.015763 |
| S.E. of regression | 0.015762 | Akaike info criterion | -5.460924 |
| Sum squared resid | 0.327940 | Schwarz criterion | -5.453077 |
| Log likelihood | 3611.671 | Hannan-Quinn criter. | -5.457982 |
| F-statistic | 1.167529 | Durbin-Watson stat | 1.662071 |
| Prob(F-statistic) | 0.280107 | | |

OLS Regression One Variable – S&P



Equation: UNTITLED Workfile: YAPsKRED\::Untitled\

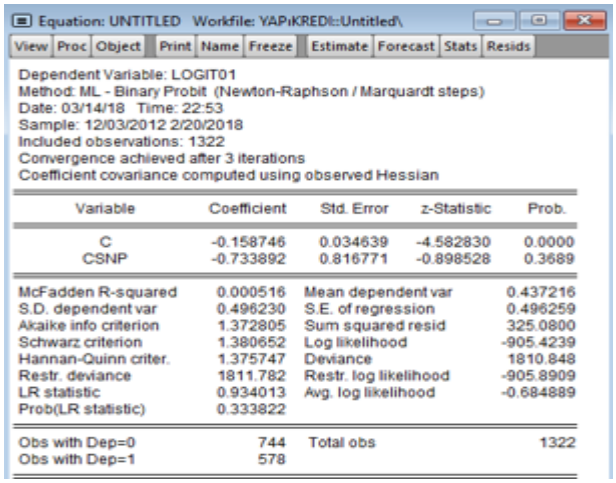
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 20:31
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 8.47E-05 | 0.000434 | 0.195210 | 0.8453 |
| CSNP(-1) | -0.012344 | 0.008745 | -1.411549 | 0.1583 |

| | | | |
|---|---|---|---|
| R-squared | 0.001508 | Mean dependent var | 9.87E-05 |
| Adjusted R-squared | 0.000751 | S.D. dependent var | 0.015767 |
| S.E. of regression | 0.015761 | Akaike info criterion | -5.461039 |
| Sum squared resid | 0.327653 | Schwarz criterion | -5.453187 |
| Log likelihood | 3609.016 | Hannan-Quinn criter. | -5.458095 |
| F-statistic | 1.992472 | Durbin-Watson stat | 1.655978 |
| Prob(F-statistic) | 0.158319 | | |

Probit Regression One Variable – S&P



Equation: UNTITLED Workfile: YAPıKREDİ::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

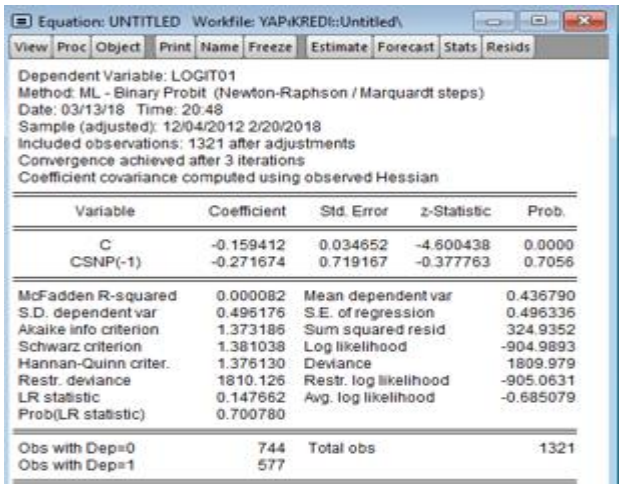
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:53
Sample: 12/03/2012 2/20/2018
Included observations: 1322
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.158746 | 0.034639 | -4.582830 | 0.0000 |
| CSNP | -0.733892 | 0.816771 | -0.898528 | 0.3689 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000516 | Mean dependent var | 0.437216 |
| S.D. dependent var | 0.496230 | S.E. of regression | 0.496259 |
| Akaike info criterion | 1.372805 | Sum squared resid | 325.0800 |
| Schwarz criterion | 1.380652 | Log likelihood | -905.4239 |
| Hannan-Quinn criter. | 1.375747 | Deviance | 1810.848 |
| Restr. deviance | 1811.782 | Restr. log likelihood | -905.8909 |
| LR statistic | 0.934013 | Avg. log likelihood | -0.684889 |
| Prob(LR statistic) | 0.333822 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1322 |
| Obs with Dep=1 | 578 | | |

Probit Regression One Variable – S&P



Equation: UNTITLED Workfile: YAPıKREDİ::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

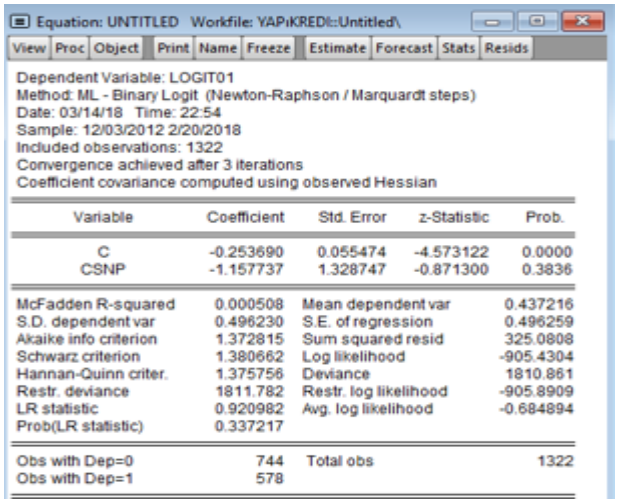
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 20:48
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.159412 | 0.034652 | -4.600438 | 0.0000 |
| CSNP(-1) | -0.271674 | 0.719167 | -0.377763 | 0.7056 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000082 | Mean dependent var | 0.436790 |
| S.D. dependent var | 0.496176 | S.E. of regression | 0.496336 |
| Akaike info criterion | 1.373186 | Sum squared resid | 324.9352 |
| Schwarz criterion | 1.381038 | Log likelihood | -904.9893 |
| Hannan-Quinn criter. | 1.376130 | Deviance | 1809.979 |
| Restr. deviance | 1810.126 | Restr. log likelihood | -905.0631 |
| LR statistic | 0.147662 | Avg. log likelihood | -0.685079 |
| Prob(LR statistic) | 0.700780 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1321 |
| Obs with Dep=1 | 577 | | |

Logit Regression One Variable – S&P



Equation: UNTITLED Workfile: YAPıKREDİ::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

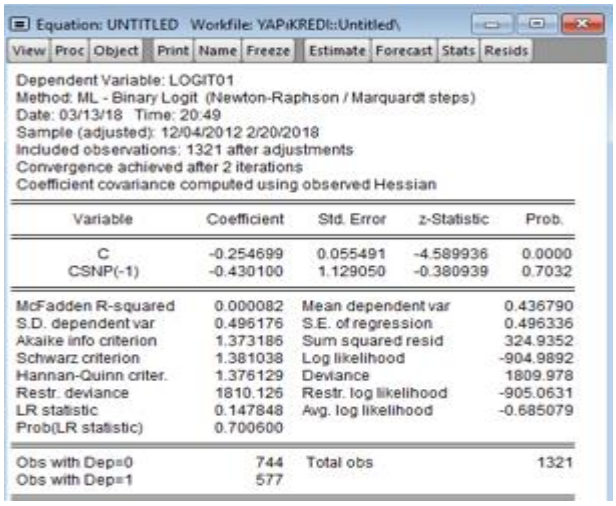
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:54
Sample: 12/03/2012 2/20/2018
Included observations: 1322
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.253690 | 0.055474 | -4.573122 | 0.0000 |
| CSNP | -1.157737 | 1.328747 | -0.871300 | 0.3836 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000508 | Mean dependent var | 0.437216 |
| S.D. dependent var | 0.496230 | S.E. of regression | 0.496259 |
| Akaike info criterion | 1.372815 | Sum squared resid | 325.0808 |
| Schwarz criterion | 1.380662 | Log likelihood | -905.4304 |
| Hannan-Quinn criter. | 1.375756 | Deviance | 1810.861 |
| Restr. deviance | 1811.782 | Restr. log likelihood | -905.8909 |
| LR statistic | 0.920982 | Avg. log likelihood | -0.684894 |
| Prob(LR statistic) | 0.337217 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1322 |
| Obs with Dep=1 | 578 | | |

Logit Regression One Variable – S&P



Equation: UNTITLED Workfile: YAP\KREDI::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

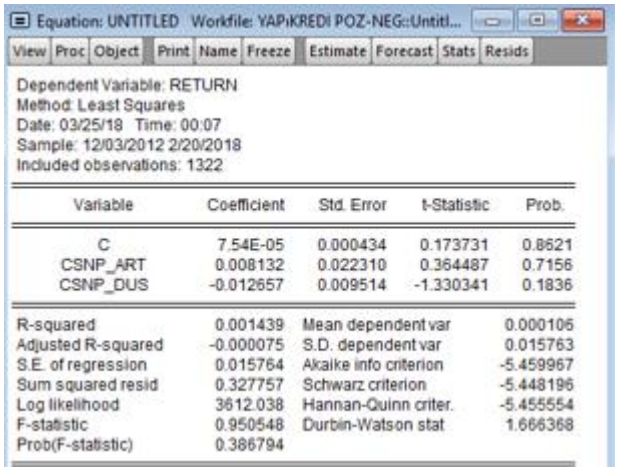
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 20:49
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.254699 | 0.055491 | -4.589936 | 0.0000 |
| CSNP(-1) | -0.430100 | 1.129050 | -0.380939 | 0.7032 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000082 | Mean dependent var | 0.436790 |
| S.D. dependent var | 0.496176 | S.E. of regression | 0.496336 |
| Akaike info criterion | 1.373186 | Sum squared resid | 324.9352 |
| Schwarz criterion | 1.381038 | Log likelihood | -904.9892 |
| Hannan-Quinn criter. | 1.376129 | Deviance | 1809.978 |
| Restr. deviance | 1810.126 | Restr. log likelihood | -905.0631 |
| LR statistic | 0.147848 | Avg. log likelihood | -0.685079 |
| Prob(LR statistic) | 0.700600 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1321 |
| Obs with Dep=1 | 577 | | |

OLS Regression Two Variable – S&P



Equation: UNTITLED Workfile: YAP\KREDI POZ-NEG::Untitl...

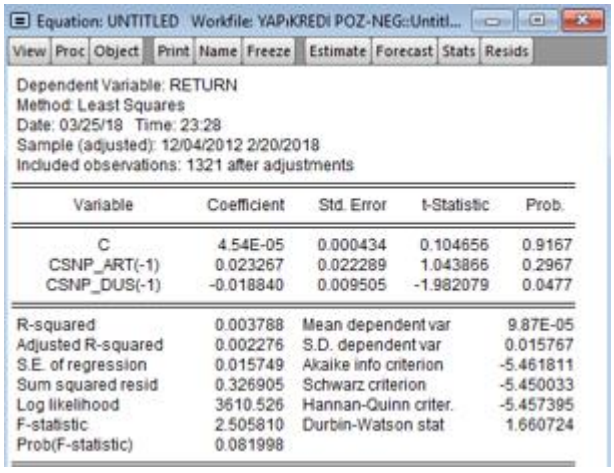
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 00:07
Sample: 12/03/2012 2/20/2018
Included observations: 1322

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 7.54E-05 | 0.000434 | 0.173731 | 0.8621 |
| CSNP_ART | 0.008132 | 0.022310 | 0.364487 | 0.7156 |
| CSNP_DUS | -0.012657 | 0.009514 | -1.330341 | 0.1836 |

| | | | |
|---|---|---|---|
| R-squared | 0.001439 | Mean dependent var | 0.000105 |
| Adjusted R-squared | -0.000075 | S.D. dependent var | 0.015763 |
| S.E. of regression | 0.015764 | Akaike info criterion | -5.459967 |
| Sum squared resid | 0.327757 | Schwarz criterion | -5.448196 |
| Log likelihood | 3612.038 | Hannan-Quinn criter. | -5.455554 |
| F-statistic | 0.950548 | Durbin-Watson stat | 1.666368 |
| Prob(F-statistic) | 0.386794 | | |

OLS Regression Two Variable – S&P



Equation: UNTITLED Workfile: YAP\KREDI POZ-NEG::Untitl...

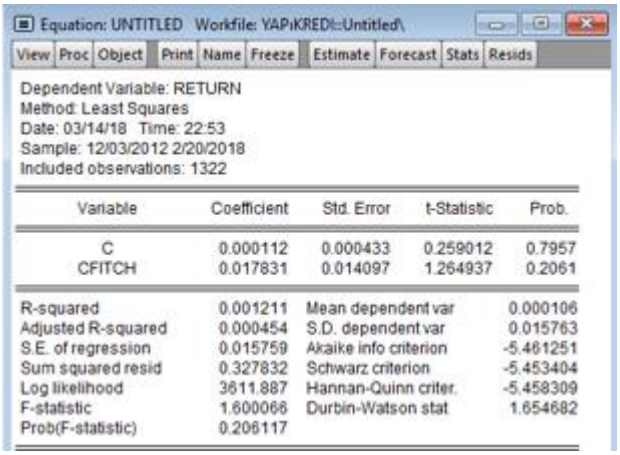
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:28
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 4.54E-05 | 0.000434 | 0.104656 | 0.9167 |
| CSNP_ART(-1) | 0.023267 | 0.022289 | 1.043866 | 0.2967 |
| CSNP_DUS(-1) | -0.018840 | 0.009505 | -1.982079 | 0.0477 |

| | | | |
|---|---|---|---|
| R-squared | 0.003788 | Mean dependent var | 9.87E-05 |
| Adjusted R-squared | 0.002276 | S.D. dependent var | 0.015767 |
| S.E. of regression | 0.015749 | Akaike info criterion | -5.461811 |
| Sum squared resid | 0.326905 | Schwarz criterion | -5.450033 |
| Log likelihood | 3610.526 | Hannan-Quinn criter. | -5.457395 |
| F-statistic | 2.505810 | Durbin-Watson stat | 1.660724 |
| Prob(F-statistic) | 0.081998 | | |

OLS Regression One Variable – Fitch



Equation: UNTITLED Workfile: YAPıKREDİ::Untitled\

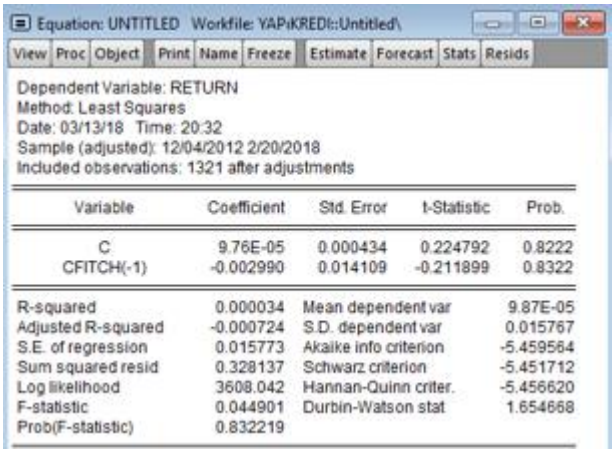
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:53
Sample: 12/03/2012 2/20/2018
Included observations: 1322

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.000112 | 0.000433 | 0.259012 | 0.7957 |
| CFITCH | 0.017831 | 0.014097 | 1.264937 | 0.2061 |

| | | | |
|---|---|---|---|
| R-squared | 0.001211 | Mean dependent var | 0.000106 |
| Adjusted R-squared | 0.000454 | S.D. dependent var | 0.015763 |
| S.E. of regression | 0.015759 | Akaike info criterion | -5.461251 |
| Sum squared resid | 0.327832 | Schwarz criterion | -5.453404 |
| Log likelihood | 3611.887 | Hannan-Quinn criter. | -5.458309 |
| F-statistic | 1.600066 | Durbin-Watson stat | 1.654682 |
| Prob(F-statistic) | 0.206117 | | |

OLS Regression One Variable – Fitch



Equation: UNTITLED Workfile: YAPıKREDİ::Untitled\

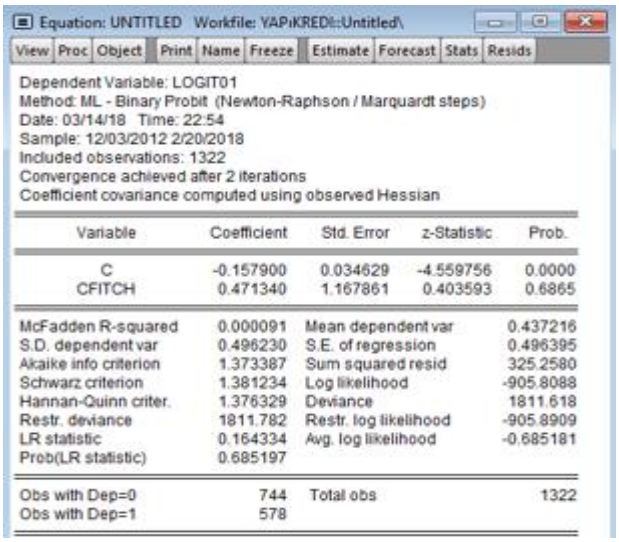
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 20:32
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 9.76E-05 | 0.000434 | 0.224792 | 0.8222 |
| CFITCH(-1) | -0.002990 | 0.014109 | -0.211899 | 0.8322 |

| | | | |
|---|---|---|---|
| R-squared | 0.000034 | Mean dependent var | 9.87E-05 |
| Adjusted R-squared | -0.000724 | S.D. dependent var | 0.015767 |
| S.E. of regression | 0.015773 | Akaike info criterion | -5.459564 |
| Sum squared resid | 0.328137 | Schwarz criterion | -5.451712 |
| Log likelihood | 3608.042 | Hannan-Quinn criter. | -5.456620 |
| F-statistic | 0.044901 | Durbin-Watson stat | 1.654668 |
| Prob(F-statistic) | 0.832219 | | |

Probit Regression One Variable – Fitch



Equation: UNTITLED Workfile: YAPıKREDİ::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

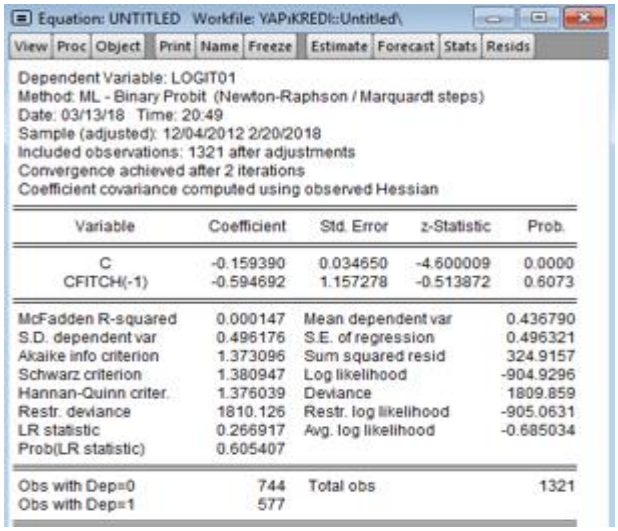
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:54
Sample: 12/03/2012 2/20/2018
Included observations: 1322
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.157900 | 0.034629 | -4.559756 | 0.0000 |
| CFITCH | 0.471340 | 1.167861 | 0.403593 | 0.6865 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000091 | Mean dependent var | 0.437216 |
| S.D. dependent var | 0.496230 | S.E. of regression | 0.496395 |
| Akaike info criterion | 1.373387 | Sum squared resid | 325.2580 |
| Schwarz criterion | 1.381234 | Log likelihood | -905.8088 |
| Hannan-Quinn criter. | 1.376329 | Deviance | 1811.618 |
| Restr. deviance | 1811.782 | Restr. log likelihood | -905.8909 |
| LR statistic | 0.164334 | Avg. log likelihood | -0.685181 |
| Prob(LR statistic) | 0.685197 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1322 |
| Obs with Dep=1 | 578 | | |

Probit Regression One Variable – Fitch



Equation: UNTITLED Workfile: YAPiKREDI::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

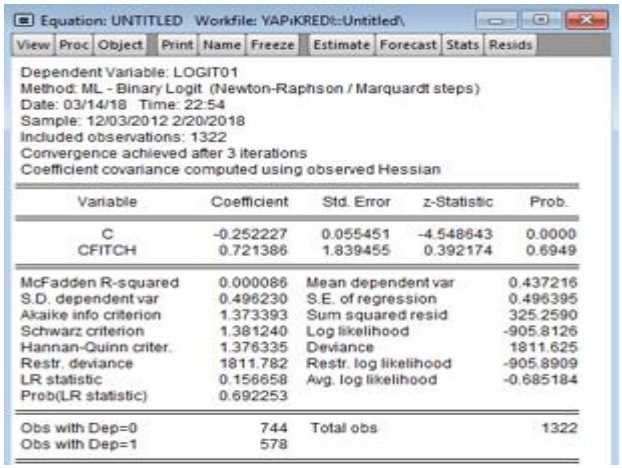
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 20:49
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.159390 | 0.034650 | -4.600009 | 0.0000 |
| CFITCH(-1) | -0.594692 | 1.157278 | -0.513872 | 0.6073 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000147 | Mean dependent var | 0.436790 |
| S.D. dependent var | 0.496176 | S.E. of regression | 0.496321 |
| Akaike info criterion | 1.373096 | Sum squared resid | 324.9157 |
| Schwarz criterion | 1.380947 | Log likelihood | -904.9296 |
| Hannan-Quinn criter. | 1.376039 | Deviance | 1809.859 |
| Restr. deviance | 1810.126 | Restr. log likelihood | -905.0631 |
| LR statistic | 0.266917 | Avg. log likelihood | -0.685034 |
| Prob(LR statistic) | 0.605407 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1321 |
| Obs with Dep=1 | 577 | | |

Logit Regression One Variable – Fitch



Equation: UNTITLED Workfile: YAPiKREDI::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

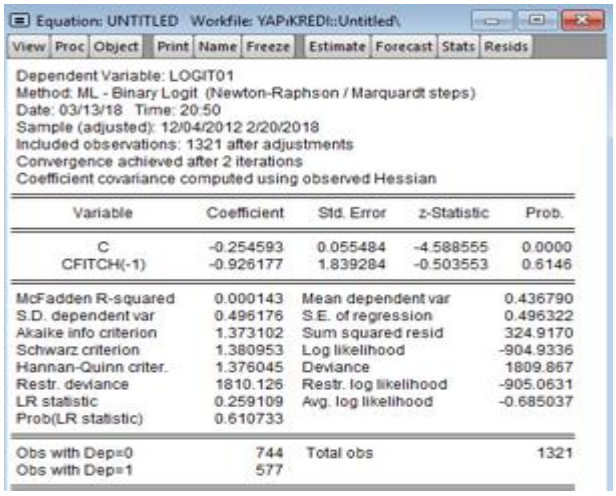
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:54
Sample: 12/03/2012 2/20/2018
Included observations: 1322
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.252227 | 0.055451 | -4.548643 | 0.0000 |
| CFITCH | 0.721386 | 1.839455 | 0.392174 | 0.6949 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000086 | Mean dependent var | 0.437216 |
| S.D. dependent var | 0.496230 | S.E. of regression | 0.496395 |
| Akaike info criterion | 1.373393 | Sum squared resid | 325.2590 |
| Schwarz criterion | 1.381240 | Log likelihood | -905.8126 |
| Hannan-Quinn criter. | 1.376335 | Deviance | 1811.625 |
| Restr. deviance | 1811.782 | Restr. log likelihood | -905.8909 |
| LR statistic | 0.156658 | Avg. log likelihood | -0.685184 |
| Prob(LR statistic) | 0.692253 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1322 |
| Obs with Dep=1 | 578 | | |

Logit Regression One Variable – Fitch



Equation: UNTITLED Workfile: YAPiKREDI::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

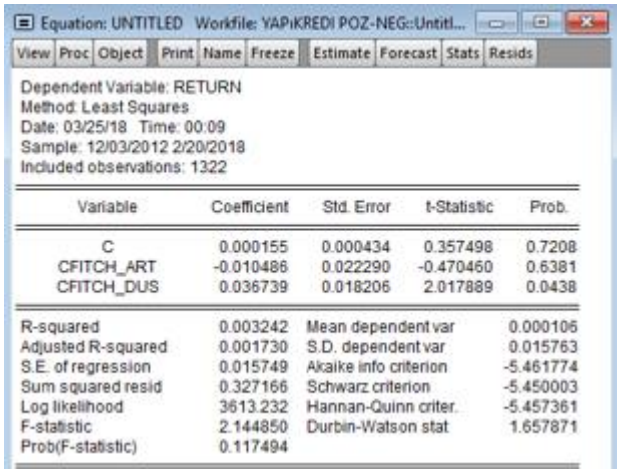
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 20:50
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.254593 | 0.055484 | -4.588555 | 0.0000 |
| CFITCH(-1) | -0.926177 | 1.839284 | -0.503553 | 0.6146 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000143 | Mean dependent var | 0.436790 |
| S.D. dependent var | 0.496176 | S.E. of regression | 0.496322 |
| Akaike info criterion | 1.373102 | Sum squared resid | 324.9170 |
| Schwarz criterion | 1.380953 | Log likelihood | -904.9336 |
| Hannan-Quinn criter. | 1.376045 | Deviance | 1809.867 |
| Restr. deviance | 1810.126 | Restr. log likelihood | -905.0631 |
| LR statistic | 0.259109 | Avg. log likelihood | -0.685037 |
| Prob(LR statistic) | 0.610733 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 744 | Total obs | 1321 |
| Obs with Dep=1 | 577 | | |

OLS Regression Two Variable



Equation: UNTITLED Workfile: YAPıKREDI POZ-NEG::Untitl...

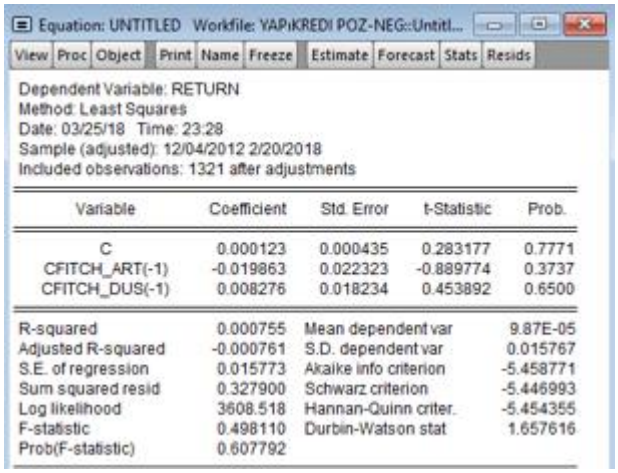
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 00:09
Sample: 12/03/2012 2/20/2018
Included observations: 1322

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.000155 | 0.000434 | 0.357498 | 0.7208 |
| CFITCH_ART | -0.010486 | 0.022290 | -0.470460 | 0.6381 |
| CFITCH_DUS | 0.036739 | 0.018206 | 2.017889 | 0.0438 |

| | | | |
|---|---|---|---|
| R-squared | 0.003242 | Mean dependent var | 0.000106 |
| Adjusted R-squared | 0.001730 | S.D. dependent var | 0.015763 |
| S.E. of regression | 0.015749 | Akaike info criterion | -5.461774 |
| Sum squared resid | 0.327166 | Schwarz criterion | -5.450003 |
| Log likelihood | 3613.232 | Hannan-Quinn criter. | -5.457361 |
| F-statistic | 2.144850 | Durbin-Watson stat | 1.657871 |
| Prob(F-statistic) | 0.117494 | | |

OLS Regression Two Variable



Equation: UNTITLED Workfile: YAPıKREDI POZ-NEG::Untitl...

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

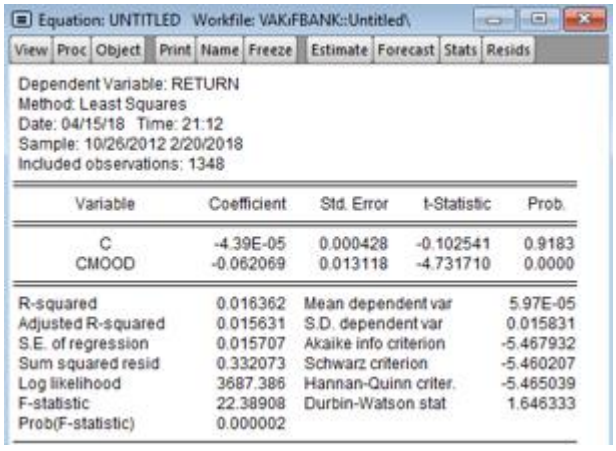
Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:28
Sample (adjusted): 12/04/2012 2/20/2018
Included observations: 1321 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.000123 | 0.000435 | 0.283177 | 0.7771 |
| CFITCH_ART(-1) | -0.019863 | 0.022323 | -0.889774 | 0.3737 |
| CFITCH_DUS(-1) | 0.008276 | 0.018234 | 0.453892 | 0.6500 |

| | | | |
|---|---|---|---|
| R-squared | 0.000755 | Mean dependent var | 9.87E-05 |
| Adjusted R-squared | -0.000761 | S.D. dependent var | 0.015767 |
| S.E. of regression | 0.015773 | Akaike info criterion | -5.458771 |
| Sum squared resid | 0.327900 | Schwarz criterion | -5.446993 |
| Log likelihood | 3608.518 | Hannan-Quinn criter. | -5.454355 |
| F-statistic | 0.498110 | Durbin-Watson stat | 1.657616 |
| Prob(F-statistic) | 0.607792 | | |

## D. Regression Result of Türkiye Vakıflar Bankası

OLS Regression One Variable – Moody's



Equation: UNTITLED Workfile: VAKıFBANK::Untitled\

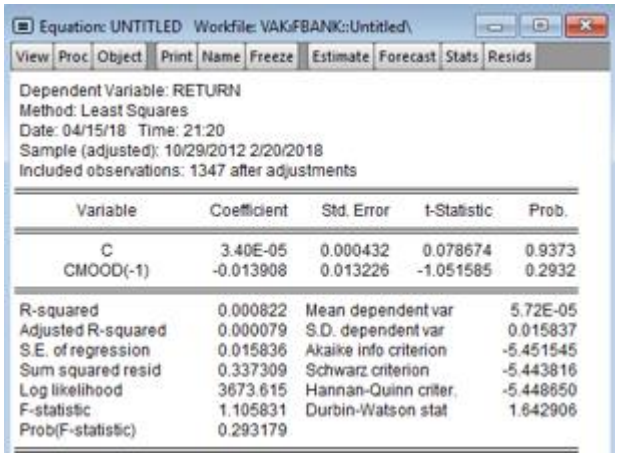
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 04/15/18 Time: 21:12
Sample: 10/26/2012 2/20/2018
Included observations: 1348

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -4.39E-05 | 0.000428 | -0.102541 | 0.9183 |
| CMOOD | -0.062069 | 0.013118 | -4.731710 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.016362 | Mean dependent var | 5.97E-05 |
| Adjusted R-squared | 0.015631 | S.D. dependent var | 0.015831 |
| S.E. of regression | 0.015707 | Akaike info criterion | -5.467932 |
| Sum squared resid | 0.332073 | Schwarz criterion | -5.460207 |
| Log likelihood | 3687.386 | Hannan-Quinn criter. | -5.465039 |
| F-statistic | 22.38908 | Durbin-Watson stat | 1.646333 |
| Prob(F-statistic) | 0.000002 | | |

OLS Regression One Variable – Moody's



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

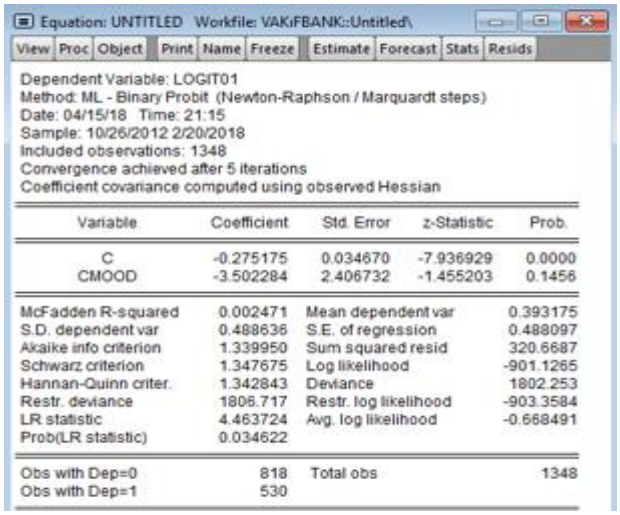
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 04/15/18 Time: 21:20
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 3.40E-05 | 0.000432 | 0.078674 | 0.9373 |
| CMOOD(-1) | -0.013908 | 0.013226 | -1.051585 | 0.2932 |

| | | | |
|---|---|---|---|
| R-squared | 0.000822 | Mean dependent var | 5.72E-05 |
| Adjusted R-squared | 0.000079 | S.D. dependent var | 0.015837 |
| S.E. of regression | 0.015836 | Akaike info criterion | -5.451545 |
| Sum squared resid | 0.337309 | Schwarz criterion | -5.443816 |
| Log likelihood | 3673.615 | Hannan-Quinn criter. | -5.448650 |
| F-statistic | 1.105831 | Durbin-Watson stat | 1.642906 |
| Prob(F-statistic) | 0.293179 | | |

Probit Regression One Variable – Moody's



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

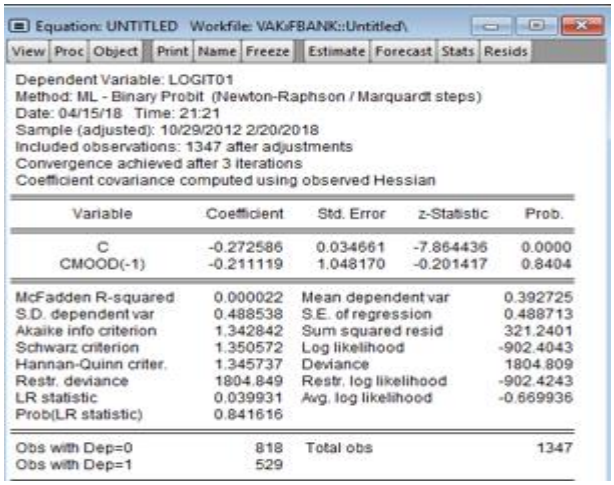
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:15
Sample: 10/26/2012 2/20/2018
Included observations: 1348
Convergence achieved after 5 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.275175 | 0.034670 | -7.936929 | 0.0000 |
| CMOOD | -3.502284 | 2.406732 | -1.455203 | 0.1456 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.002471 | Mean dependent var | 0.393175 |
| S.D. dependent var | 0.488636 | S.E. of regression | 0.488097 |
| Akaike info criterion | 1.339950 | Sum squared resid | 320.6687 |
| Schwarz criterion | 1.347675 | Log likelihood | -901.1265 |
| Hannan-Quinn criter. | 1.342843 | Deviance | 1802.253 |
| Restr. deviance | 1806.717 | Restr. log likelihood | -903.3584 |
| LR statistic | 4.463724 | Avg. log likelihood | -0.668491 |
| Prob(LR statistic) | 0.034622 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1348 |
| Obs with Dep=1 | 530 | | |

Probit Regression One Variable – Moody's



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

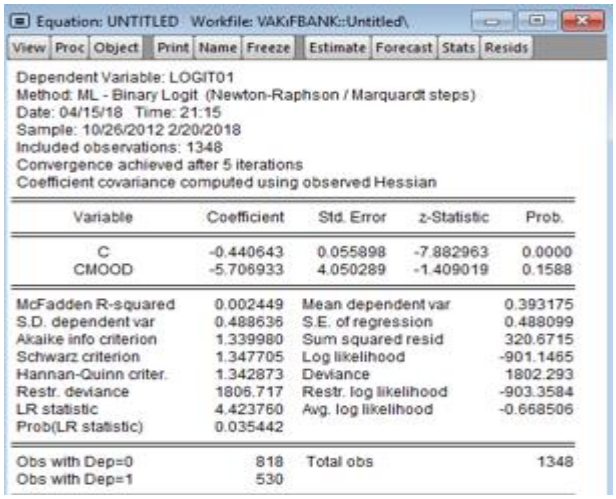
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:21
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.272586 | 0.034661 | -7.864436 | 0.0000 |
| CMOOD(-1) | -0.211119 | 1.048170 | -0.201417 | 0.8404 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000022 | Mean dependent var | 0.392725 |
| S.D. dependent var | 0.488538 | S.E. of regression | 0.488713 |
| Akaike info criterion | 1.342842 | Sum squared resid | 321.2401 |
| Schwarz criterion | 1.350572 | Log likelihood | -902.4043 |
| Hannan-Quinn criter. | 1.345737 | Deviance | 1804.809 |
| Restr. deviance | 1804.849 | Restr. log likelihood | -902.4243 |
| LR statistic | 0.039931 | Avg. log likelihood | -0.669936 |
| Prob(LR statistic) | 0.841616 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1347 |
| Obs with Dep=1 | 529 | | |

Logit Regression One Variable – Moody's



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

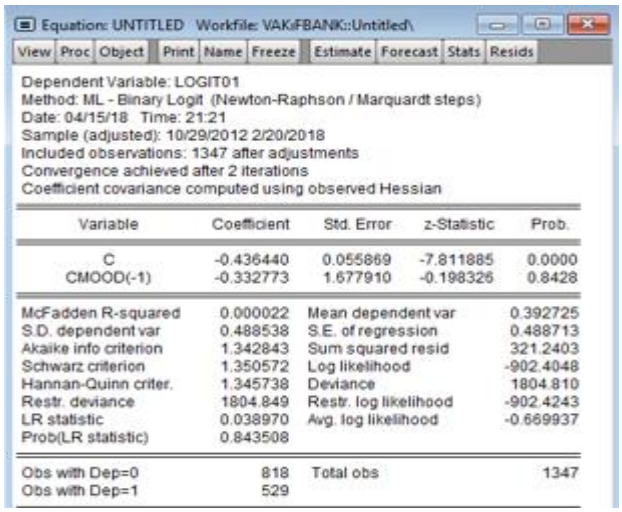
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:15
Sample: 10/26/2012 2/20/2018
Included observations: 1348
Convergence achieved after 5 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.440643 | 0.055898 | -7.882963 | 0.0000 |
| CMOOD | -5.706933 | 4.050289 | -1.409019 | 0.1588 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.002449 | Mean dependent var | 0.393175 |
| S.D. dependent var | 0.488636 | S.E. of regression | 0.488099 |
| Akaike info criterion | 1.339980 | Sum squared resid | 320.6715 |
| Schwarz criterion | 1.347705 | Log likelihood | -901.1465 |
| Hannan-Quinn criter. | 1.342873 | Deviance | 1802.293 |
| Restr. deviance | 1806.717 | Restr. log likelihood | -903.3584 |
| LR statistic | 4.423760 | Avg. log likelihood | -0.668506 |
| Prob(LR statistic) | 0.035442 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1348 |
| Obs with Dep=1 | 530 | | |

Logit Regression One Variable – Moody's



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

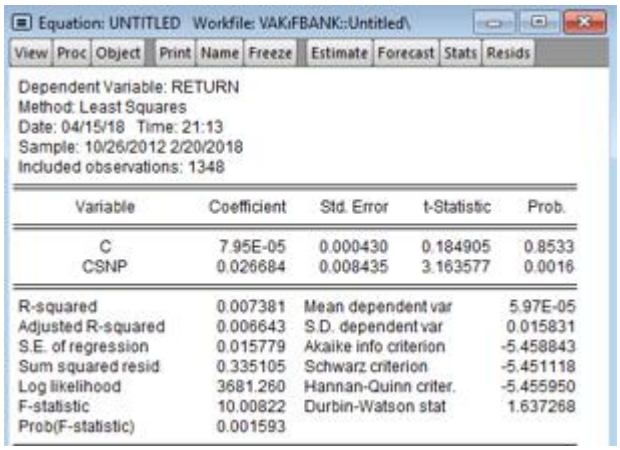
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:21
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.436440 | 0.055869 | -7.811885 | 0.0000 |
| CMOOD(-1) | -0.332773 | 1.677910 | -0.198326 | 0.8428 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000022 | Mean dependent var | 0.392725 |
| S.D. dependent var | 0.488538 | S.E. of regression | 0.488713 |
| Akaike info criterion | 1.342843 | Sum squared resid | 321.2403 |
| Schwarz criterion | 1.350572 | Log likelihood | -902.4048 |
| Hannan-Quinn criter. | 1.345738 | Deviance | 1804.810 |
| Restr. deviance | 1804.849 | Restr. log likelihood | -902.4243 |
| LR statistic | 0.038970 | Avg. log likelihood | -0.669937 |
| Prob(LR statistic) | 0.843508 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1347 |
| Obs with Dep=1 | 529 | | |

OLS Regression One Variable – S&P



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

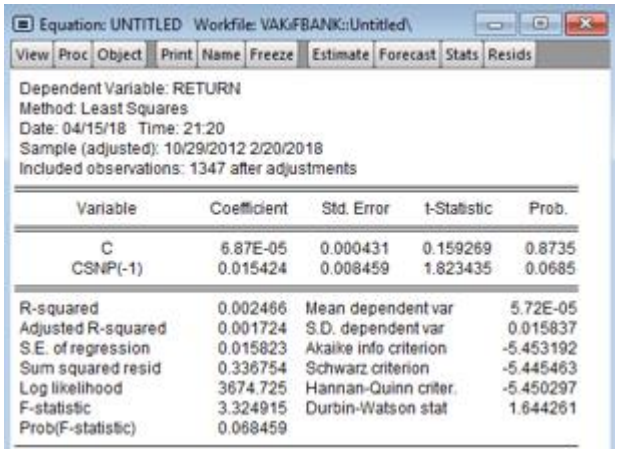
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 04/15/18 Time: 21:13
Sample: 10/26/2012 2/20/2018
Included observations: 1348

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 7.95E-05 | 0.000430 | 0.184905 | 0.8533 |
| CSNP | 0.026684 | 0.008435 | 3.163577 | 0.0016 |

| | | | |
|---|---|---|---|
| R-squared | 0.007381 | Mean dependent var | 5.97E-05 |
| Adjusted R-squared | 0.006643 | S.D. dependent var | 0.015831 |
| S.E. of regression | 0.015779 | Akaike info criterion | -5.458843 |
| Sum squared resid | 0.335105 | Schwarz criterion | -5.451118 |
| Log likelihood | 3681.260 | Hannan-Quinn criter. | -5.455950 |
| F-statistic | 10.00822 | Durbin-Watson stat | 1.637268 |
| Prob(F-statistic) | 0.001593 | | |

OLS Regression One Variable – S&P



Equation: UNTITLED Workfile: VAKıFBANK::Untitled\

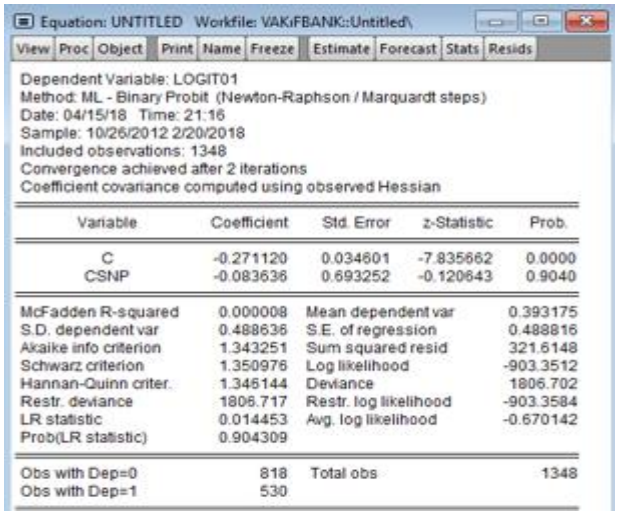
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 04/15/18 Time: 21:20
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 6.87E-05 | 0.000431 | 0.159269 | 0.8735 |
| CSNP(-1) | 0.015424 | 0.008459 | 1.823435 | 0.0685 |

| | | | |
|---|---|---|---|
| R-squared | 0.002466 | Mean dependent var | 5.72E-05 |
| Adjusted R-squared | 0.001724 | S.D. dependent var | 0.015837 |
| S.E. of regression | 0.015823 | Akaike info criterion | -5.453192 |
| Sum squared resid | 0.336754 | Schwarz criterion | -5.445463 |
| Log likelihood | 3674.725 | Hannan-Quinn criter. | -5.450297 |
| F-statistic | 3.324915 | Durbin-Watson stat | 1.644261 |
| Prob(F-statistic) | 0.068459 | | |

Probit Regression One Variable – S&P



Equation: UNTITLED Workfile: VAKıFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

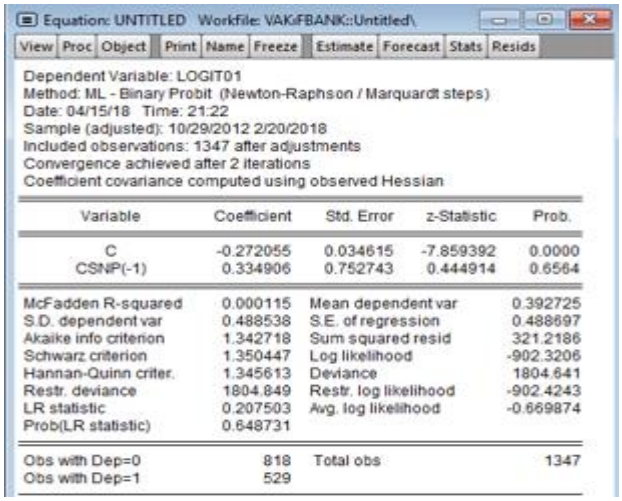
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:16
Sample: 10/26/2012 2/20/2018
Included observations: 1348
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.271120 | 0.034601 | -7.835662 | 0.0000 |
| CSNP | -0.083636 | 0.693252 | -0.120643 | 0.9040 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000008 | Mean dependent var | 0.393175 |
| S.D. dependent var | 0.488636 | S.E. of regression | 0.488816 |
| Akaike info criterion | 1.343251 | Sum squared resid | 321.6148 |
| Schwarz criterion | 1.350976 | Log likelihood | -903.3512 |
| Hannan-Quinn criter. | 1.346144 | Deviance | 1806.702 |
| Restr. deviance | 1806.717 | Restr. log likelihood | -903.3584 |
| LR statistic | 0.014453 | Avg. log likelihood | -0.670142 |
| Prob(LR statistic) | 0.904309 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1348 |
| Obs with Dep=1 | 530 | | |

Probit Regression One Variable – S&P



Equation: UNTITLED Workfile: VAKıFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

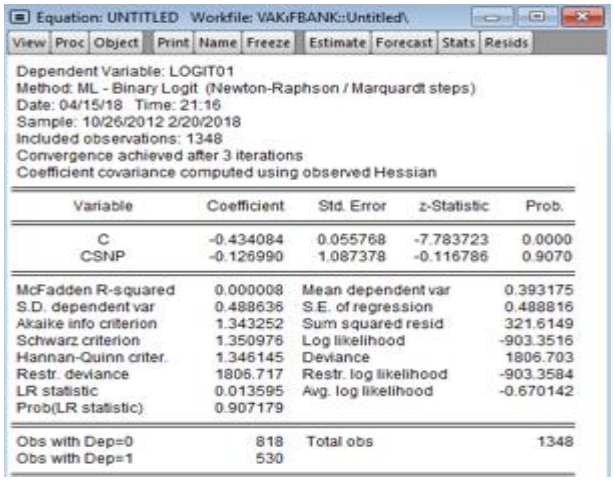
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:22
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.272055 | 0.034615 | -7.859392 | 0.0000 |
| CSNP(-1) | 0.334906 | 0.752743 | 0.444914 | 0.6564 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000115 | Mean dependent var | 0.392725 |
| S.D. dependent var | 0.488538 | S.E. of regression | 0.488697 |
| Akaike info criterion | 1.342718 | Sum squared resid | 321.2186 |
| Schwarz criterion | 1.350447 | Log likelihood | -902.3206 |
| Hannan-Quinn criter. | 1.345613 | Deviance | 1804.641 |
| Restr. deviance | 1804.849 | Restr. log likelihood | -902.4243 |
| LR statistic | 0.207503 | Avg. log likelihood | -0.669874 |
| Prob(LR statistic) | 0.648731 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1347 |
| Obs with Dep=1 | 529 | | |

Logit Regression One Variable – S&P



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

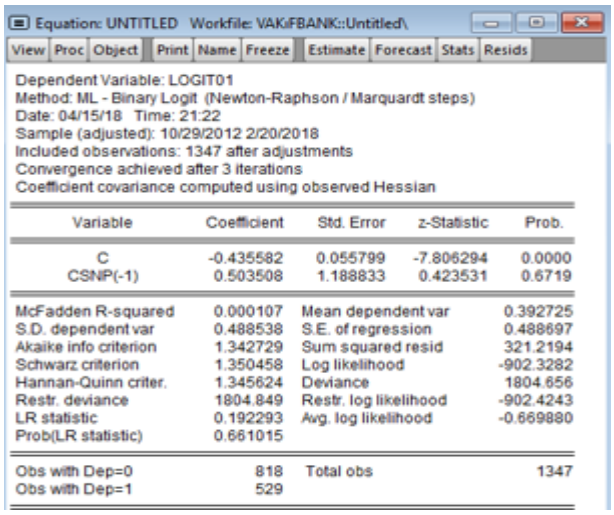
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:16
Sample: 10/26/2012 2/20/2018
Included observations: 1348
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.434084 | 0.055768 | -7.783723 | 0.0000 |
| CSNP | -0.126990 | 1.087378 | -0.116786 | 0.9070 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000008 | Mean dependent var | 0.393175 |
| S.D. dependent var | 0.488636 | S.E. of regression | 0.488816 |
| Akaike info criterion | 1.343252 | Sum squared resid | 321.6149 |
| Schwarz criterion | 1.350976 | Log likelihood | -903.3516 |
| Hannan-Quinn criter. | 1.346145 | Deviance | 1806.703 |
| Restr. deviance | 1806.717 | Restr. log likelihood | -903.3584 |
| LR statistic | 0.013595 | Avg. log likelihood | -0.670142 |
| Prob(LR statistic) | 0.907179 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1348 |
| Obs with Dep=1 | 530 | | |

Logit Regression One Variable – S&P



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

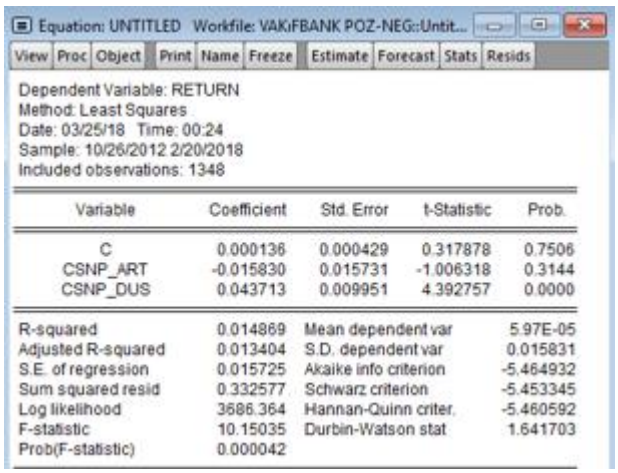
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:22
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.435582 | 0.055799 | -7.806294 | 0.0000 |
| CSNP(-1) | 0.503508 | 1.188833 | 0.423531 | 0.6719 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000107 | Mean dependent var | 0.392725 |
| S.D. dependent var | 0.488538 | S.E. of regression | 0.488697 |
| Akaike info criterion | 1.342729 | Sum squared resid | 321.2194 |
| Schwarz criterion | 1.350458 | Log likelihood | -902.3282 |
| Hannan-Quinn criter. | 1.345624 | Deviance | 1804.656 |
| Restr. deviance | 1804.849 | Restr. log likelihood | -902.4243 |
| LR statistic | 0.192293 | Avg. log likelihood | -0.669880 |
| Prob(LR statistic) | 0.661015 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1347 |
| Obs with Dep=1 | 529 | | |

OLS Regression Two Variable – S&P



Equation: UNTITLED Workfile: VAKiFBANK POZ-NEG::Untit...

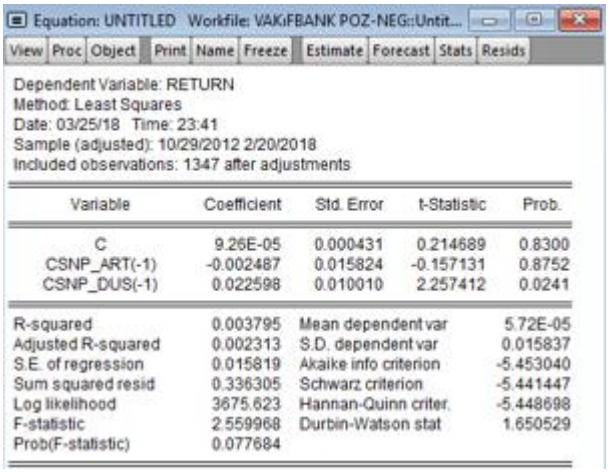
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 00:24
Sample: 10/26/2012 2/20/2018
Included observations: 1348

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.000136 | 0.000429 | 0.317878 | 0.7506 |
| CSNP_ART | -0.015830 | 0.015731 | -1.006318 | 0.3144 |
| CSNP_DUS | 0.043713 | 0.009951 | 4.392757 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.014869 | Mean dependent var | 5.97E-05 |
| Adjusted R-squared | 0.013404 | S.D. dependent var | 0.015831 |
| S.E. of regression | 0.015725 | Akaike info criterion | -5.464932 |
| Sum squared resid | 0.332577 | Schwarz criterion | -5.453345 |
| Log likelihood | 3686.364 | Hannan-Quinn criter. | -5.460592 |
| F-statistic | 10.15035 | Durbin-Watson stat | 1.641703 |
| Prob(F-statistic) | 0.000042 | | |

OLS Regression Two Variable – S&P



Equation: UNTITLED Workfile: VAKiFBANK POZ-NEG::Untit...

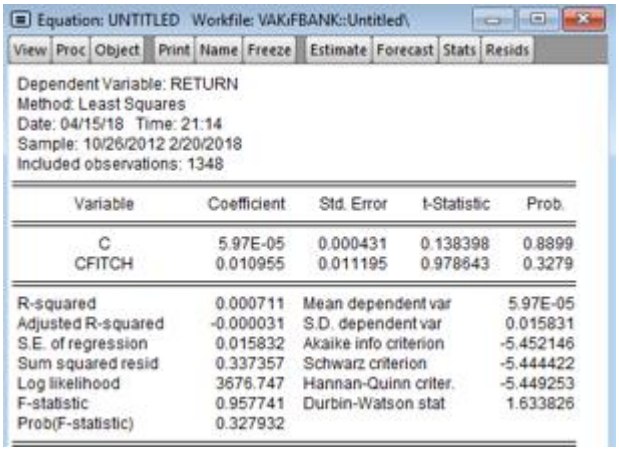
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:41
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 9.26E-05 | 0.000431 | 0.214689 | 0.8300 |
| CSNP_ART(-1) | -0.002487 | 0.015824 | -0.157131 | 0.8752 |
| CSNP_DUS(-1) | 0.022598 | 0.010010 | 2.257412 | 0.0241 |

| | | | |
|---|---|---|---|
| R-squared | 0.003795 | Mean dependent var | 5.72E-05 |
| Adjusted R-squared | 0.002313 | S.D. dependent var | 0.015837 |
| S.E. of regression | 0.015819 | Akaike info criterion | -5.453040 |
| Sum squared resid | 0.336305 | Schwarz criterion | -5.441447 |
| Log likelihood | 3675.623 | Hannan-Quinn criter. | -5.448698 |
| F-statistic | 2.559968 | Durbin-Watson stat | 1.650529 |
| Prob(F-statistic) | 0.077684 | | |

OLS Regression One Variable – Fitch



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

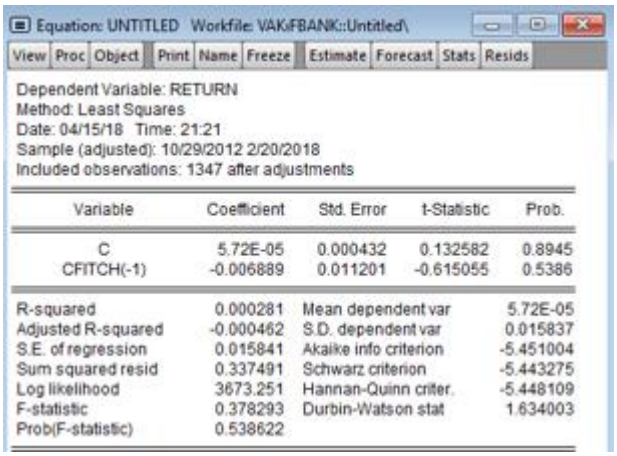
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 04/15/18 Time: 21:14
Sample: 10/26/2012 2/20/2018
Included observations: 1348

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 5.97E-05 | 0.000431 | 0.138398 | 0.8899 |
| CFITCH | 0.010955 | 0.011195 | 0.978643 | 0.3279 |

| | | | |
|---|---|---|---|
| R-squared | 0.000711 | Mean dependent var | 5.97E-05 |
| Adjusted R-squared | -0.000031 | S.D. dependent var | 0.015831 |
| S.E. of regression | 0.015832 | Akaike info criterion | -5.452146 |
| Sum squared resid | 0.337357 | Schwarz criterion | -5.444422 |
| Log likelihood | 3676.747 | Hannan-Quinn criter. | -5.449253 |
| F-statistic | 0.957741 | Durbin-Watson stat | 1.633826 |
| Prob(F-statistic) | 0.327932 | | |

OLS Regression One Variable – Fitch



Equation: UNTITLED Workfile: VAKiFBANK::Untitled\

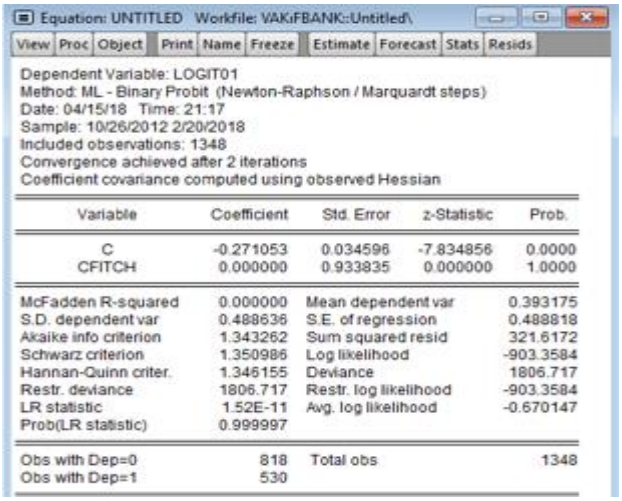
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 04/15/18 Time: 21:21
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 5.72E-05 | 0.000432 | 0.132582 | 0.8945 |
| CFITCH(-1) | -0.006889 | 0.011201 | -0.615055 | 0.5386 |

| | | | |
|---|---|---|---|
| R-squared | 0.000281 | Mean dependent var | 5.72E-05 |
| Adjusted R-squared | -0.000462 | S.D. dependent var | 0.015837 |
| S.E. of regression | 0.015841 | Akaike info criterion | -5.451004 |
| Sum squared resid | 0.337491 | Schwarz criterion | -5.443275 |
| Log likelihood | 3673.251 | Hannan-Quinn criter. | -5.448109 |
| F-statistic | 0.378293 | Durbin-Watson stat | 1.634003 |
| Prob(F-statistic) | 0.538622 | | |

Probit Regression One Variable – Fitch



Equation: UNTITLED Workfile: VAKıFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

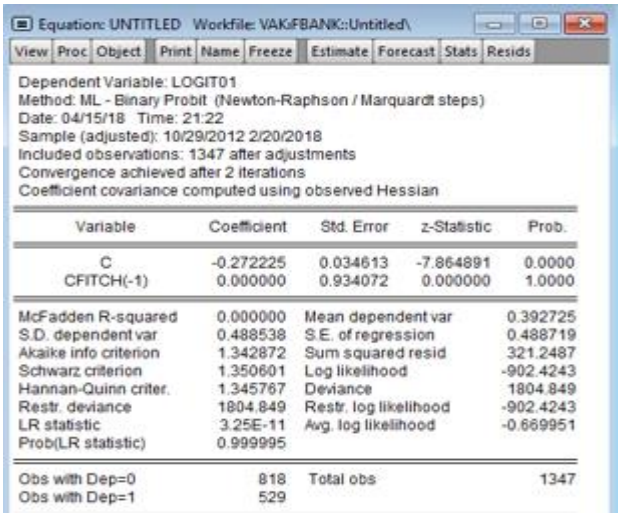
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:17
Sample: 10/26/2012 2/20/2018
Included observations: 1348
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.271053 | 0.034596 | -7.834856 | 0.0000 |
| CFITCH | 0.000000 | 0.933835 | 0.000000 | 1.0000 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000000 | Mean dependent var | 0.393175 |
| S.D. dependent var | 0.488636 | S.E. of regression | 0.488818 |
| Akaike info criterion | 1.343262 | Sum squared resid | 321.6172 |
| Schwarz criterion | 1.350986 | Log likelihood | -903.3584 |
| Hannan-Quinn criter. | 1.346155 | Deviance | 1806.717 |
| Restr. deviance | 1806.717 | Restr. log likelihood | -903.3584 |
| LR statistic | 1.52E-11 | Avg. log likelihood | -0.670147 |
| Prob(LR statistic) | 0.999997 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1348 |
| Obs with Dep=1 | 530 | | |

Probit Regression One Variable – Fitch



Equation: UNTITLED Workfile: VAKıFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

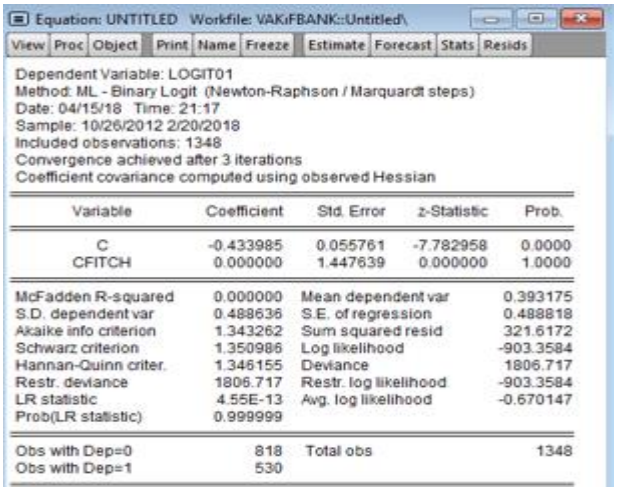
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:22
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.272225 | 0.034613 | -7.864891 | 0.0000 |
| CFITCH(-1) | 0.000000 | 0.934072 | 0.000000 | 1.0000 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000000 | Mean dependent var | 0.392725 |
| S.D. dependent var | 0.488538 | S.E. of regression | 0.488719 |
| Akaike info criterion | 1.342872 | Sum squared resid | 321.2487 |
| Schwarz criterion | 1.350601 | Log likelihood | -902.4243 |
| Hannan-Quinn criter. | 1.345767 | Deviance | 1804.849 |
| Restr. deviance | 1804.849 | Restr. log likelihood | -902.4243 |
| LR statistic | 3.25E-11 | Avg. log likelihood | -0.669951 |
| Prob(LR statistic) | 0.999995 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1347 |
| Obs with Dep=1 | 529 | | |

Logit Regression One Variable – Fitch



Equation: UNTITLED Workfile: VAKıFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

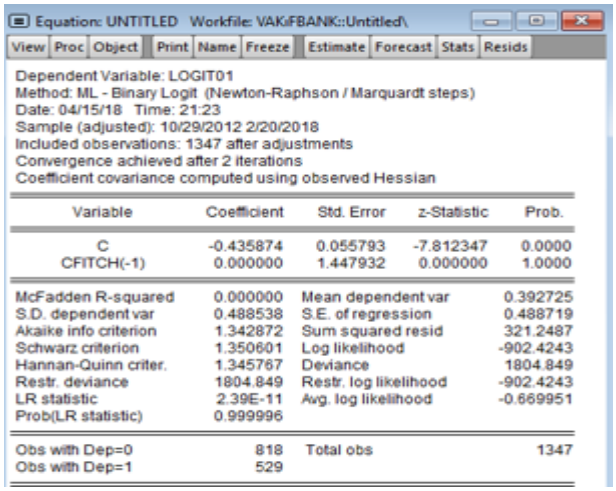
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:17
Sample: 10/26/2012 2/20/2018
Included observations: 1348
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.433985 | 0.055761 | -7.782958 | 0.0000 |
| CFITCH | 0.000000 | 1.447639 | 0.000000 | 1.0000 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000000 | Mean dependent var | 0.393175 |
| S.D. dependent var | 0.488636 | S.E. of regression | 0.488818 |
| Akaike info criterion | 1.343262 | Sum squared resid | 321.6172 |
| Schwarz criterion | 1.350986 | Log likelihood | -903.3584 |
| Hannan-Quinn criter. | 1.346155 | Deviance | 1806.717 |
| Restr. deviance | 1806.717 | Restr. log likelihood | -903.3584 |
| LR statistic | 4.55E-13 | Avg. log likelihood | -0.670147 |
| Prob(LR statistic) | 0.999999 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1348 |
| Obs with Dep=1 | 530 | | |

Logit Regression One Variable – Fitch



Equation: UNTITLED Workfile: VAKıFBANK::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

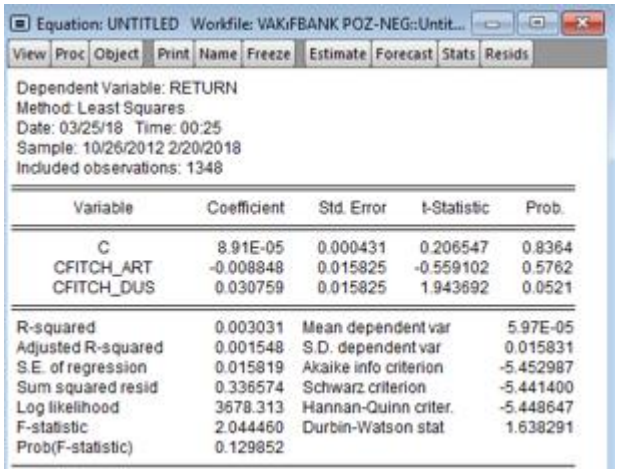
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 04/15/18 Time: 21:23
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.435874 | 0.055793 | -7.812347 | 0.0000 |
| CFITCH(-1) | 0.000000 | 1.447932 | 0.000000 | 1.0000 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000000 | Mean dependent var | 0.392725 |
| S.D. dependent var | 0.488538 | S.E. of regression | 0.488719 |
| Akaike info criterion | 1.342872 | Sum squared resid | 321.2487 |
| Schwarz criterion | 1.350601 | Log likelihood | -902.4243 |
| Hannan-Quinn criter. | 1.345767 | Deviance | 1804.849 |
| Restr. deviance | 1804.849 | Restr. log likelihood | -902.4243 |
| LR statistic | 2.39E-11 | Avg. log likelihood | -0.669951 |
| Prob(LR statistic) | 0.999996 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 818 | Total obs | 1347 |
| Obs with Dep=1 | 529 | | |

OLS Regression Two Variable – Fitch



Equation: UNTITLED Workfile: VAKıFBANK POZ-NEG::Untit...

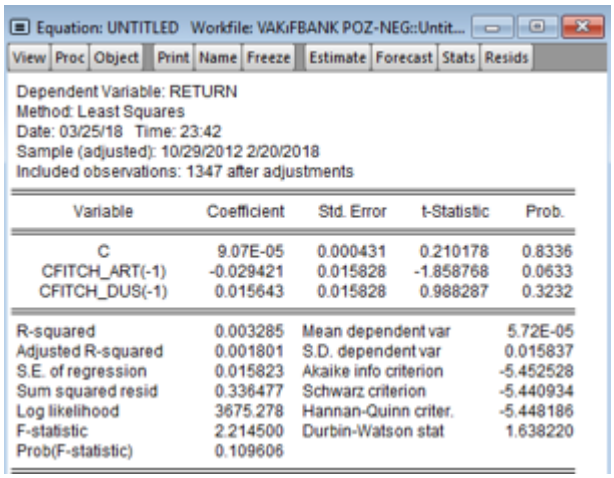
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 00:25
Sample: 10/26/2012 2/20/2018
Included observations: 1348

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 8.91E-05 | 0.000431 | 0.206547 | 0.8364 |
| CFITCH_ART | -0.008848 | 0.015825 | -0.559102 | 0.5762 |
| CFITCH_DUS | 0.030759 | 0.015825 | 1.943692 | 0.0521 |

| | | | |
|---|---|---|---|
| R-squared | 0.003031 | Mean dependent var | 5.97E-05 |
| Adjusted R-squared | 0.001548 | S.D. dependent var | 0.015831 |
| S.E. of regression | 0.015819 | Akaike info criterion | -5.452987 |
| Sum squared resid | 0.336574 | Schwarz criterion | -5.441400 |
| Log likelihood | 3678.313 | Hannan-Quinn criter. | -5.448647 |
| F-statistic | 2.044460 | Durbin-Watson stat | 1.638291 |
| Prob(F-statistic) | 0.129852 | | |

OLS Regression Two Variable – Fitch



Equation: UNTITLED Workfile: VAKıFBANK POZ-NEG::Untit...

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

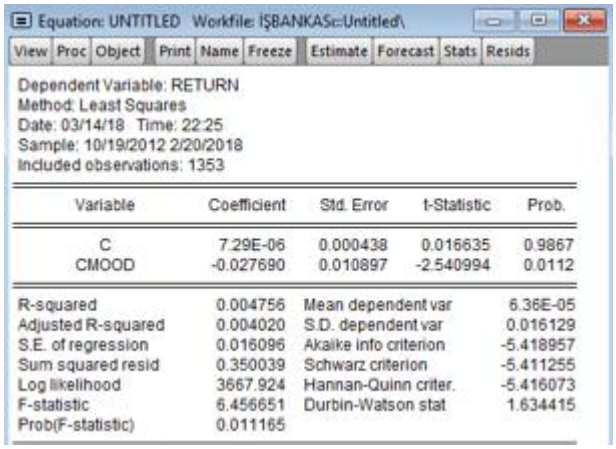
Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:42
Sample (adjusted): 10/29/2012 2/20/2018
Included observations: 1347 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 9.07E-05 | 0.000431 | 0.210178 | 0.8336 |
| CFITCH_ART(-1) | -0.029421 | 0.015828 | -1.858768 | 0.0633 |
| CFITCH_DUS(-1) | 0.015643 | 0.015828 | 0.988287 | 0.3232 |

| | | | |
|---|---|---|---|
| R-squared | 0.003285 | Mean dependent var | 5.72E-05 |
| Adjusted R-squared | 0.001801 | S.D. dependent var | 0.015837 |
| S.E. of regression | 0.015823 | Akaike info criterion | -5.452528 |
| Sum squared resid | 0.336477 | Schwarz criterion | -5.440934 |
| Log likelihood | 3675.278 | Hannan-Quinn criter. | -5.448186 |
| F-statistic | 2.214500 | Durbin-Watson stat | 1.638220 |
| Prob(F-statistic) | 0.109606 | | |

## E. Regression Result of Türkiye İş Bankası

OLS Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

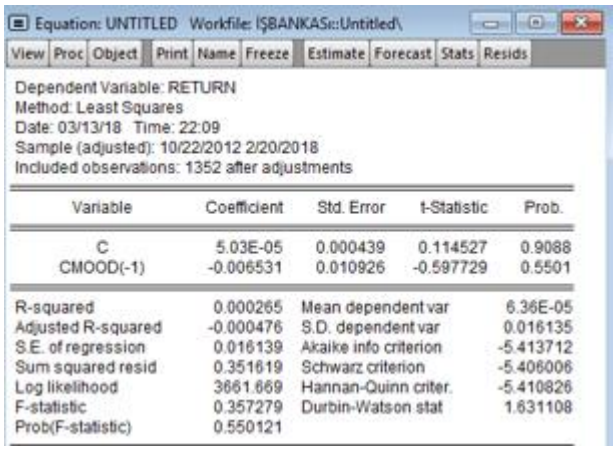
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:25
Sample: 10/19/2012 2/20/2018
Included observations: 1353

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 7.29E-06 | 0.000438 | 0.016635 | 0.9867 |
| CMOOD | -0.027690 | 0.010897 | -2.540994 | 0.0112 |

| | | | |
|---|---|---|---|
| R-squared | 0.004756 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | 0.004020 | S.D. dependent var | 0.016129 |
| S.E. of regression | 0.016096 | Akaike info criterion | -5.418957 |
| Sum squared resid | 0.350039 | Schwarz criterion | -5.411255 |
| Log likelihood | 3667.924 | Hannan-Quinn criter. | -5.416073 |
| F-statistic | 6.456651 | Durbin-Watson stat | 1.634415 |
| Prob(F-statistic) | 0.011165 | | |

OLS Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

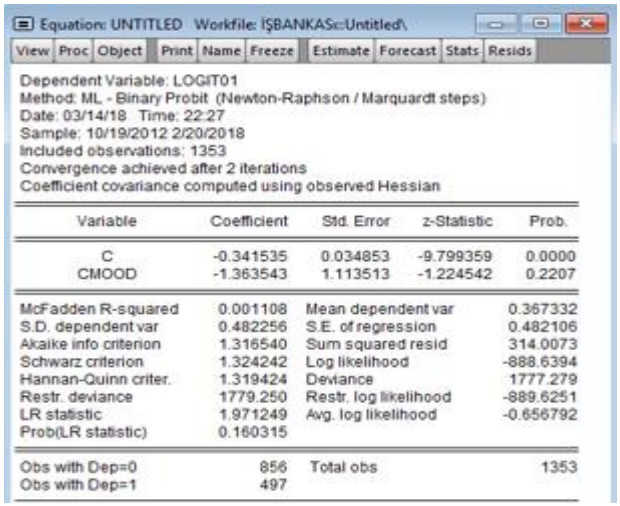
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 22:09
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 5.03E-05 | 0.000439 | 0.114527 | 0.9088 |
| CMOOD(-1) | -0.006531 | 0.010926 | -0.597729 | 0.5501 |

| | | | |
|---|---|---|---|
| R-squared | 0.000265 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | -0.000476 | S.D. dependent var | 0.016135 |
| S.E. of regression | 0.016139 | Akaike info criterion | -5.413712 |
| Sum squared resid | 0.351619 | Schwarz criterion | -5.406006 |
| Log likelihood | 3661.669 | Hannan-Quinn criter. | -5.410826 |
| F-statistic | 0.357279 | Durbin-Watson stat | 1.631108 |
| Prob(F-statistic) | 0.550121 | | |

Probit Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

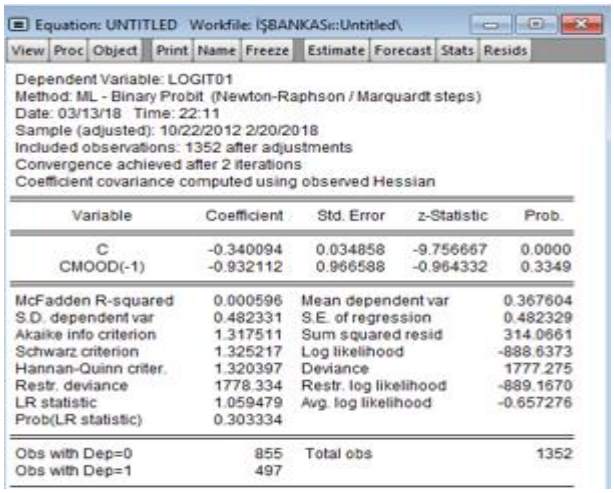
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:27
Sample: 10/19/2012 2/20/2018
Included observations: 1353
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.341535 | 0.034853 | -9.799359 | 0.0000 |
| CMOOD | -1.363543 | 1.113513 | -1.224542 | 0.2207 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.001108 | Mean dependent var | 0.367332 |
| S.D. dependent var | 0.482256 | S.E. of regression | 0.482106 |
| Akaike info criterion | 1.316540 | Sum squared resid | 314.0073 |
| Schwarz criterion | 1.324242 | Log likelihood | -888.6394 |
| Hannan-Quinn criter. | 1.319424 | Deviance | 1777.279 |
| Restr. deviance | 1779.250 | Restr. log likelihood | -889.6251 |
| LR statistic | 1.971249 | Avg. log likelihood | -0.656792 |
| Prob(LR statistic) | 0.160315 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 856 | Total obs | 1353 |
| Obs with Dep=1 | 497 | | |

Probit Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

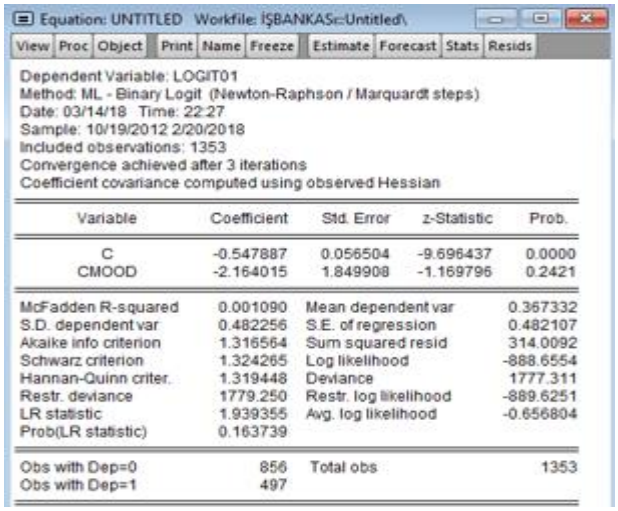
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 22:11
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.340094 | 0.034858 | -9.756667 | 0.0000 |
| CMOOD(-1) | -0.932112 | 0.966588 | -0.964332 | 0.3349 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000596 | Mean dependent var | 0.367604 |
| S.D. dependent var | 0.482331 | S.E. of regression | 0.482329 |
| Akaike info criterion | 1.317511 | Sum squared resid | 314.0661 |
| Schwarz criterion | 1.325217 | Log likelihood | -888.6373 |
| Hannan-Quinn criter. | 1.320397 | Deviance | 1777.275 |
| Restr. deviance | 1778.334 | Restr. log likelihood | -889.1670 |
| LR statistic | 1.059479 | Avg. log likelihood | -0.657276 |
| Prob(LR statistic) | 0.303334 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 855 | Total obs | 1352 |
| Obs with Dep=1 | 497 | | |

Logit Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

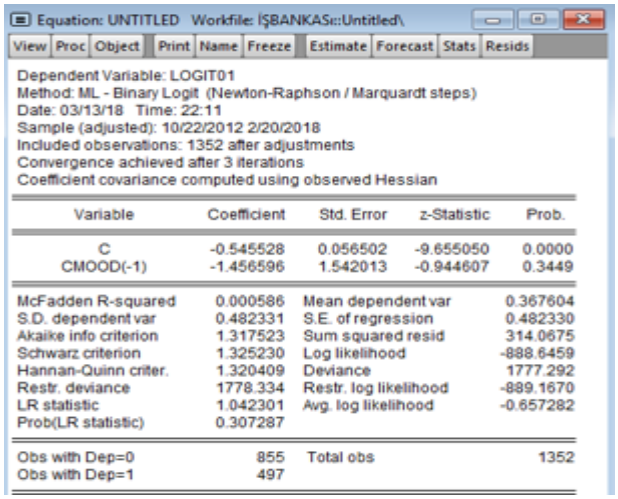
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:27
Sample: 10/19/2012 2/20/2018
Included observations: 1353
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.547887 | 0.056504 | -9.696437 | 0.0000 |
| CMOOD | -2.164015 | 1.849908 | -1.169795 | 0.2421 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.001090 | Mean dependent var | 0.367332 |
| S.D. dependent var | 0.482256 | S.E. of regression | 0.482107 |
| Akaike info criterion | 1.316564 | Sum squared resid | 314.0092 |
| Schwarz criterion | 1.324265 | Log likelihood | -888.6554 |
| Hannan-Quinn criter. | 1.319448 | Deviance | 1777.311 |
| Restr. deviance | 1779.250 | Restr. log likelihood | -889.6251 |
| LR statistic | 1.939355 | Avg. log likelihood | -0.656804 |
| Prob(LR statistic) | 0.163739 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 856 | Total obs | 1353 |
| Obs with Dep=1 | 497 | | |

Logit Regression One Variable Results – Moody's



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

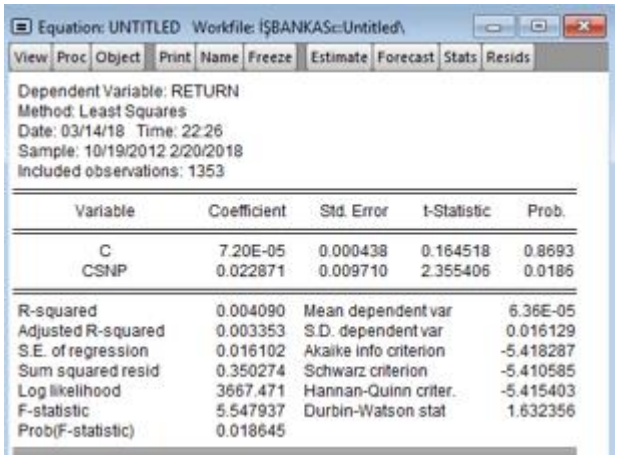
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 22:11
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.545528 | 0.056502 | -9.655050 | 0.0000 |
| CMOOD(-1) | -1.456596 | 1.542013 | -0.944607 | 0.3449 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000586 | Mean dependent var | 0.367604 |
| S.D. dependent var | 0.482331 | S.E. of regression | 0.482330 |
| Akaike info criterion | 1.317523 | Sum squared resid | 314.0675 |
| Schwarz criterion | 1.325230 | Log likelihood | -888.6459 |
| Hannan-Quinn criter. | 1.320409 | Deviance | 1777.292 |
| Restr. deviance | 1778.334 | Restr. log likelihood | -889.1670 |
| LR statistic | 1.042301 | Avg. log likelihood | -0.657282 |
| Prob(LR statistic) | 0.307287 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 855 | Total obs | 1352 |
| Obs with Dep=1 | 497 | | |

OLS Regression One Variable Results – S&P



Equation: UNTITLED Workfile: İŞBANKASc::Untitled\

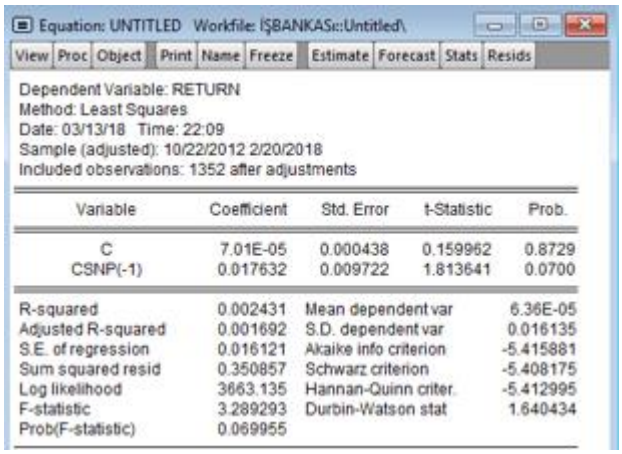
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:26
Sample: 10/19/2012 2/20/2018
Included observations: 1353

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 7.20E-05 | 0.000438 | 0.164518 | 0.8693 |
| CSNP | 0.022871 | 0.009710 | 2.355406 | 0.0186 |

| | | | |
|---|---|---|---|
| R-squared | 0.004090 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | 0.003353 | S.D. dependent var | 0.016129 |
| S.E. of regression | 0.016102 | Akaike info criterion | -5.418287 |
| Sum squared resid | 0.350274 | Schwarz criterion | -5.410585 |
| Log likelihood | 3667.471 | Hannan-Quinn criter. | -5.415403 |
| F-statistic | 5.547937 | Durbin-Watson stat | 1.632356 |
| Prob(F-statistic) | 0.018645 | | |

OLS Regression One Variable Results – S&P



Equation: UNTITLED Workfile: İŞBANKASc::Untitled\

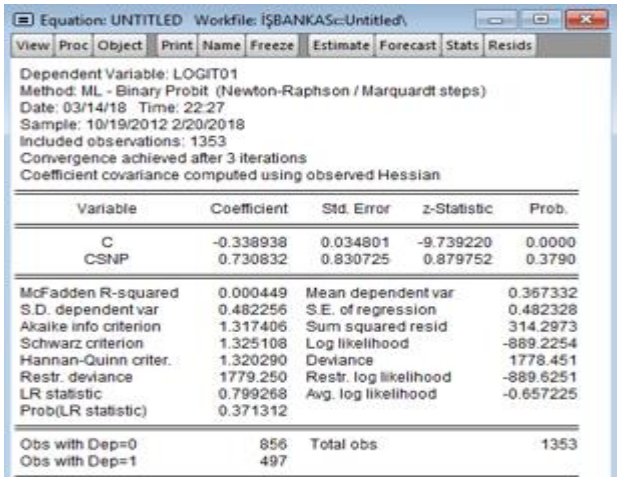
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 22:09
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 7.01E-05 | 0.000438 | 0.159962 | 0.8729 |
| CSNP(-1) | 0.017632 | 0.009722 | 1.813641 | 0.0700 |

| | | | |
|---|---|---|---|
| R-squared | 0.002431 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | 0.001692 | S.D. dependent var | 0.016135 |
| S.E. of regression | 0.016121 | Akaike info criterion | -5.415881 |
| Sum squared resid | 0.350857 | Schwarz criterion | -5.408175 |
| Log likelihood | 3663.135 | Hannan-Quinn criter. | -5.412995 |
| F-statistic | 3.289293 | Durbin-Watson stat | 1.640434 |
| Prob(F-statistic) | 0.069955 | | |

Probit Regression One Variable Results – S&P



Equation: UNTITLED Workfile: İŞBANKASc::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

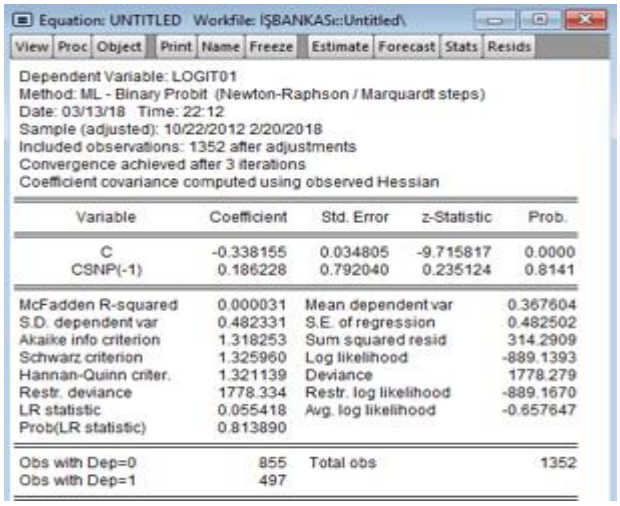
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:27
Sample: 10/19/2012 2/20/2018
Included observations: 1353
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.338938 | 0.034801 | -9.739220 | 0.0000 |
| CSNP | 0.730832 | 0.830725 | 0.879752 | 0.3790 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000449 | Mean dependent var | 0.367332 |
| S.D. dependent var | 0.482256 | S.E. of regression | 0.482328 |
| Akaike info criterion | 1.317406 | Sum squared resid | 314.2973 |
| Schwarz criterion | 1.325108 | Log likelihood | -889.2254 |
| Hannan-Quinn criter. | 1.320290 | Deviance | 1778.451 |
| Restr. deviance | 1779.250 | Restr. log likelihood | -889.6251 |
| LR statistic | 0.799268 | Avg. log likelihood | -0.657225 |
| Prob(LR statistic) | 0.371312 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 856 | Total obs | 1353 |
| Obs with Dep=1 | 497 | | |

Probit Regression One Variable Results – S&P



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

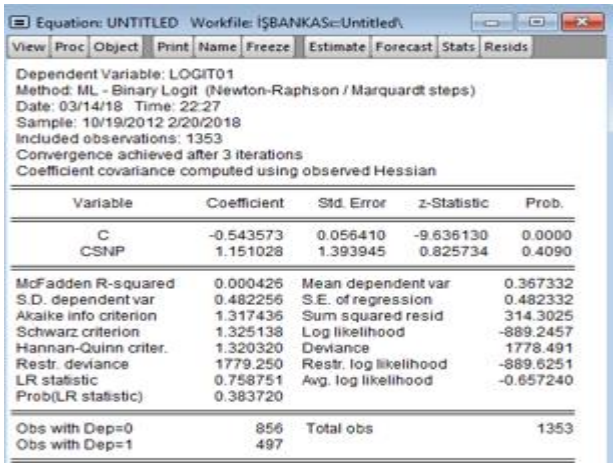
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 22:12
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.338155 | 0.034805 | -9.715817 | 0.0000 |
| CSNP(-1) | 0.186228 | 0.792040 | 0.235124 | 0.8141 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000031 | Mean dependent var | 0.367604 |
| S.D. dependent var | 0.482331 | S.E. of regression | 0.482502 |
| Akaike info criterion | 1.318253 | Sum squared resid | 314.2909 |
| Schwarz criterion | 1.325960 | Log likelihood | -889.1393 |
| Hannan-Quinn criter. | 1.321139 | Deviance | 1778.279 |
| Restr. deviance | 1778.334 | Restr. log likelihood | -889.1670 |
| LR statistic | 0.055418 | Avg. log likelihood | -0.657647 |
| Prob(LR statistic) | 0.813890 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 855 | Total obs | 1352 |
| Obs with Dep=1 | 497 | | |

Logit Regression One Variable Results – S&P



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

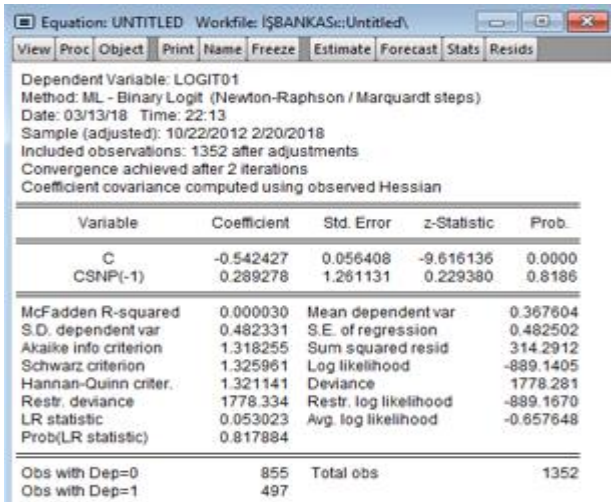
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:27
Sample: 10/19/2012 2/20/2018
Included observations: 1353
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.543573 | 0.056410 | -9.636130 | 0.0000 |
| CSNP | 1.151028 | 1.393945 | 0.825734 | 0.4090 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000426 | Mean dependent var | 0.367332 |
| S.D. dependent var | 0.482256 | S.E. of regression | 0.482332 |
| Akaike info criterion | 1.317436 | Sum squared resid | 314.3025 |
| Schwarz criterion | 1.325138 | Log likelihood | -889.2457 |
| Hannan-Quinn criter. | 1.320320 | Deviance | 1778.491 |
| Restr. deviance | 1779.250 | Restr. log likelihood | -889.6251 |
| LR statistic | 0.758751 | Avg. log likelihood | -0.657240 |
| Prob(LR statistic) | 0.383720 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 856 | Total obs | 1353 |
| Obs with Dep=1 | 497 | | |

Logit Regression One Variable Results – S&P



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

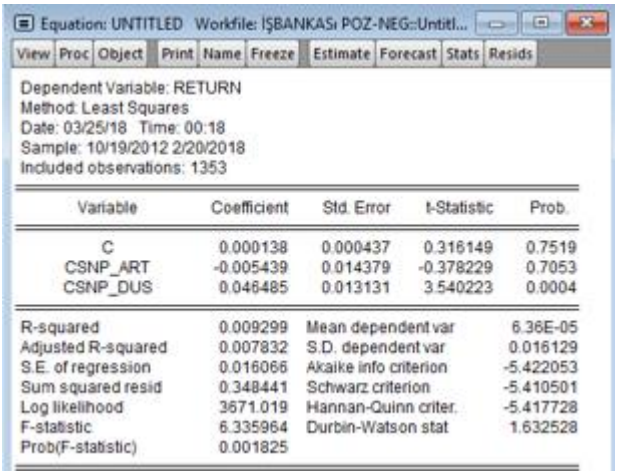
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 22:13
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.542427 | 0.056408 | -9.616136 | 0.0000 |
| CSNP(-1) | 0.289278 | 1.261131 | 0.229380 | 0.8186 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000030 | Mean dependent var | 0.367604 |
| S.D. dependent var | 0.482331 | S.E. of regression | 0.482502 |
| Akaike info criterion | 1.318255 | Sum squared resid | 314.2912 |
| Schwarz criterion | 1.325961 | Log likelihood | -889.1405 |
| Hannan-Quinn criter. | 1.321141 | Deviance | 1778.281 |
| Restr. deviance | 1778.334 | Restr. log likelihood | -889.1670 |
| LR statistic | 0.053023 | Avg. log likelihood | -0.657648 |
| Prob(LR statistic) | 0.817884 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 855 | Total obs | 1352 |
| Obs with Dep=1 | 497 | | |

OLS Regression Two Variable Results – S&P



Equation: UNTITLED Workfile: İŞBANKASı POZ-NEG::Untitl...

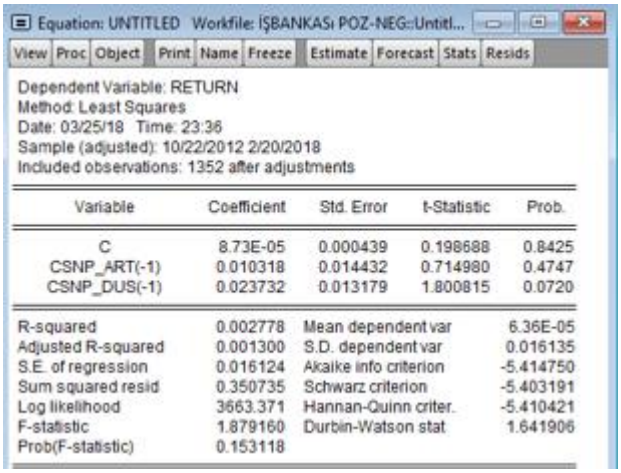
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 00:18
Sample: 10/19/2012 2/20/2018
Included observations: 1353

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.000138 | 0.000437 | 0.316149 | 0.7519 |
| CSNP_ART | -0.005439 | 0.014379 | -0.378229 | 0.7053 |
| CSNP_DUS | 0.046485 | 0.013131 | 3.540223 | 0.0004 |

| | | | |
|---|---|---|---|
| R-squared | 0.009299 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | 0.007832 | S.D. dependent var | 0.016129 |
| S.E. of regression | 0.016066 | Akaike info criterion | -5.422053 |
| Sum squared resid | 0.348441 | Schwarz criterion | -5.410501 |
| Log likelihood | 3671.019 | Hannan-Quinn criter. | -5.417728 |
| F-statistic | 6.335964 | Durbin-Watson stat | 1.632528 |
| Prob(F-statistic) | 0.001825 | | |

OLS Regression Two Variable Results – S&P



Equation: UNTITLED Workfile: İŞBANKASı POZ-NEG::Untitl...

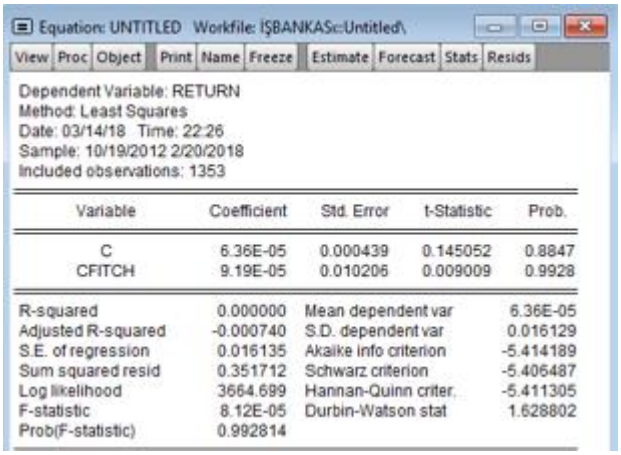
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:36
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 8.73E-05 | 0.000439 | 0.198688 | 0.8425 |
| CSNP_ART(-1) | 0.010318 | 0.014432 | 0.714980 | 0.4747 |
| CSNP_DUS(-1) | 0.023732 | 0.013179 | 1.800815 | 0.0720 |

| | | | |
|---|---|---|---|
| R-squared | 0.002778 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | 0.001300 | S.D. dependent var | 0.016135 |
| S.E. of regression | 0.016124 | Akaike info criterion | -5.414750 |
| Sum squared resid | 0.350735 | Schwarz criterion | -5.403191 |
| Log likelihood | 3663.371 | Hannan-Quinn criter. | -5.410421 |
| F-statistic | 1.879160 | Durbin-Watson stat | 1.641906 |
| Prob(F-statistic) | 0.153118 | | |

OLS Regression One Variable Results – Fitch



Equation: UNTITLED Workfile: İŞBANKASc:Untitled\

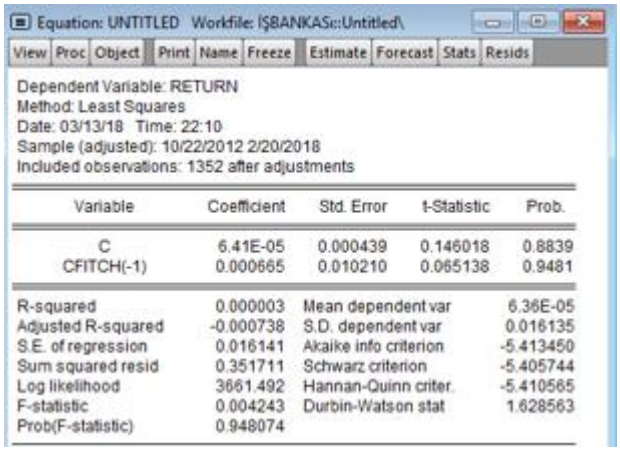
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:26
Sample: 10/19/2012 2/20/2018
Included observations: 1353

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 6.36E-05 | 0.000439 | 0.145052 | 0.8847 |
| CFITCH | 9.19E-05 | 0.010206 | 0.009009 | 0.9928 |

| | | | |
|---|---|---|---|
| R-squared | 0.000000 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | -0.000740 | S.D. dependent var | 0.016129 |
| S.E. of regression | 0.016135 | Akaike info criterion | -5.414189 |
| Sum squared resid | 0.351712 | Schwarz criterion | -5.406487 |
| Log likelihood | 3664.699 | Hannan-Quinn criter. | -5.411305 |
| F-statistic | 8.12E-05 | Durbin-Watson stat | 1.628802 |
| Prob(F-statistic) | 0.992814 | | |

OLS Regression One Variable Results – Fitch



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

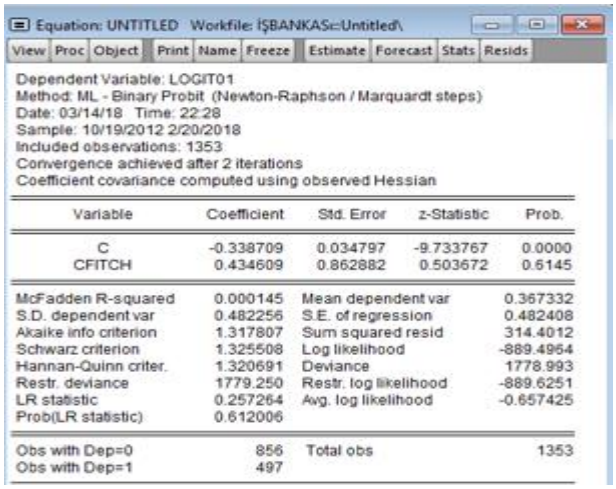
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 22:10
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 6.41E-05 | 0.000439 | 0.146018 | 0.8839 |
| CFITCH(-1) | 0.000665 | 0.010210 | 0.065138 | 0.9481 |

| | | | |
|---|---|---|---|
| R-squared | 0.000003 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | -0.000738 | S.D. dependent var | 0.016135 |
| S.E. of regression | 0.016141 | Akaike info criterion | -5.413450 |
| Sum squared resid | 0.351711 | Schwarz criterion | -5.405744 |
| Log likelihood | 3661.492 | Hannan-Quinn criter. | -5.410565 |
| F-statistic | 0.004243 | Durbin-Watson stat | 1.628563 |
| Prob(F-statistic) | 0.948074 | | |

Probit Regression One Variable Results – Fitch



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

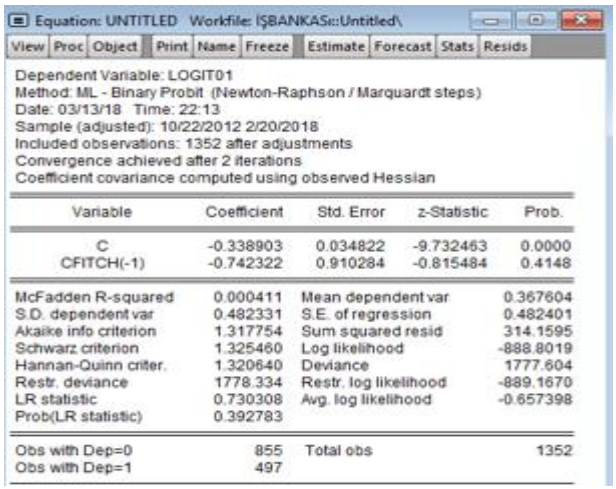
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:28
Sample: 10/19/2012 2/20/2018
Included observations: 1353
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.338709 | 0.034797 | -9.733767 | 0.0000 |
| CFITCH | 0.434609 | 0.862882 | 0.503672 | 0.6145 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000145 | Mean dependent var | 0.367332 |
| S.D. dependent var | 0.482256 | S.E. of regression | 0.482408 |
| Akaike info criterion | 1.317807 | Sum squared resid | 314.4012 |
| Schwarz criterion | 1.325508 | Log likelihood | -889.4964 |
| Hannan-Quinn criter. | 1.320691 | Deviance | 1778.993 |
| Restr. deviance | 1779.250 | Restr. log likelihood | -889.6251 |
| LR statistic | 0.257264 | Avg. log likelihood | -0.657425 |
| Prob(LR statistic) | 0.612006 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 856 | Total obs | 1353 |
| Obs with Dep=1 | 497 | | |

Probit Regression One Variable Results – Fitch



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

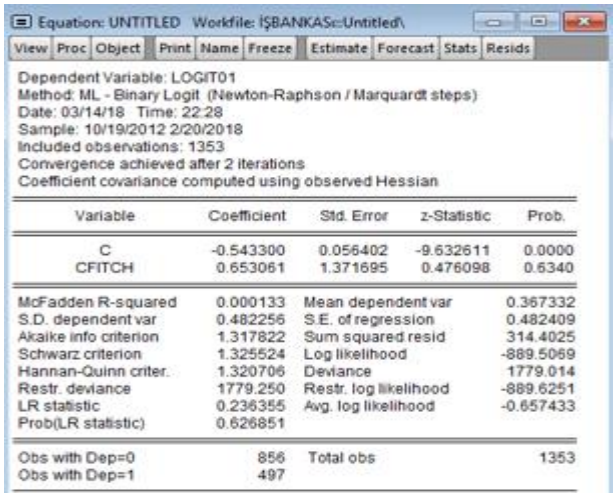
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 22:13
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.338903 | 0.034822 | -9.732463 | 0.0000 |
| CFITCH(-1) | -0.742322 | 0.910284 | -0.815484 | 0.4148 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000411 | Mean dependent var | 0.367604 |
| S.D. dependent var | 0.482331 | S.E. of regression | 0.482401 |
| Akaike info criterion | 1.317754 | Sum squared resid | 314.1595 |
| Schwarz criterion | 1.325460 | Log likelihood | -888.8019 |
| Hannan-Quinn criter. | 1.320640 | Deviance | 1777.604 |
| Restr. deviance | 1778.334 | Restr. log likelihood | -889.1670 |
| LR statistic | 0.730308 | Avg. log likelihood | -0.657398 |
| Prob(LR statistic) | 0.392783 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 855 | Total obs | 1352 |
| Obs with Dep=1 | 497 | | |

Logit Regression One Variable Results – Fitch



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

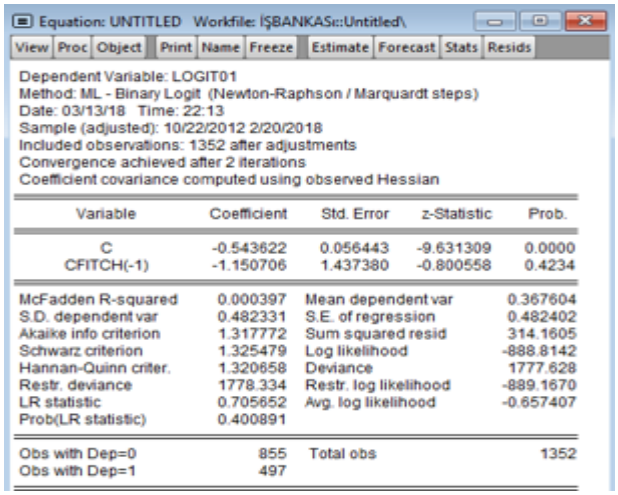
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:28
Sample: 10/19/2012 2/20/2018
Included observations: 1353
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.543300 | 0.056402 | -9.632611 | 0.0000 |
| CFITCH | 0.653061 | 1.371695 | 0.476098 | 0.6340 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000133 | Mean dependent var | 0.367332 |
| S.D. dependent var | 0.482256 | S.E. of regression | 0.482409 |
| Akaike info criterion | 1.317822 | Sum squared resid | 314.4025 |
| Schwarz criterion | 1.325524 | Log likelihood | -889.5069 |
| Hannan-Quinn criter. | 1.320706 | Deviance | 1779.014 |
| Restr. deviance | 1779.250 | Restr. log likelihood | -889.6251 |
| LR statistic | 0.236355 | Avg. log likelihood | -0.657433 |
| Prob(LR statistic) | 0.626851 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 856 | Total obs | 1353 |
| Obs with Dep=1 | 497 | | |

Logit Regression One Variable Results – Fitch



Equation: UNTITLED Workfile: İŞBANKASı::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

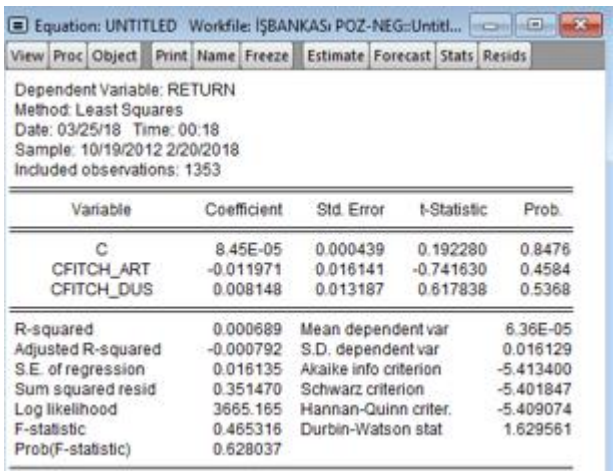
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 22:13
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.543622 | 0.056443 | -9.631309 | 0.0000 |
| CFITCH(-1) | -1.150706 | 1.437380 | -0.800558 | 0.4234 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000397 | Mean dependent var | 0.367604 |
| S.D. dependent var | 0.482331 | S.E. of regression | 0.482402 |
| Akaike info criterion | 1.317772 | Sum squared resid | 314.1605 |
| Schwarz criterion | 1.325479 | Log likelihood | -888.8142 |
| Hannan-Quinn criter. | 1.320658 | Deviance | 1777.628 |
| Restr. deviance | 1778.334 | Restr. log likelihood | -889.1670 |
| LR statistic | 0.705652 | Avg. log likelihood | -0.657407 |
| Prob(LR statistic) | 0.400891 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 855 | Total obs | 1352 |
| Obs with Dep=1 | 497 | | |

OLS Regression Two Variable Results – Fitch



Equation: UNTITLED Workfile: İŞBANKASı POZ-NEG::Untitl...

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 00:18
Sample: 10/19/2012 2/20/2018
Included observations: 1353

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 8.45E-05 | 0.000439 | 0.192280 | 0.8476 |
| CFITCH_ART | -0.011971 | 0.016141 | -0.741630 | 0.4584 |
| CFITCH_DUS | 0.008148 | 0.013187 | 0.617838 | 0.5368 |

| | | | |
|---|---|---|---|
| R-squared | 0.000689 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | -0.000792 | S.D. dependent var | 0.016129 |
| S.E. of regression | 0.016135 | Akaike info criterion | -5.413400 |
| Sum squared resid | 0.351470 | Schwarz criterion | -5.401847 |
| Log likelihood | 3665.165 | Hannan-Quinn criter. | -5.409074 |
| F-statistic | 0.465316 | Durbin-Watson stat | 1.629561 |
| Prob(F-statistic) | 0.628037 | | |

OLS Regression Two Variable Results – Fitch

Equation: UNTITLED Workfile: İŞBANKASı POZ-NEG::Untitl...

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:36
Sample (adjusted): 10/22/2012 2/20/2018
Included observations: 1352 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 6.54E-05 | 0.000440 | 0.148657 | 0.8818 |
| CFITCH_ART(-1) | -6.54E-05 | 0.016153 | -0.004047 | 0.9968 |
| CFITCH_DUS(-1) | 0.001153 | 0.013197 | 0.087357 | 0.9304 |

| | | | |
|---|---|---|---|
| R-squared | 0.000006 | Mean dependent var | 6.36E-05 |
| Adjusted R-squared | -0.001477 | S.D. dependent var | 0.016135 |
| S.E. of regression | 0.016147 | Akaike info criterion | -5.411974 |
| Sum squared resid | 0.351710 | Schwarz criterion | -5.400414 |
| Log likelihood | 3661.494 | Hannan-Quinn criter. | -5.407645 |
| F-statistic | 0.003823 | Durbin-Watson stat | 1.628719 |
| Prob(F-statistic) | 0.996184 | | |

## F. Regression Result of Türk Telekom

OLS Regression One Variable Results – S&P

Equation: UNTITLED Workfile: TÜRK TELEKOM::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:36
Sample: 6/16/2014 2/20/2018
Included observations: 935

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -3.36E-05 | 0.000422 | -0.079587 | 0.9366 |
| CSNP | 0.021175 | 0.012509 | 1.692816 | 0.0908 |

| | | | |
|---|---|---|---|
| R-squared | 0.003062 | Mean dependent var | -2.79E-05 |
| Adjusted R-squared | 0.001993 | S.D. dependent var | 0.012906 |
| S.E. of regression | 0.012893 | Akaike info criterion | -5.862088 |
| Sum squared resid | 0.155098 | Schwarz criterion | -5.851734 |
| Log likelihood | 2742.526 | Hannan-Quinn criter. | -5.858140 |
| F-statistic | 2.865625 | Durbin-Watson stat | 1.687497 |
| Prob(F-statistic) | 0.090824 | | |

OLS Regression One Variable Results – S&P

Equation: UNTITLED Workfile: TÜRK TELEKOM::Untitled\

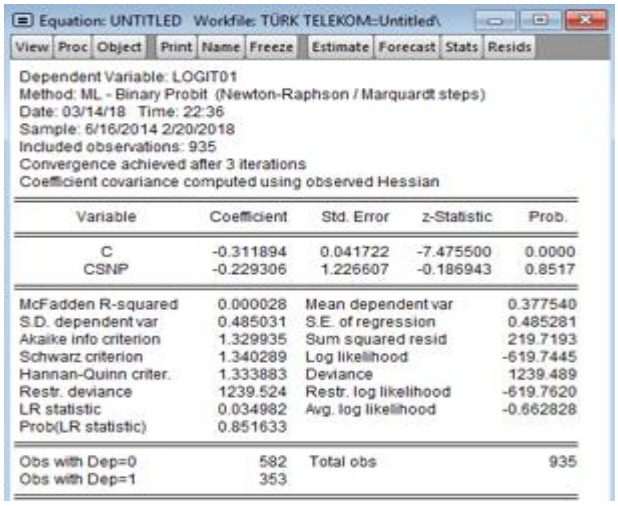
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 22:18
Sample (adjusted): 6/17/2014 2/20/2018
Included observations: 934 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -6.17E-05 | 0.000419 | -0.147366 | 0.8829 |
| CSNP(-1) | 0.049852 | 0.012413 | 4.016139 | 0.0001 |

| | | | |
|---|---|---|---|
| R-squared | 0.017012 | Mean dependent var | -4.84E-05 |
| Adjusted R-squared | 0.015957 | S.D. dependent var | 0.012898 |
| S.E. of regression | 0.012795 | Akaike info criterion | -5.877456 |
| Sum squared resid | 0.152569 | Schwarz criterion | -5.867093 |
| Log likelihood | 2746.772 | Hannan-Quinn criter. | -5.873504 |
| F-statistic | 16.12937 | Durbin-Watson stat | 1.713194 |
| Prob(F-statistic) | 0.000064 | | |

Probit Regression One Variable Results – S&P



Equation: UNTITLED Workfile: TÜRK TELEKOM::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

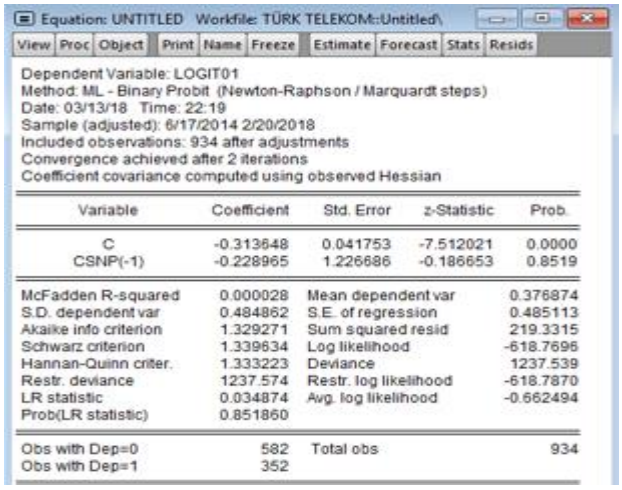
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:36
Sample: 6/16/2014 2/20/2018
Included observations: 935
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.311894 | 0.041722 | -7.475500 | 0.0000 |
| CSNP | -0.229306 | 1.226607 | -0.186943 | 0.8517 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000028 | Mean dependent var | 0.377540 |
| S.D. dependent var | 0.485031 | S.E. of regression | 0.485281 |
| Akaike info criterion | 1.329935 | Sum squared resid | 219.7193 |
| Schwarz criterion | 1.340289 | Log likelihood | -619.7445 |
| Hannan-Quinn criter. | 1.333883 | Deviance | 1239.489 |
| Restr. deviance | 1239.524 | Restr. log likelihood | -619.7620 |
| LR statistic | 0.034982 | Avg. log likelihood | -0.662828 |
| Prob(LR statistic) | 0.851633 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 582 | Total obs | 935 |
| Obs with Dep=1 | 353 | | |

Probit Regression One Variable Results – S&P



Equation: UNTITLED Workfile: TÜRK TELEKOM::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

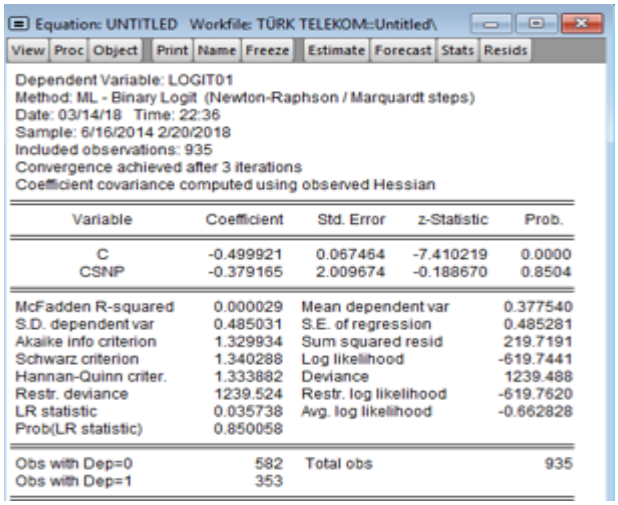
Dependent Variable: LOGIT01
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 22:19
Sample (adjusted): 6/17/2014 2/20/2018
Included observations: 934 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.313648 | 0.041753 | -7.512021 | 0.0000 |
| CSNP(-1) | -0.228965 | 1.226686 | -0.186653 | 0.8519 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000028 | Mean dependent var | 0.376874 |
| S.D. dependent var | 0.484862 | S.E. of regression | 0.485113 |
| Akaike info criterion | 1.329271 | Sum squared resid | 219.3315 |
| Schwarz criterion | 1.339634 | Log likelihood | -618.7696 |
| Hannan-Quinn criter. | 1.333223 | Deviance | 1237.539 |
| Restr. deviance | 1237.574 | Restr. log likelihood | -618.7870 |
| LR statistic | 0.034874 | Avg. log likelihood | -0.662494 |
| Prob(LR statistic) | 0.851860 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 582 | Total obs | 934 |
| Obs with Dep=1 | 352 | | |

Logit Regression One Variable Results – S&P



Equation: UNTITLED Workfile: TÜRK TELEKOM::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

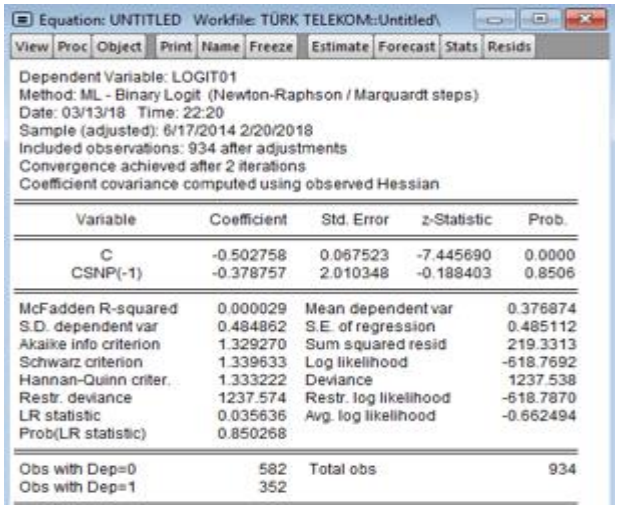
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/14/18 Time: 22:36
Sample: 6/16/2014 2/20/2018
Included observations: 935
Convergence achieved after 3 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.499921 | 0.067464 | -7.410219 | 0.0000 |
| CSNP | -0.379165 | 2.009674 | -0.188670 | 0.8504 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000029 | Mean dependent var | 0.377540 |
| S.D. dependent var | 0.485031 | S.E. of regression | 0.485281 |
| Akaike info criterion | 1.329934 | Sum squared resid | 219.7191 |
| Schwarz criterion | 1.340288 | Log likelihood | -619.7441 |
| Hannan-Quinn criter. | 1.333882 | Deviance | 1239.488 |
| Restr. deviance | 1239.524 | Restr. log likelihood | -619.7620 |
| LR statistic | 0.035738 | Avg. log likelihood | -0.662828 |
| Prob(LR statistic) | 0.850058 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 582 | Total obs | 935 |
| Obs with Dep=1 | 353 | | |

Logit Regression One Variable Results – S&P



Equation: UNTITLED Workfile: TÜRK TELEKOM::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

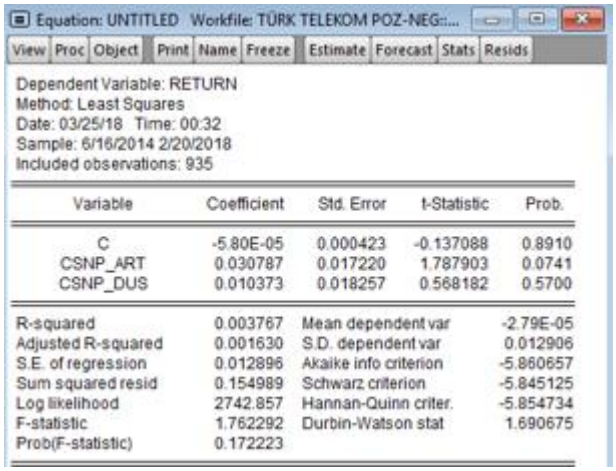
Dependent Variable: LOGIT01
Method: ML - Binary Logit (Newton-Raphson / Marquardt steps)
Date: 03/13/18 Time: 22:20
Sample (adjusted): 6/17/2014 2/20/2018
Included observations: 934 after adjustments
Convergence achieved after 2 iterations
Coefficient covariance computed using observed Hessian

| Variable | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| C | -0.502758 | 0.067523 | -7.445690 | 0.0000 |
| CSNP(-1) | -0.378757 | 2.010348 | -0.188403 | 0.8506 |

| | | | |
|---|---|---|---|
| McFadden R-squared | 0.000029 | Mean dependent var | 0.376874 |
| S.D. dependent var | 0.484862 | S.E. of regression | 0.485112 |
| Akaike info criterion | 1.329270 | Sum squared resid | 219.3313 |
| Schwarz criterion | 1.339633 | Log likelihood | -618.7692 |
| Hannan-Quinn criter. | 1.333222 | Deviance | 1237.538 |
| Restr. deviance | 1237.574 | Restr. log likelihood | -618.7870 |
| LR statistic | 0.035636 | Avg. log likelihood | -0.662494 |
| Prob(LR statistic) | 0.850268 | | |

| | | | |
|---|---|---|---|
| Obs with Dep=0 | 582 | Total obs | 934 |
| Obs with Dep=1 | 352 | | |

OLS Regression Two Variable Results – S&P



Equation: UNTITLED Workfile: TÜRK TELEKOM POZ-NEG::...

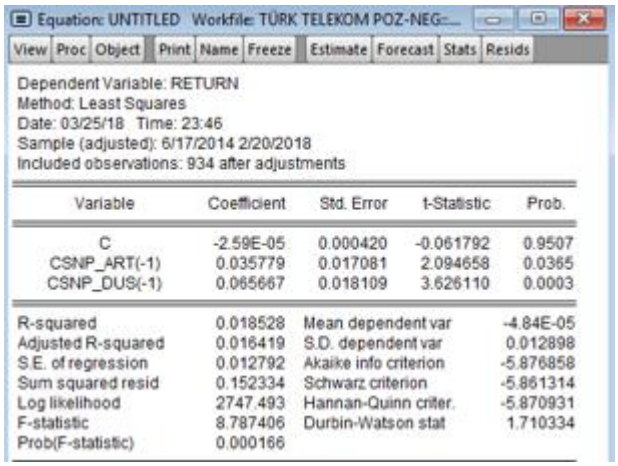
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 00:32
Sample: 6/16/2014 2/20/2018
Included observations: 935

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -5.80E-05 | 0.000423 | -0.137088 | 0.8910 |
| CSNP_ART | 0.030787 | 0.017220 | 1.787903 | 0.0741 |
| CSNP_DUS | 0.010373 | 0.018257 | 0.568182 | 0.5700 |

| | | | |
|---|---|---|---|
| R-squared | 0.003767 | Mean dependent var | -2.79E-05 |
| Adjusted R-squared | 0.001630 | S.D. dependent var | 0.012906 |
| S.E. of regression | 0.012896 | Akaike info criterion | -5.860657 |
| Sum squared resid | 0.154989 | Schwarz criterion | -5.845125 |
| Log likelihood | 2742.857 | Hannan-Quinn criter. | -5.854734 |
| F-statistic | 1.762292 | Durbin-Watson stat | 1.690675 |
| Prob(F-statistic) | 0.172223 | | |

OLS Regression Two Variable Results – S&P



Equation: UNTITLED Workfile: TÜRK TELEKOM POZ-NEG::...

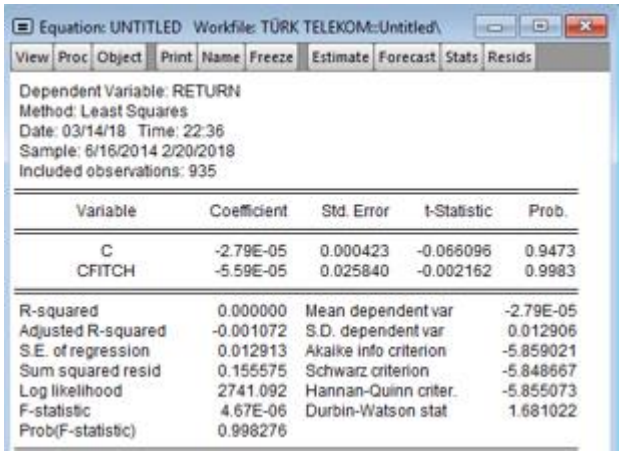
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/25/18 Time: 23:46
Sample (adjusted): 6/17/2014 2/20/2018
Included observations: 934 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -2.59E-05 | 0.000420 | -0.061792 | 0.9507 |
| CSNP_ART(-1) | 0.035779 | 0.017081 | 2.094658 | 0.0365 |
| CSNP_DUS(-1) | 0.065667 | 0.018109 | 3.626110 | 0.0003 |

| | | | |
|---|---|---|---|
| R-squared | 0.018528 | Mean dependent var | -4.84E-05 |
| Adjusted R-squared | 0.016419 | S.D. dependent var | 0.012898 |
| S.E. of regression | 0.012792 | Akaike info criterion | -5.876858 |
| Sum squared resid | 0.152334 | Schwarz criterion | -5.861314 |
| Log likelihood | 2747.493 | Hannan-Quinn criter. | -5.870931 |
| F-statistic | 8.787406 | Durbin-Watson stat | 1.710334 |
| Prob(F-statistic) | 0.000166 | | |

OLS Regression One Variable Results – Fitch



Equation: UNTITLED Workfile: TÜRK TELEKOM::Untitled\

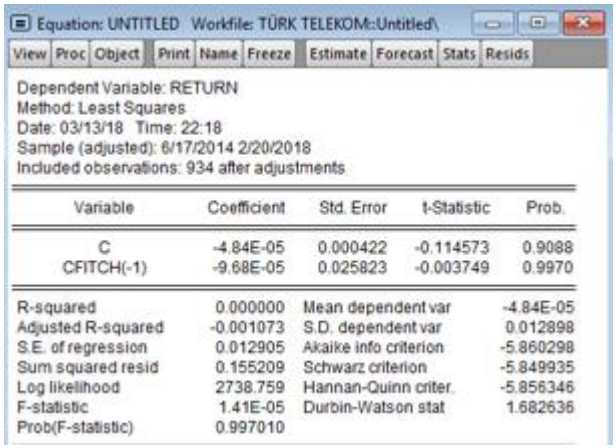
View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/14/18 Time: 22:36
Sample: 6/16/2014 2/20/2018
Included observations: 935

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -2.79E-05 | 0.000423 | -0.066096 | 0.9473 |
| CFITCH | -5.59E-05 | 0.025840 | -0.002162 | 0.9983 |

| | | | |
|---|---|---|---|
| R-squared | 0.000000 | Mean dependent var | -2.79E-05 |
| Adjusted R-squared | -0.001072 | S.D. dependent var | 0.012906 |
| S.E. of regression | 0.012913 | Akaike info criterion | -5.859021 |
| Sum squared resid | 0.155575 | Schwarz criterion | -5.848667 |
| Log likelihood | 2741.092 | Hannan-Quinn criter. | -5.855073 |
| F-statistic | 4.67E-06 | Durbin-Watson stat | 1.681022 |
| Prob(F-statistic) | 0.998276 | | |

OLS Regression One Variable Results – Fitch



Equation: UNTITLED Workfile: TÜRK TELEKOM::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: RETURN
Method: Least Squares
Date: 03/13/18 Time: 22:18
Sample (adjusted): 6/17/2014 2/20/2018
Included observations: 934 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -4.84E-05 | 0.000422 | -0.114573 | 0.9088 |
| CFITCH(-1) | -9.68E-05 | 0.025823 | -0.003749 | 0.9970 |

| | | | |
|---|---|---|---|
| R-squared | 0.000000 | Mean dependent var | -4.84E-05 |
| Adjusted R-squared | -0.001073 | S.D. dependent var | 0.012898 |
| S.E. of regression | 0.012905 | Akaike info criterion | -5.860298 |
| Sum squared resid | 0.155209 | Schwarz criterion | -5.849935 |
| Log likelihood | 2738.759 | Hannan-Quinn criter. | -5.856346 |
| F-statistic | 1.41E-05 | Durbin-Watson stat | 1.682636 |
| Prob(F-statistic) | 0.997010 | | |