KADİR HAS UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES

THE EFFECT OF MONETARY POLICY ON FOREIGN TRADE BALANCE IN TURKEY, IN PARTICULAR THROUGH CREDIT CHANNEL

GRADUATE DISSERTATION

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THE EFFECT OF MONETARY POLICY ON FOREIGN TRADE BALANCE IN TURKEY, IN PARTICULAR THROUGH CREDIT CHANNEL

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I, Gürbüz Kıran, confirm that the work presented in this dissertation is my own. Where information has been derived from other sources, I confirm that this has been indicated in the dissertation.

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ABSTRACT

THE EFFECT OF MONETARY POLICY ON FOREIGN TRADE BALANCE IN TURKEY, IN PARTICULAR THROUGH CREDIT CHANNEL
Gürbüz Kıran
Doctor of Philosophy in Economics
Advisor: Asst. Prof. Dr. Sabri Arhan Ertan
April, 2017

The paper is about the possible effect of monetary policy on the post 2001 lending boom, and the related current account deficit in Turkey. In the analysis, VAR, ARDL, IRF and Granger causality tests have been used. Moreover, the effect of the policy, in particular through real interest rates, has also been analyzed separately on consumer, public and other (business) loans. Even after taking the influence of global risk appetite as the factor for funds flow into emerging markets, including Turkey, into the consideration, it has been shown that monetary policy seems to affect current account and its main component of foreign trade balance via its influence on loan growth, especially through consumer and other (business) loan channels.

Keywords: Monetary Policy, Credit (Loan) Channel, Foreign Trade Balance

ÖZET

THE EFFECT OF MONETARY POLICY ON FOREIGN TRADE BALANCE IN TURKEY, IN PARTICULAR THROUGH CREDIT CHANNEL

Gürbüz Kıran

Ekonomi Doktora

Danışman: Yard. Doç. Dr. Sabri Arhan Ertan

Nisan, 2017

Bu çalışma Türkiye'deki para politikasının 2001 yılı sonrasında gözlemlenen kredi genişlemesi ve cari açık üzerindeki muhtemel etkileri üzerinedir. Araştırmada, VAR, ARDL, IRF ve Granger nedensellik testleri kullanılmıştır. Bu kapsamda, reel faiz oranı ile temsil edilen para politikasının tüketici, kamu ve diğer ticari kredileri üzerine etkileri incelenmiştir. Sonuç olarak, Türkiye gibi yükselen / gelişen ekonomilere fon akışının temel faktörlerinden olan küresel risk iştahı ve benzeri değişkenler de dikkate alındığında, para politikasının nihai olarak cari denge ve onun ana bileşeni dış ticaret dengesini diğer ticari ve tüketici kradiler kanalı yoluyla etkilediği gözlemlenmiştir.

Anahtar Kelimeler: Para Politikası, Kredi Kanalı, Dış Ticaret Açığı

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List of Abbreviations

AR:	Auto Regressive
ARDL:	Auto Regressive Distributed Lag
C:	Consumption Expenditures
CA:	Current Account
CBTR:	the Central Bank of the Republic of Turkey
CDS:	Credit Default Swap
CPI:	Consumer Price Index
ECM:	Error Correction Model
EMBI+:	Emerging Markets BondIndex+
EU:	European Union
EUR:	Euro
FAVAR:	Factor Augmented Vector Auto Regression
FDI:	Foreign Direct Investment
FED:	Federal Reserve
FOMC:	Federal Open Market Committee
FTB:	Foreign Trade Balance
FX:	Foreign Exchange
G:	Government Expenditures
GARCH:	Generalized Autoregressive Conditional Heteroskedasticity
GDP:	Gross Domestic Product
GMM:	Generalized Method of Moments
HFI:	High Frequency Identification
I:	Investment Expenditures
IS - LM:	Investment Savings - Liquidity Money
M:	Imports
OLS:	Ordinary Least Square)
OMO:	Open Market Operations
RER / REER:	Real Exchange Rate
RHS:	Right Hand Side
ROM:	Reserve Option Mechanism
RPI:	Retail Price Index
SSR:	Sum of Squared Residuals
TOT:	Terms of Trade
TRY / TL:	Turkish Lira
TSI:	Turkstat, Turkish Statistical Institute
UK:	United Kingdom
USA:	United States of America
USD:	United States Dollar
VAR:	Vector Autoregressive
VECM:	Vector Error Correction Model
VIX:	Chicago Board of Exchange Volatility Index
WW:	World War
X:	Exports

1 Introduction

There have been several papers published related to the risk of excessive loan growth on financial stabilities (i.e. their role in financial crises), especially after the 2007 mortgage crisis. In this respect, the lending boom, in particular the consumer lending boom (including credit card receivables) in Turkey of the last decade, whose size has more than quadrupled, has received particular attention.

Likewise, with the policy change in Q4 2010 in Turkey (following the successful inflation targeting regime applied since the February 2001 crisis, when short-term interest rates have been used as the main policy tool,[1] while foreign exchange[FX] rates are also allowed to float) CBTR has started a new monetary policy. Thus, the bank, apart from setting the policy rate to get price stability, has started to use other tools like Reserve Requirement Ratios, where further flexibility is ensured by Reserve Option Mechanism (ROM), Open Market Operations, and TRY interest rate corridor[2], to maintain financial stability, through loans and FX rate channel[55, pp. 2-5]. Primarily, the bank has tried to control the current account deficit, mostly through foreign trade deficit as its main component, by means of limiting excessive loan growth and excessive TRY exchange rate appreciation[42, pp. 14-15].

However, in terms of the foreign trade deficit, there are also some important points to make. Initially, there are some expenditures which are mainly out of control of the CBTR, but which Turkish production sectors depend on such as energy. Similarly, due to the structural nature of its open economy, exports and the growth of Turkey are significantly dependent on the imports of intermediate and capital goods.

Therefore, in this study, the effect of monetary policy on foreign trade balance through the credit channel has been analyzed, in order to shed some more light onto this process, so that questions like: whether rather than controlling overall credit growth, would it make more sense to control consumer loans? might be answered with more evidence.

Hence, the second section of the thesis comprises the main time series econometric models which have been used. In this respect, definitions and main properties, together with the strengths and weaknesses of these models have been presented. This section starts with the "Vector Auto Regressive (VAR) Model", which is followed by "Error Correction (EC)" and "Auto Regressive Distributed Lag (ARDL)" models respectively. Afterwards, the section comprises "Seasonality" as one of the

[1] interest rates are adjusted in response to deviations of inflation from a targeted path

[2] Interest rate corridor is defined as the margin between the overnight lending and borrowing rates of the CBRT

critical concepts in time series analysis, and it ends with the Structural Break Test which has been applied in the study as well.

The literature review has been situated in section 3 of the thesis. It starts with the current account deficit issue. Three main approaches evolved in the post second World War era about the negativity and the sustainability of deficits have been presented. The section continues with a review of the literature about the role of credit expansions on financial stability (their roles in the past crises), for both advanced and emerging economies like Turkey. Next, there follows a part related to monetary policy transmission channels, covering banks. Afterwards, the literature about the determi- nants of consumption and investment expenditures respectively have been presented . The following section consists of the literature about the effects of monetary policy on foreign trade and external balances for advanced and emerging economies. Finally, the related studies about Turkey have also been presented.

Section 4 contains the theoretical background. A small open economy IS - LM model (a version of the Mundell-Fleming model)with floating exchange rates has been used as a base template, to which loans have been added to represent the Turkish economy. Furthermore, the response of the model variables to a monetary shock and both short and long run equilibrium conditions have been analyzed.

Variables used in the analyses of the thesis have been presented in section 5. The section contains various details such as the sources, the types (whether they have been used as exogenous or endogenous variables), seasonality and stationarity of these variables.

The sixth section is also about the results of the analyses carried out on both real values of the variables[3], and the ratio of real values over real GDP[4]. Initially, the results related to the effect of the loan transmission channel of monetary policy have been presented, where in addition to the total loans, the loan channel has also been examined through the composition of consumer, public and other (business) loans. The methods used at this stage are VAR and ARDL. Then the results of the studies of three subparts of the transmission channel have been reported in three subsections: the effect of aggregate expenditures on Foreign Trade Balance, the effect of real interest rate on loans and the effect of loans on aggregate expenditures. The methods used at these stages are also VAR, ARDL and ECM. The section ends with the robustness check subsection, where through the inclusion of several related variables(such as net FDI, net portfolio investments, oil prices, public budget deficit and variance in global and country risk level), the results of the models have been tested.

In the seventh section, in the light of the results derived, some policy recommendations have been suggested, and areas for future research have also been pointed out, and some recommendations for practitioners of time series analysis have been made.

Finally, the impulse-response graphics are also presented in the appendix, captioned as the ninth chapter.

[3]This is called the level analysis

[4]This is called the ratio analysis

2 Models

2.1 VAR (Vector Auto Regressive) Model

The first methodology comprises setting up a base VAR model representing the basic monetary relation in an economy, in particular the monetary transmission mechanism by bank loan channel, among the variables like ex-ante overnight real interest rate, variances in several loan stocks (business, consumer, public loans and total loans), macroeconomic expenditures, real effective exchange rate and foreign trade balance and current account balance, with the control of several variables like open market operations, reserve requirements, global mortgage crisis period and local volatility represented through relative standard deviation of nominal exchange rate. It is represented by the following:

$$Y_t = C + \sum_{i=1}^{p} \Phi_i Y_{t-i} + BX_t + \varepsilon_t$$

Where, the components of the vector Yt are the endogenous variables, and Xt are the exogenous variables as their values are determined outside of the model (in other words, they are the control variables). Moreover, the components C and ε_t are also the components of constant and error variables respectively.

VAR models were made famous in econometrics by Sims(1980). VAR is indeed a systems regression model, where there is more than one dependent variable, which might be thought of as a hybrid between a simultaneous equations model and an univariate time series model. Compared with these models, VAR models have various advantages:

- They are more flexible than univariate AR (Auto regressive) models since the value of a variable might depend not only on its own lags or combinations of white noise terms but also those of other endogenous variables.
- Using OLS (Ordinary Least Square) separately on each equation is possible, if there are no contemporaneous terms on the RHS (Right Hand Side) of the equations due to the fact that all variables on RHS are predetermined.
- It is not necessary to define which variables are exogenous or endogenous as all variables are endogenous. This allows one the discretion as to how to classify the variables, so there is no need to use and impose identifying restrictions (and use of Hausman-type tests).

- It is often seen that the forecasts of VARs perform better than those of traditional structural models. Probably owing to the ad hoc nature of the restrictions put on structural models to make sure of aforementioned identification, in several articles [70] it has been claimed that large scale structural models did not perform as well in terms of out-of-sample forecast accuracy.

Besides these advantages, VAR models, however, have several disadvantages and limitations as well.

- All variables of the VAR model need to be stationary. It is not possible to use data in levels and first differences together in the analysis. Hence any information will be lost in getting any long run relationship among the variables, if differencing is used in order to make non-stationary variables into stationary ones.

- The number of parameters needed to be estimated is quite large. To illustrate, if there are n equations for n variables, together with l lags, then total [n(1+kn)] parameters are required to be estimated. For analyses with rather small sample sizes, this means large standard errors, so wide confidence intervals for the coefficients of the models due to the degrees of freedom issue.

- Generally VARs are a-theoretical models, as they might depend on less use of theoretical background among the variables to monitor the specification of the model. In this respect, sometimes it is not obvious how to interpret their coefficient estimates as well.

2.1.1 Granger Causality

Within VAR models, Granger Causality among the variables has also been tested. A rather simple definition of Granger Causality, in the case of two time-series variables, M and N can be stated as: Variable M is stated to Granger-cause variable N provided that N would be better predicted using the histories of both M and N than it would by using the history of N alone. An absence of Granger Causality can be tested by estimating the following VAR model:

$$N_t = a_0 + a_1 N_{t-1} + ... + a_p N_{t-p} + b_1 M_{t-1} + ... + b_p M_{t-p} + u_t (1)$$

$$M_t = c_0 + c_1 M_{t-1} + ... + c_p M_{t-p} + d_1 N_{t-1} + ... + d_p N_{t-p} + e_t (2)$$

Then, testing $H_0 : b_1 = b_2 = ... = b_p = 0$, against $H_A : NotH_0$, is a test that M does not Granger-cause N. Likewise, testing $H_0 : d_1 = d_2 = ... = d_p = 0$, against $H_A : NotH_0$, is a test that N does not Granger-cause M. In each case, a rejection of the null implies there is Granger Causality.

2.1.2 Impulse Responses

Any responsiveness of the dependent variables in a VAR model to shocks to each one of the (dependent) variables is traced out by impulse response analyses. In this respect, a unit shock (innovation) is applied to the error and the effects on the VAR system over time are analyzed. Furthermore, if the model and the underlying system are stable, any shock should gradually die away. Thus, in this way, any positive and negative effect on the other variables of a change of a variable within the system, and how long it takes for that effect to go through the system is revealed through impulse response analyses.

2.1.3 Variance Decompositions

Variance decompositions provide the proportion of the movements in the dependent variables resulting from their own shocks versus those of other variables in a VAR system. Hence, how much of t step ahead forecast error variance of a given variable is explained by innovations to each independent variable as $t = 1, 2, 3..$ is determined by variance decompositions. The basis for these analyses is the dynamic structure of VAR models, so due to this dynamic set up, an innovation (shock) given to a variable affects not only itself but is transmitted to other variables in the system. Finally, in both Impulse Response and Variance Decomposition analyses, the ordering of the variables is important and economic theory is applied at this stage. Moreover, orthogonalization is also used in order to overcome the correlated error terms possibility among the equations in VAR models, as impulse responses and variance decompositions refer to unit shock (innovation) as the errors of one equation only.

2.2 Error Correction Model (ECM)

Error Correction Models are used in order to model long-term relations in time series analyses. In time series analyses, moreover, the notion of stationarity and non-stationarity is essential, as the variables which are stationary are treated dissimilarly to the ones which are non-stationary. Furthermore, variables which have constant mean and constant variance, as well as constant auto covariance for a given lag can be defined as stationary series, more formally[20, p. 367] : a variable y is stationary if it satisfies the following three conditions for $t = 1, 2, 3, ..\infty$

- $E(y_t) = \mu$
- $E(y_t - \mu)(y_t - \mu) = \sigma < \infty$
- $E(y_{t1} - \mu)(y_{t2} - \mu) = \mu_{t1-t2}$[5], $\forall t_1, t_2$

[5]This is also called weak stationarity or covariance stationary process. There is also strictly stationary process. This is defined as: the process $(y_t : t = 1, 2, 3, ..)$ where for every collection of time indices $1 < t_1 < .. < t_n$ the joint distribution of $(y_{t1}, ..y_{tn})$ is the same as the joint distibution of $(y_{t1+g}, ..y_{tn+g})$ for all integers $g \geq 1$, thus, the probability of y fallng a specific interval is the same irrelevant of time, now, future or past.[20, pp. 230-231]

The main results of using nonstationary data (so the differences from stationary data) would be stated as follows:

- Spurious regressions might come out as a consequence of using nonstationary data. For instance when two independent but trending over time variables are regressed on each other, then a regression which seems good under standard measures such as significant coefficient estimates and a high R2 might be obtained, which however is indeed nonsense.

- In regressions among the nonstationary variables, the standard assumptions for the asymptotic analysis would not work so are not valid. That is to state that the F statistic would not follow an F distribution, and similarly t ratios would not follow a t distribution either, and so on.

- Finally, any shocks (or innovations) to a system will die away gradually for stationary series. In other words, the effect of an innovation applied at time t will have a smaller effect at time t+1, then a much smaller effect at time t+2 and onwards. However, this is not the case for nonstationary series, where the innovations will persist infinitively. Hence, compared with the stationary series, the effect of an innovation will not have smaller effects as time goes by.

Differencing comes into the picture at this stage. It is one way of converting nonstationary time series into stationary ones. The first difference of a variable x is calculated by the difference between the value of x at time t and its value at one period before, and shown as:

$$\triangle x_t = x_t - x_{t-1}[20, p.156]$$

Moreover, assuming this variable becomes stationary, then, it is also stated as integrated of order 1. In addition, for any variable that is required by differenced g times in order to be stationary, it is stated to be integrated of order g and is represented by $x_t \sim I(g)$. In this frame a stationary variable can be show as I(0)[20, p. 375] . Normally, the residuals of I(1) series are also I(1). However, it is also possible that the residuals of linear combinations of some I(1) series are stationary I(0), provided that the variables are **cointegrated**. Furthermore, theoretically it is reasonable for some variables to have long term relationship with each other, like spot and future prices of assets. A more general definition of cointegration can be presented as the following: Given v_t being an $m \times 1$ vector of variables, the elements of v_t are stated to be integrated of order (f,h) provided that:

1. All elements of v_t are I(f)

2. There is at least one vector of coefficients β where $\beta' v_t$ is $I(f-h)$[20, p. 388]

Moreover, the main test which is used to estimate cointegration systems is the Johansen technique. For a system of h variables all of which are I(1), it can be represented as :

$$\triangle m_t = \Pi m_{t-k} + \Gamma_1 \triangle m_{t-1} + \Gamma_2 \triangle m_{t-2} + \Gamma_3 \triangle m_{t-3} + .. + \Gamma_{k-1} \triangle m_{t-(k-1)} + \varepsilon_t$$

where, I stands for identity matrix, and k is the number of lags, then: $\Pi = (\sum_{i=1}^{k} \beta_i) - I_h$ and $\Gamma_i = (\sum_{j=1}^{i} \beta_j) - I_h$

The Johansen Method focuses around analysis of Π matrix which can also be inferred as a long run coefficient matrix. The cointegration test among m series is calculated by comparing the rank of Π matrix b its eigenvalues. Finally, this method also allows coefficient restrictions as well to test the cases imposed by theoretical intuitions etc [20, pp. 403-409]. Furthermore, if the series are I(1)[6] and there is cointegration among them, then ECM, (if there is more than one cointegration equation among them, then the model is also called Vector Error Correction Models VECM-) is the appropriate model to analyze, their potential in both long term and short term relationships. A basic two variable model is presented below:

$$\Delta m_t = \beta_1 \Delta n_t + \beta_2 (m_{t-1} - \gamma n_{t-1}) + \varepsilon_t$$

Here, γ stands for the long run relationship between m and n, as any model based solely on differenced terms (Δ) does not lead to any long run equilibrium result. Plus, the short run relationship between changes in n and changes in m is also defined by β_1. Finally, the fraction of the previous periods equilibrium error which is corrected for is also described by β_2 (This is also called the speed of adjustment of the ECM model)[20, pp. 390-391] . Besides this, a VECM with k lags with the cointegration rank $r(\leq h)$ is presented as

$$\Delta m_t = \delta + \Pi m_{t-1} + \sum_{i=1}^{k-1} \Theta_i \Delta m_{t-1} + \varepsilon_t$$

where, $\Pi = \alpha\beta$ and α and β are h×r matrices; while, Θ is an h×h matrix[36]

2.3 Auto Regressive Distributed Lag (ARDL) Model

Auto Regressive Distributed Lag (ARDL) Models comprises the cases where the value of a dependent variable depends on the contemporaneous and the previous values of explanatory variables and the previous values of the dependent variable. Hence, an ARDL(p,r) model is represented by the following:

$$y_t = \eta + \sum_{i=1}^{p} \gamma_i y_{t-1} + \sum_{j=0}^{r} \beta_j x_{t-1j} + \varepsilon_t$$

where, ε is i.i.d $\forall t$

These models have become popular in recent years as a method of examining long-run and cointegrating relationships among variables (Pesaran and Shin, 1999)[59] and Pesaran et al. (2001)[60] . In this regard, they allow us to incorporate I(0) and I(1) variables in the same estimation. Apart from these, other basic advantages of the ARDL model are that compared with VAR, ARDL uses a single equation, so requires much fewer parameters to be estimated. Finally, with ARDL, restrictions on the number of lags might separately be applied to each variable unlike the Johansen Method.

[6] Assuming they turn into I(0) with differencing, so that OLS and its standard procedures for statistical analyssis can be used

2.4 Seasonality

Seasonality can be defined as the observed movements in time series, which recur in a year, at particular time points and with similar intensity in a given season. Moreover, seasonality can be observed in time series whose frequency is higher than once in a year (like monthly, quarterly etc.). Hence, it is the orderly, though not necessarily regular, intra - year movement which results from the changes of the calendar, timing of decisions and the weather, directly or indirectly, via the consumption and the production decisions made by the agent of the economy.[38].

Thus, seasonal movements are likely to be foreseeable. Under normal circumstances though factors which induce seasonality can gradually change through time as they might not be non-steady, they can be expected to repeat. The main tests used to check is a variable has seasonality or not are presented below:

2.4.1 Seasonality Tests

The Friedman Test (Stable Seasonality Test)
This is a non-parametric method to test whether samples are drawn from the same population or from populations with equal medians. Moreover, in the regression equation the significance of the quarter (in this analysis) effect is tested. the test requires no distributional assumptions and the rankings of the observations are used. The Friedman Test is also described as a stable seasonality test. The test uses initial estimation of the unmodified Seasonal-Irregular component (outliers or seasonal-irregular factors with extreme values) from which l samples are derived (it is 4 as quarterly variables are used in this analysis) of size $n_1, ..., n_l$ respectively. Each l represents a different level of seasonality. Here, the fact that seasonality affects only the means of distribution and not their variance is assumed. Moreover, the null hypothesis below is tested under the assumption that each sample is derived from a random variable X_i following normal distribution with mean m_i and standard deviation σ.

$H_0 : m_1 = m_2 = ... = m_l$

against:$H_1 : m_r \neq m_s$ for at least one pair (r, s)

Moreover the test applies the following decomposition of the variance:

$$\sum_{j=1}^{l}\sum_{i=1}^{n_j}(x_{i,j}-\bar{x})^2 = \sum_{j=1}^{l} n_j(\bar{x}_{.j}-\bar{x}_{..})^2 + \sum_{j=1}^{l}\sum_{i=1}^{n_j}(x_{i,j}-\bar{x}_{.j})^2$$

here, $\bar{x}_{.j}$ stands for the average of j -th sample. Hence, the total variance is decomposed into a variance of the averages due to seasonality and a residual seasonality. Then, the test statistics are calculated as:

$$F = \frac{\frac{\sum_{j=1}^{l} n_j(\bar{x}_{.j}-\bar{x}_{..})^2}{l-1}}{\frac{\sum_{j=1}^{l}\sum_{i=1}^{n_j}(x_{i,j}-\bar{x}_{.j})^2}{n-l}} \sim F(l-1, n-l)$$

Where l 1 and n k represents the degrees of freedom. Finally, If the null hypothesis of no stable seasonality is not rejected at the 0.001 significance level ($P \geq 0.001$), then the series is assumed to be non-seasonal.

The Kruskal-Wallis test
This is a non-parametric test used to compare samples from two or more sets. The null hypothesis claims that all quarters (in this analysis) have the same mean. Moreover, the Kruskal-Wallis test is run (or excercised)for the final estimate of the unmodified Seasonal-Irregular component in which m samples G_j are derived (m = 4 for quarterly series in this analysis) of size $n_1, n_2, ...n_m$ respectively. Finally, the test is founded upon the statistic:

$$W = \frac{12}{n(n+1)} \sum_{j=1}^{m} \frac{S_j^2}{n_j} - 3(n+1)$$

here S_j is the sum of the ranks of the observations from the sample G_j in the total sample of $n = \sum_{j=1}^{m} n_j$ observations .Furthermore, rejection of null hypothesis points to a seasonality where the test statistic follows a chi-square distribution with $m-1$ degrees of freedom as well. Like the Friedman test, if the null hypothesis of no stable seasonality is not rejected at the 0.001 significance level ($P \geq 0.001$), then the series is assumed to be non-seasonal.

Evolutive seasonality test (Moving seasonality test)
This test is founded upon a two-way analysis of a variance model and in the model only the values from complete years are used. Moreover, it uses the seasonal-irregular component in the following model[7]

$$|SI_{ij} - 1| = X_{ij} + b_i + m_i + e_{ij}$$

Here m_j stands for the quarterly effect for j -th period, where j = (1,2,3,4) b_j stands for the yearly effect $i(i = 1, ..., N)$ where N represents the number of complete years, e_{ij} stands also for the residual effect.

Furthermore, this test depends on the decomposition $S^2 = S_A^2 + S_B^2 + S_R^2$ where,
$S_A^2 = k \sum_{j=1}^{N} (\bar{X}_{.j} - \bar{X}_{..})^2$ represents the inter-quarter[8] sum of squares
$S_B^2 = k \sum_{i=1}^{N} (\bar{X}_{.i} - \bar{X}_{..})^2$ represents the inter-year sum of squares
$S_R^2 = \sum_{i=1}^{N} \sum_{j=1}^{N} (\bar{X}_{ij} - \bar{X}_{i.} - \bar{X}_{.j} - \bar{X}_{..})^2$ represents the residual sum of squares
$S^2 = \sum_{i=1}^{N} \sum_{j=1}^{N} (\bar{X}_{ij} - \bar{X}_{..})^2$ represents the total sum of squares

Furthermore, the null hypothesis H_0 claims that $b_1 = b_2 = ... = b_N$ which is to state that there is no change in seasonality over the years. The hypothesis is checked

[7]In this analysis as the multiplicative decomposition, which is generally accepted in the contemporary literature, is used, so the related model is presented, there is also another model, if the decomposition is based on additive decomposition

[8]it is inter-quarter in this analysis, depending on the frequency, it could be inter-month, inter-week etc.

through the test statistics below:

$$F_M = \frac{\frac{S_B^2}{(n-1)}}{\frac{S_R^2}{(n-1)(k-1}}$$

This has an F distribution, and the degrees of freedoms are $k-1$ and $n-k$

Test for presence of identifiable seasonality
In the test for presence of identifiable seasonality, F statistic values of the aforementioned moving seasonality test and the parametric test for stable seasonality are combined. The test statistic is also presented as:

$T = \sqrt{(\frac{\frac{7}{F_s} + \frac{3F_m}{FS}}{2})}$ where F_m is the moving seasonality test statistic and F_s is also stable seasonality test statistic respectively.

This test is applied once the stable seasonality test is rejected (so favoring a seasonality), as a part of the "Combined Seasonality Test" .

Combined Seasonality Test

The Kruskal-Wallis test, together with the test for the presence of seasonality assuming stability, the evaluative seasonality test and the test for presence of identifiable seasonality are all combined in this test in order to check if the seasonality of the series is identifiable or not, as the identification of the seasonal pattern is an issue if the underlying process is dominated by highly moving seasonality[9]. Moreover, these tests are also calculated based on the final unmodified seasonal-irregular (S-I) component of the series. The process can be summarized in the following order:

- If in the test for the presence of stable seasonality (Friedman test) the null hypothesis is not rejected at 0.001 significance level, then it is concluded that there is *no identifiable seasonality present* in the series. If the null is rejected then, the tests for the presence of moving seasonality and the tests for identifiable seasonality are executed:

- If the null hypothesis of moving seasonality is not rejected at 0.05 significance level and T ≥ 1 of the identifiable seasonality test, then it is concluded that there is *no identifiable seasonality present* in the series as well. Moreover, while the null hypothesis of moving seasonality is not rejected at 0.05 significance level and T ≤ 1 but, $\frac{7}{F_s} \geq 1$ or $\frac{3F_m}{F_s} \geq 1$ of identifiable seasonality test then it is concluded that there is *probably no identifiable seasonality present* in the series.

[9]It is a form of seasonality which accounts for the changeability in the seasonal component of a time series as time goes by. To illustrate, due to the timing of post New Year (and/or Christmas) specials in January, these have become more popular recently. There might happen to be a steady increase in sales in January over the years and this is reflected by the slowly changing nature of the seasonal pattern.

- If both $\frac{7}{F_s} \leq 1$ and $\frac{3F_m}{F_s} \leq 1$ of the identifiable seasonality test, together with the null hypothesis of moving seasonality is rejected at 0.05 significance level, then finally, the Kruskal-Wallis test is also executed, and if the null hypothesis of this test is rejected at 0.001 significance level, then it is concluded that there is *identifiable seasonality present* in the series.

- If the null hypothesis of the Kruskal-Wallis test is not rejected at 0.001 significance level, then it is concluded that there is *probably no identifiable seasonality present* in the series.

2.4.2 TRAMO SEAT Methodology

Tramo (Time Series Regression with ARIMA Noise, Missing Observations, and Outliers) performs estimation, forecasting, and interpolation of regression models with missing observations and ARIMA errors, in the presence of possibly several types of outliers. Seats (Signal Extraction in ARIMA Time Series) performs an ARIMA-based decomposition of an observed time series into unobserved components. The two programs were developed by Victor Gomez and Agustin Maravall.

Used together, Tramo and Seats provide a commonly used alternative to the Census X12 program for seasonally adjusting a series. Typically, individuals will first linearize a series using Tramo and will then decompose the linearized series using Seats

2.5 Structural Break Tests

It is possible that economic time series might exhibit episodes where their behavior might change rather dramatically compared with the pattern they have shown previously. The phenomenon where the behaviour change takes place once and for all is called a structural break in a series. Moreover, tests for structural change in regression models have also been quite significant for applied econometric analyses[20, p. 533]. In the literature, one of the main tests used to find out multiple unknown breakpoints of time series is Bai and Perron[12] [11][10]. Accordingly, the multiple regression equation with m potential breaks (which means m+1 regimes), could be defined as:

$Y_t = X_t\beta + Z_t\delta_j + \varepsilon_t$, where $t = T_{j-1} + 1, ..., T_j$

Here Y is the dependent variable, X_t is (p1) and Z_t (q 1) are vectors of covariates and ε is the regular residual. The indices $(T_1, ..., T_m)$, or break points, are treated as unknown. Moreover, as δs are subject to change (and i= 1,,m+1), but βs are not subject to shift, this is a partial structural change model[11]. Ordinary Least Square (OLS) method is used to estimate the unknown regression coefficients and the break points.

Through minimizing the sum of squared residuals (SSRs), $S_T(T_1, ., T_m)$ the least square estimates of βs and δs can be found out for each m partition. The break

[10] As stated in [72, p. 14]

[11] In cases where βs are also allowed to shift, this becomes a pure structural change model

points could be estimated via an efficient algorithm based on the principle of dynamic programming which allows the computation of estimates of break points as global minimizers of the SSRs, due to the fact that they are discrete parameters and would just have a finite number of values[12][12].

Moreover, the total number of possible segments would be at most W [=T(T+1)/2], given a sample size of T. With, the total number of possible segments at most W ($= \frac{T(T+1}{2}$). Enforcing a minimum distance between each break [13] leads to decreasing the number of segments to be thought of to $(h-1)T\frac{(h-2)(h-1)}{2}$. On condition that m breaks are allowed the maximum length of this segment becomes Thm if the segment starts at a date between 1 and h. As a result, the possible number of segments drops further to $\frac{h^2m(m+1)}{2}$. Lastly, since otherwise no segment of minimal length h might be put in at the beginning of the sample, a segment would not start at dates 2 to h as well. As a consequence, the possible number of segments drops further to $T(h-1) - mh(h-1) - (h-1)^2 - \frac{h(h-1)}{2}$ segments.

For a pure structural change model, via OLS segment by segment, the estimates of δ, u_t and $S_T(T_1, .., T_m)$ can be found. Afterwards, in order to assess which partition manages to find a global minimization of the overall SSRs, dynamic programming approach is employed. The method, then, keeps on through a sequential examination of optimal one break[14] partitions. Next, the following recursive problem is solved by the optimal partition, given SSR ($T_{r,n}$, the SSRs being related with the optimal partition consisting of r breaks employing first n observations:

$$SSR(T_{m,T}) = min[SSR(T_{m-1,j}) + SSR(j+1, T)]$$

where, $mh \leq j \leq T - h$ Moreover, the procedure comprises these three steps:

- To assess the optimal one break partition for all sub samples which lets a possible break extend from observations h to $T - mh$. Next, to save a set of $T - (m+1)h + 1$ optimal one break partitions together with their associated SSRs where each of the optimal partitions relate to sub samples ending in dates extending from $2h$ to $T - (m-1)h$.

- Afterwards, to seek out optimal partitions having 2 breaks, such that these partitions have ending dates varying from $3h$ to $T - (m-2)h$. The procedure, then, searches for where a one-break partition would be placed to get a minimal SSR for each of these possible ending dates. A set of $T(m+1)h+1$ optimal two breaks partitions becomes the result. Then, till a set of $T-(m+1)h+1$ optimal m-1 breaks partitions is attained, this technique keeps on consecutively.

- Lastly, when merged with an additional segment, to ensure which of the optimal m-1 breaks partitions results in an total minimal SSR[15][12][16].

[12] As stated in [72, p. 15]

[13] like $h \geq k$

[14] Or 2 segments

[15] In other words, to update consecutively $T-(m+1)h+1$ segments into optimal one, two, three, and up to m-1 break partitions so as to get a sole optimal m breaks partition

[16] As stated in [72, pp. 15-17]

Afterwards supF type test is applied to check that there is no structural break (m=0) versus where there are a fixed number of breaks, k. The F statistics are stated, given as $(R\delta)' = (\delta_1' - \delta_2', ., \delta_k' - \delta_{k+1}')$ and the break fractions $\lambda_i = \frac{T_i}{T}$:

$$FT(\lambda_1, \lambda_2, ..., \lambda_k; q) = (\frac{1}{T})[\frac{(T-(k+1)qp)}{kq}]\hat{\delta}' R'(RV(\hat{\delta}R')^{-1}R\hat{\delta}$$

Here $V(\delta)$ stands for an estimate of the variance covariance matrix of δ robust to heteroscedasticity and serial correlation. Then, the supF test can also be stated as: $supF_T(k;q) = F_T(\hat{\lambda}_1, ...\hat{\lambda}_k; q)$, where $\hat{\lambda}_1, ..\hat{\lambda}_k$ minimize the global SSR[17]. Moreover the asymptotic distribution also relies on the truncating parameter through the imposition of the minimal length h of a segment (in other words, $\varepsilon = \frac{h}{T}$).

Furthermore, the Sup$F_T(\iota+1|\iota)$ test checking ι versus $\iota+1$ is structured upon the difference between the SSR got from ι breaks and that of from $\iota+1$ breaks, and is used for each segment comprising the observations T_{i-1} to $T_i (i = 1, 2, ..\iota+1)$. The model with $\iota+1$ breaks is rejected on condition that the overall minimal value of SSR is sufficiently smaller than the SSR of ι breaks model[18].

Finally, Two Double Maximum Tests by Bai and Perron[11][19] are also used for the cases which present an upper bound M, "no structural break" hypothesis against an unknown number of breaks. The first one[20]:

$$UDmaxF_T(M,q) = max_{1\leq m\leq M} F_T(\hat{\lambda}_1, ...\hat{\lambda}_k; q)$$

here $\hat{\lambda}_j = \hat{T}_j/T (j = 1, , m)$ are the estimates of the break points attained by the global minimization of the SSR. $WDmaxF_T(M,q)$ is the second test. Here, weights of the individual tests are employed in such a way that the marginal ρ-values are equal through values of m[21]. For a significance level α, given $c(q,\alpha,m)$ as the asymptotic critical value of the test sup $F_T(\lambda_1, ..., \lambda_m; q)$, the weights would be specified as $a_1 = 1$ and for $m > 1$ as $a_m = c(q,\alpha,1)/c(q,\alpha,m)$. The test is, then, is specified as[72, pp. 18-19]:

$$WDmaxF_T(M,q) = max_{1\leq m\leq M}[c(q,\alpha,1)/c(q,\alpha,m)]supF_T(\lambda_1, ..., \lambda_m; q)$$

In this analysis, the results of Bai Perron tests carried out for level and ratio models have generally indicated that there is a structural break in the period covering the end of 2008 and the first half of 2009. Moreover, this has been captured by the crisis dummy (Dcrisis) used for the USA mortgage crisis period[22] starting from $2007Q4 to 2009Q2$. [23]

[17] This is the same as maximizing the F test assuming spherical errors as well.

[18] Asymptotic critical values are provided in [13], as stated in [72, p. 18]

[19] as stated in [72, p. 18]

[20] Of two, this is an equal weighted one

[21] This means that weights depend on 1 and the significance level of the test

[22] which is defined by The National Bureau of Economic Research

[23] Apart from this, there are some other points have also been raised. Among these, $2011Q1$ - $2011Q2$, are also highlighted by the unorthodox monetary policy of the Central Bank of Turkey starting at $2010Q4$ where it began to use different reserve requirement ratio for the banks favoring long term borrowing for both TL and FX liabilities. These are also captured by "rr_tl_diff" and "rr_fx_diff" standing for Reserve Requirement Ratio Difference of TL and FX Liabilities with maturities of up to 3 months and more than 1 year respectively as well.

3 Literature Review

The literature review section consists of eight sub-chapters. It starts with the current account deficit problem, whose main component is the foreign trade deficit and its extent for economies, as this study focuses on any effect of monetary policy on foreign trade deficit, particularly through the loan growth framework in Turkey. Likewise, the second sub-chapter is about the role of credit expansions on financial stability. The next three sub-chapters focus on monetary policy transmission channels, covering banks, determinants of consumption and investment expenditures respectively, in order to illuminate the mechanics of the phenomenon and the main channels affecting the current account deficit in Turkey. The last three sub-chapters are concerned with studies on the effects of monetary policy on foreign trade and external balances for advanced economies, emerging economies and Turkey, in that order.

3.1 Current Account Deficits: How bad are they?

The balance of payments covers a countrys international trade in goods and services and international borrowing and lending. It comprises two main accounts: the current account and the financial account.

The current account measures the change over time in the sum total of three separate parts: the trade account, the income account, and the transfer account. The trade account measures the difference between the value of exports and imports of goods and services. A trade deficit occurs when a country imports more than it exports. The income account also measures the income payments made to foreign investors, and the net amount of income payments received from foreigners. An income deficit arises when the value of income paid by a country to foreigners exceeds the value of income received by that country from foreigners. Finally, the transfer account measures the difference in the value of private and official transfer payments to and from other countries. This account measures the change over time in a countrys international borrowing and lending.

When a country lends in the international market, it buys foreign assets, and financial capital flows out of that country. When it borrows in the international market, it sells domestic assets to foreigners, and financial capital flows into that country. A financial account surplus takes place when a country borrows more than it lends, hence more financial capital flows into than out of the country. Thus, a financial account deficit is referred to as a net capital outflow. Similarly a financial account surplus is called a net capital inflow. A countrys financial account is the sum of two parts: private capital flows and official capital flows. Private capital flows

comprise foreign direct investment, private purchases, sales of equity and debt and bank/financial flows. Official capital flows are also mainly used by governments to change their holdings of foreign currency.

Theoretically, the balance of payments accounts must add up to zero. In other words, the following accounting identity must hold:

$$CurrentAccountBalance + CapitalAccountBalance = 0.$$

The accounting identity indicates that if a country experiences a deficit on its current account, it must simultaneously realize a surplus on its financial account. Thus, when a country runs a trade deficit, it funds this deficit by borrowing from abroad[37, pp. 7-8] Similarly in an open economy there are also other two identities for its GDP: Basically, according to the expenditures approach, $GDP = C + I + G + (X - M)$ and with respect to the incomes approach: $GDP = C + S + T$ Where, C stands for private consumption, I for investment expenditures, G for government/ official expenditures, $(X - M)$, current account balance, S for private savings, and T for Taxes. Hence, from these identities, it is fairly easy to get:

$$(X - M) = (S - I) + (T - G)$$

Therefore, for a given period, current account balance is equal to net private savings and net government deficit for a country,[57, pp. 191-192] which is in line with and the another view of the aforementioned definition.

It could be stated that economists views regarding the nature and consequences of current account deficits evolved in three main phases within the post WW2 period. Their initial attitude can be summarized as the fact that the current account matters. The relation between relative price changes, elasticities and trade flows had been emphasized. Accordingly, most authors had focused on whether a devaluation would lead to an improvement in the countrys external position, including its trade and current account balances[29, pp. 23-24], and indeed in Coopers (1971a, b) paper, it has been shown that according to analysis of 21 devaluations in the developing world in the 195869 period devaluations had, overall, been successful in helping to improve the trade and current account balances though the relevant elasticities were small[22] [24]. Moreover, structuralist tradition had also argued that trade and current account imbalances were structural in nature and severely constrained poorer countries ability to grow with respect to advanced countries. Hence according to this view, the solution to improve the current account balance is to encourage industrialization through import substitution policies, and not to amend the countrys currency peg.

The second phase started during the second half of the 1970s, and due to the oil price shocks at that time, when most countries in the world, including the advanced economies, experienced large swings in their current account balances. Probably the main essential analytical development of this phase was a move away from trade flows to a renewed and formal emphasis on the intertemporal dimensions of the current account. The difference was based on the recognition of two interrelated

[24] As stated in [29, p. 23]

facts. First (as mentioned before), that the current account is equal to savings minus investment; and second, as both saving and investment decisions are based on intertemporal factors, like lifelong expected returns on investment projects and cycle considerations, the current account is necessarily an intertemporal phenomenon[65] [25]. Likewise the work of Sachs (1981) has highlighted the intertemporal nature of the current account, and claimed that as long as higher current account deficits reflect new investment opportunities, it is not necessary to be concerned about them . A similar case has been stated for The USA deficit in the second half of the 1990s where the reason for the deficit was stated as the increase in US investments in particular to benefit from productivity improvements observed there[37, pp. 6-11].

Obstfeld and Rogoff (1996)[54] [26] provided an extensive review of modern models of the current account which assume intertemporal optimization for consumers and firms. In this type of model (based on a constant interest rate), consumption smoothing across periods is one of the primary drivers of the current account. According to the intertemporal approach, if output falls below its permanent value there would be a higher current account deficit. Likewise, if investment increases above its permanent value, then the current account deficit would grow, because new investment projects would be partially financed by an increase in foreign borrowing, hence generating a bigger current account deficit. Similarly, increased government consumption would lead to a higher current account deficit. If the constant world interest rate assumption is relaxed, then a countrys net foreign asset position and the level of the world interest rate would fundamentally affect the current account deficit. Therefore, if a country is a net foreign debtor, and the world interest rate exceeds its permanent level, the current account deficit will be higher. The second phase, thus, might also be designated the Lawsons Doctrine[27]: a large current account deficit is not a cause of concern if the fiscal accounts are balanced [29, pp. 24-28].

The third phase was ignited by the Chilean Debt crisis of 1982, where a 14% current account deficit was generated by private-sectorinduced capital inflows. The empirical work of Kamin (1988)[41] [28], argued that the trade and current accounts deteriorated steadily through the year immediately prior to devaluation. Moreover, Edwards and Edwards (1991)[30] [29] asserted that Chiles experience illustrated that the Lawson Doctrine was seriously flawed. In the following three decades, most financial crises have highlighted the part played by large current account deficits in the run-up to crisis episodes. As a result, the concept of a sustainable current account deficit has become an important theoretical, political and economic issue. Likewise, Corsetti et al. (1998)[24] [30] concluded that, generally, the countries which were hit hardest by currency crises were the ones running persistent current account deficits throughout the 1990s, such as in the 1997 Asian Crisis.

[25] As stated in [29, p. 24]
[26] As stated in [29, pp. 24-28]
[27] Nigel Lawson, the former UK Chancellor of the Exchequer
[28] As stated in [29, p. 29]
[29] As stated in [29, p. 29]
[30] As stated in [6, p.6]

Hence, even though this is not a universal truth and there is still an ongoing debate, the conventional wisdom is that current account deficits above 5 % of GDP generally represent a problem, in particular if they are funded through short-term bor- rowing. But it could be stated that, due to the lasting improvement in capital market access, the constant improvement in the terms of trade and productivity growth seen in transition countries can, as forecast by the intertemporal models, finance and fund moderate current account deficits on an ongoing basis [6, p. 6].

3.2 The Role Of Credit Expansion On Financial Stability

In the literature, especially after the 2007 mortgage crisis, there have been several studies on the role of credit (expansion) on financial stability.

First of all, in Obstfeld and Gourinchas' article[35] two main questions are asked: *How have crises differed, in their precursors and aftermaths, between emerging and advanced economies?* and in both sets of countries, *How does the 2007 mortgage crisis differ from earlier crises?* (In particular why less-developed countries in general had not done worse than advanced economies in the later crisis, and why the impact differed so noticeably across different emerging regions?) By crisis, they have meant currency, banking and, government default crises (the ones seen in reality and material so far), and their analysis captures the period from 1970 till 2010. They define the currency crisis as a situation where a managed exchange rate falls to speculative pressure; the banking crisis as a situation in which material defaults and instability in the banking system including shadow banking takes place; and default crises as a situation which involves default, restructuring, or market fears of default on internal or external public debt.

They have also stated several structural defects which might have a role for a country to fall into crisis[35, pp. 226-231]:

Political and Economic Instability Mainly as seen in the emerging countries, political instability breeds economic instability, where Macro policies tend to be procyclical due to conflicts over windfalls in good times and the absence of predictable and widely accepted mechanisms to allocate losses in bad times which increases volatility.

Undeveloped and Unstable Financial Markets Unreliable contract enforcements in such markets would cause, reliance on relatively simple contracts where imperfect protection of equity investors fosters ownership concentration and limits gains from risk sharing, both domestic and international[73][31]. Weak political institutions also limit the checks and balances needed to minimize abuses. In particular it has been observed (in Latin America, Asia, etc) that the expectations of possible government bail out failing financial institutions would result in a moral hazard issue. Hence these weak conditions in an economy can lead to trouble if financial transactions are liberalized either externally or domestically[44][32].

Dollarization, Original Sin, and Currency Mismatches It has been observed that inflationary finance in an economy has motivated the making of financial

[31] As stated in [35, pp. 231-232]

[32] As stated in [35, p. 232]

contracts both internal and external to be denominated in a stable foreign currency, like USD or EUR. Likewise, the original sin is the conventional terminology used for the situation where there is an inability to borrow from foreigners in domestic currency[31][33]. Moreover, the so called dollarization of the liabilities generally leads to fragility in the banking system as bank loans to domestic customers denominated in dollars are likely to go bust in the event of a sudden currency depreciation which raises the real value of the loan, even if the banking system carries no short position in dollars[25][34].

Fear of Floating There is a possibility of demand pull inflation and domestic credit expansion reaching dangerous levels for an economy which is financially open, if it faces financial inflows and executes incomplete sterilization of reserve inflows. The reverse case (of financial outflows) can also be risky as depreciation can cause debt deflation (in the case of currency mismatch) and a jump in inflation. In fact, once the domestic currency begins to depreciate, dollar debtors may rush to close their short positions which might lead to further depreciations and a rise in financial distress[67][35].

Sudden Stops and Debt Intolerance If an economy has weak official reserves and a high amount of short term external debt, then it would be vulnerable to sudden stops in foreign lending, which may necessitate both a sharp reduction in the current account deficit and immediate demand for repayment of short-term external debt. This might also result in credit rationing or debt intolerance (foreign debt levels far below that of an advanced economy[62][36].

Overregulation of Nonfinancial Markets There might be issues in resource reallocation within an economy after shocks if there are profound regulations in product and labor markets. Likewise, as unexpected exchange rate movements have magnified effects on sectoral imbalances, these structural rigidities justify the fear of floating as well.

In their work, Obstfeld and Gourinchas have applied two methodologies based on discrete-choice panel analysis. The first one comprises several event studies of how key economic variables (like output gap, CPI inflation, Gross public debt/GDP, Domestic credit/GDP real interest rate, real exchange rate, external leverage, Current account/GDP, foreign reserves), behave around different categories of crisis. The second one also consisted of logit analyses of crisis probabilities. According to the results of their first work in terms of what happens before, during and after crises, that though emerging markets have tended to bear greater output losses during currency crises, the patterns observed in the crises of emerging and advanced economies can be stated as qualitatively similar.

As to the main results of their second analysis, it turned out that, for both emerging and advanced economies the two most powerful predictors for the crises are credit growth and real currency appreciation[37]. Hence, it could also be observed

[33]As stated in [35, pp. 232-233]

[34]As stated in [35, p. 233]

[35]As stated in [35, p. 233]

[36]As stated in [35, pp. 233-234]

[37]For example, for the emerging markets: standard deviation increase in the Credit/GDP (around

that in general, credit booms typically presage real currency appreciation, and the economies which experience both developments at the same time are probably strong candidates for a financial crisis. Another important factor but only for emerging markets increasing the crisis probabilities is the level of foreign exchange reserves[38] [35, pp. 235-259].

Similarly, in the article by Schularick and Taylor[68] it has been shown that the credit growth is a potent predictor of financial crises. In their work, they have used the data of 14 advanced countries over the years 1870-2008[39]. Moreover, in order to capture the structural change in the financial system, they divide this period into two: The first sub-period goes from 1870 to 1939. In this era, though money and credit were volatile but over the long run they kept an approximately stable relationship to each other, and to the size of the economy in GDP. The second sub-period, however, runs from 1945 to 2008 and is quite different than the former. Initially, money and credit volumes started a long and rapid postwar recovery, then surpassing their pre-1940 levels compared to GDP by about 1970. This trend went onwards while credit volumes then began to decouple from broad money and grew quickly, through a combination of amplified leverage and augmented funding through the nonmonetary liabilities of the banks[68, pp. 1031-1035].

Moreover, they used a very similar technique to Gourinchas and Obstfeld (2012), so applied logit analyses of financial crisis probabilities, in particular to measure the effect of money and credit on them. According to the results of their analysis it can be summarized that, especially in the second sub-period (after WW2) when the decoupling of credit from monetary aggregates took place, (i.e. growth of credit overcomes that of money) in terms of financial crises credit has a clear and superior predictive power (over money). Hence, in this respect, it is quite easy to conclude that in terms of sustaining financial stability, targeting credit aggregates would be a better policy tool like the appropriateness of the targeting monetary aggregates for price stability in an economy[68, pp. 1042-1052].

Finally, the effect of overleverage of credits (which required correction afterwards) on financial crises and their role in the resulting volatility are also analyzed in the work of Aisen and Franken[2]. They used a dataset covering about 80 countries for the period of Jan/2002-May/2009, and applied standard cross-section econometric techniques to analyze the bank credits throughout the 2007 mortgage crisis. Accordingly, it was found that credit booms prior to the crisis are rather essential factors for credit contraction seen following the crisis. Among the other results of this work, is that the growth performance of their main trading partners has a role on the credit growth of the country facing the external shock. Moreover, it has been observed

9%) increases the probability of default over the next 3 years by 11.5 %, increases the probability of banking crisis by 6.4%, and increases the probability of currency crisis by 9.4%. Similarly a 1 standard deviation depreciation of the real exchange rate (around 19%) reduces the same probabilities by 4.3%, 4.7%, and 2.5%, respectively

[38] 1 standard deviation increase in the reserves (around 7%) increases the probability of all three crises over the next 3 years by around 5%.

[39] These countries: The United States, Canada, Australia, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom.

that counter-cyclical monetary policy and liquidity has an important role in to mitigating the credit crunch in the period following a crisis. Finally, due most probably to the diversity in the structural characteristics of countries such as financial depth and international financial integration, bank credits have responded very differently among world regions[2, pp. 6-14].

However, there is also a rather sizeable amount of literature on the positive role of credits on economic growth. For instance, in the work of Levine and Zervos [49][40] using data on 47 countries it has been shown that bank lending has a robust independent effect on growth . Likewise, in the work of Rajan and Zingales[61][41], it has also been shown that in The USA, the industries which are external financing-dependent have expanded faster than less dependent industries (meaning that countries which have more developed financial industries could grow more than the ones with less developed industries.

3.3 Monetary Policy Transmission Channels Covering Banks

In the article by Ciccarelli, Maddaloni and Peydr[21], there are four major monetary policy transmission channels through bank loans: the first one is *the bank lending channel* which works through the availability of funds for banks to lend by monetary expansion and contraction carried out by a central bank, as the amount of funds in an economy changes. The second channel is *the balance sheet channel*, which is related to the net worth of the bank borrowers, as their net (financial) worth changes by cash flow and collateral values of the assets they own, with respect to monetary policy (expansions and contractions). The third one is *the bank capital channel* which operates via the impact of monetary policy on banks profitability and capital. Like the second channel, a monetary expansion/(contraction) increases/(decreases) the profitability of the bank, which leads banks to provide more/(fewer) loans as their capital leverage changes. The last channel is also *the risk-taking channel* which works through the risk perceptions of the banks as they are more eager to lend in booms than contractions [21, pp. 5-12]. Moreover, the authors of the panel VAR analysis of 12 counties in the Eurozone in the period of 2002 2009, have shown that the bank lending channel together with the bank capital channel is more significant. However, though less relevant, regarding balance sheet and risk taking channels, there is increasing evidence and amplification of monetary impulses[21, pp. 14-31].

Furthermore, Chang and Jensen [19] in their article have also used a VAR analysis, in particular, a Logistic Smooth Transition Vector Error Correcting Model for quarterly data in The USA in the period of 1976 Q1 to 1999 Q3. They found out that banks have a statistically significant role in monetary transmission mechanism, and the loan growth of big banks which have an asset size greater than 300 million USD shows stronger response to monetary policy[19, pp. 133-145]. Hence, the heterogeneity of the banking system in an economy seems also to have a role in the transmission mechanism.

[40] As stated in [2, p. 5]
[41] As stated in [2, p. 5]

Finally, in their paper Bernanke and Blinder[16] have set up a model where both money and credit, in particular bank loans, affect aggregate demand. Moreover, they applied a Vector Autoregressive analysis for The USA for the period between 1953 Q1 and 1985 Q4. Using quarterly data, they found out that credit demand shocks seemed more significant than money demand shocks in the 1980s. However, up to the mid 1970s money demand shocks seemed more important[19, pp. 437-439].

3.4 Determinants of Consumption in a Macroeconomic Environment

The first paper related to the subject written after 2000 is that of Montiel[52, pp. 457-458], where there was an attempt to analyze the main drivers of the consumption booms[42] which have been common in both industrial and developing countries. The paper focuses on the period 1960-95, using annual panel data of 91 countries.

Moreover, main hypotheses in terms of the links between observable macroeconomic variables have also been described:

Income Redistribution: Consumption booms may arise as a consequence of a substantial redistribution of income in favor of lower-income groups as an outcome of populist policies. Since lower-income groups are more likely to be more liquidity-constrained than higher-income groups, such a redistribution would tend to shift income from unconstrained to constrained households, hence leading aggregate consumption to rise. In the work they used either the Gini coefficient or the household distribution, to measure the effect. Deininger and Squires[27][43] work has been stated to be the major one in this respect.

Changes In Intertemporal Relative Prices: The first one covers the case of exchange rate-based stabilization with inflation inertia, where real interest rates drop due to inflation inertia of the agents as nominal rates drop[44][63][45]. The second one contains "incredible" exchange rate-based stabilization, where exchange rate-based stabilization programs which are not expected to last by the agents lead to an intertemporal distortion in the form of an expected future increase in the real price of importables (a real exchange rate depreciation) [71][46]. To the extent that consumption durables fall into this category, the anticipation that their price will increase in the future will lead consumers to shift the purchase of durables to the present.

Wealth Effects: A boom may arise when the private sector perceives a rise in its wealth and adjusts its consumption path accordingly due to a perceived permanent improvement in the country's terms of trade or a change in the policy regime expected

[42] A consumption boom is defined as an unusual increase in the ratio of real private consumption expenditures to real national income.

[43] As stated in [52, pp. 457-458]

[44] In economies that are financially open, domestic nominal interest rates would tend to fall when the exchange rate is used as a nominal anchor to stabilize inflation. If expectations of inflation remain high, the domestic real interest rate would tend to fall.

[45] As stated in [52, pp. 457-458]

[46] As stated in [52, pp. 457-458]

to accelerate economic growth, or a change in fiscal policy that is perceived to reduce the present value of the private sector's future tax liabilities.[52, p. 463]

Credit Expansion: Finally, consumption booms have also been attributed to a rapid expansion of credit to the private sector. The expansion may arise from a variety of sources, involving the relaxation of credit constraints triggered by explicit or implicit backing of financial liabilities by the public sector. This has two forms: a domestic one and where the expansions originated abroad. (Domestically, the relaxation of credit constraints; or large foreign capital inflows).[52, p. 464]

According to the results of the analysis, then, it has been found that the wealth effects linked to favorable movements in the terms of trade and anticipated improvements in macroeconomic performance seems to have been more important empirically as the drivers of the consumer booms than explanations relying primarily on fiscal factors or distortions in intertemporal relative price movements. Explanatory variables used in the paper for consumption booms are presented below[52, pp. 465-479]:

- Real exchange rate
- Real interest rate
- Nominal interest rate
- Real GDP growth
- Terms of trade
- Government consumption
- Credit to the private sector

The other paper related to determinants of the consumption in a macroeconomic environment after 2000 is that of Jonsson[39, pp. 183-214], where how different elements (like duration, size, and composition of fiscal changes) can change the effects of fiscal policy on private consumption is considered.

Unlike the Keynesian paradigm, in the German contraction during the first half of the 1980s, when the fiscal consolidation in Germany was primarily resulted in by a drop in public expenditure, private consumption expanded during and after the fiscal contraction[33][47]. Hence, the traditional Keynesian theory of fiscal policy effects has been challenged by the neo-classical theory. The latter theory stresses the fact that households internalize the government's budget constraint. So, the present value of household disposable income will be positively affected by a decrease in government expenditures. Likewise, in the German case, the decrease in government expenditures will decrease the expected present value of taxation, which implies higher expected present value of disposable income. Therefore, it seems very probable that the two (Keynesian and Neo Classical) effects coexist and the key issue raised is as to which of the effects dominates the other at a particular point in time.

[47] As stated in [39, p. 184]

In the paper, how prolonged periods of fiscal budget changes affect the way private consumption responds to fiscal policy has been studied. Moreover, how sizeable and/or long-lasting fiscal budget adjustments change the way that private consumption is affected by changes in government taxes, consumption, and transfers has been investigated. Furthermore, a long-lasting or sizeable budget balance weakening is called an expansion, while a corresponding enhancement of the budget balance is called an contraction.

In this study, an unbalanced panel of 19 OECD countries for the period 1960-2000 was carried out, and it was found out that transfer expenditures seems to behave in line with Ricardian equivalence during fiscal contractions. In other words, households internalize the government's budget constraint, so neo classical theory prevails. However, as transfers are likely to be a redistribution of income from richer to poorer households the social cost of an expansionary fiscal contraction through transfer cuts should be considered [39, pp. 185-211].

Explanatory variables used in the paper for consumption booms are presented below:

- Income
- Government Consumption
- Taxes
- Transfers

Plus, *short run interest rates* are also used as control variable.

In this section a final point worths mentioning is the phenomenon of **instant gratification**: peoples decisions might be time inconsistent; they can alter their decisions as time goes by. They place more weight on instant consumption, as the utility discount curves of people are much flatter in the longer run. In other words, people tend to be more impatient in the shorter run while more patient in the longer run.

Comparing two questions of preference, first, *Would you choose one chocolate now or two tomorrow?* and second: *Would you choose one chocolate 150 days from now or two 151 days from now?* People tend to choose two chocolates in the latter question more than the former one. However, after 150 days have passed the same people might prefer to consume one chocolate, as they face the short run and the pressure of instant gratification would induce them to change their minds.

Similarly, a person aiming to get into a good body shape before the summer with a two month sport program, on his first day might rather choose to go to the cinema with his/her friends and postpone the program while promising himself/herself to compensate for this tomorrow with more intensive work. However, when tomorrow comes, the promise becomes left in the past and a new phase starts for him/her in his/her decision making under the influence of instant gratification. A parallel phenomenon would hold true for the people who have access to loans. Faced with some instant commodities regardless of the fact that one has no real need for them he/she can choose to spend money on them at present under the effect of instant

gratification through bank borrowing, while promising to save and pay tomorrow[50, pp. 488-489][48]

3.5 Determinants of Investment Expenditures in Macroeconomic Environments

The first paper written in the post 2000 period belongs to Serven[69] where the link between real exchange rate uncertainty and private investment in developing countries was investigated. On theoretical grounds, the relationship and its coefficient is ambiguous, and the analytical literature proposes that it may be highly nonlinear and/or depend on economic features such as: the output share of variable inputs [48][49] *(as within the constant-returns environment, for a perfectly competitive firm which has capital as the only fixed factor, marginal profitability is a convex function of output prices, so Jensen's inequality infers that higher price uncertainty raises the expected profitability of capital, hence increasing the desired capital stock and investment)*, trade openness *(The effect of real exchange rate volatility should be greater in economies which have greater exposure to foreign trade)*, and the degree of financial market development *(More sophisticated market helps reducing hedging the risk)*

In the work 61 developing countries within the period 1970 to 1995 were analyzed via the panel data method. Moreover, real exchange rate uncertainty is also reflected through GARCH(1,1) specification in a simple equation where the (log) real exchange rate follows an AR(1) process with trend, that can have different parameters for each country.

According to the results, it has been found that there is a negative and highly significant effect of real exchange rate uncertainty on private investment in the overall sample. Moreover, this effect is indeed larger at higher levels of uncertainty which is also in line with the analytical literature underscoring threshold effects. Furthermore, the degree of trade openness and financial development has also affected the investment effect of real exchange rate uncertainty: weaker financial systems and higher openness are connected with a significantly negative uncertainty- investment link. In parallel, with high financial development and low openness, real exchange rate uncertainty might have a positive effect on private investment[69, pp. 214-217].

Lastly, explanatory variables used in the paper for consumption booms are presented below:

- Lagged private investment/GDP
- Relative price of capital
- Credit flow to private sector/GDP
- Real interest rate
- Real exchange rate uncertainty

[48] Also [47] and [5], as stated in [50, pp. 488-489]
[49] As stated in [69, p. 213]

- RER uncertainty squared
- High RER uncertainty
- Low RER uncertainty

The other study related to the determinants of the consumption in a macroeconomic environment after 2000 is that of Salahuddin and Islam[66]. The paper investigates the gross investment behavior in a panel of 97 developing countries within the period 1973 - 2002.

Several theories for of this e investment behavior have been stated. The Keynesian approach was the first one, suggesting an independent investment function in an economy which asserts the accelerator theory of investment while disregarding the role of factor costs [45][50]. The neoclassicals, however, formulated a version of the flexible accelerator model where desired/optimal capital stock is relational to output and the user cost of capital[51] [40][52]. As another version of neoclassical theory, Tobin's "Q" hypothesis of investment argues that the ratio of the market value of the existing capital stock to its replacement cost (the Q ratio) is the central force driving investment. The other neoliberal approach underlines the importance of financial deepening and high interest rates in stimulating growth, where investment is positively related to the real rate of interest, because a rise in interest rates raises the value of financial savings through financial intermediaries [51][53], considering also the element of uncertainty into investment theory due to irreversible investment (Pindyck, 1991). Recently, the literature has shifted the focus to the adjustment costs implied by the acquisition and installation of capital stressing the irrevocable nature of most fixed investment projects. (disinvestment is more costly than positive investment as capital goods are often firm-specific and have low resale value) According to this hypothesis, it is a must that the value of the unit exceeds its purchase and installation cost by an amount equal to the value of keeping the investment option alive[28][54].

As regards further technical details, Fixed Effect Model is employed; and the Granger Causality test is conducted to see if reverse causality exists. Furthermore, the 2- Step 1st Difference Generalized Method of Moments (GMM) dynamic panel estimator has also been employed to balance unobserved heterogeneity and endogeneity of regressors. and endogeneity of regressors.

The result of the study has indicated that investment decisions seem to be significantly affected by traditional determinants like domestic savings (the strongest factor), growth and trade openness. The aid (variable) seemed to potentially influence investment that requires a developing country's measures to make sure of its appropriate utilization. However, due to macroeconomic volatility, the effect of

[50] As stated in [66, p. 21]

[51] Which in turn relies on the price of capital goods, the rate of depreciation, the real rate of interest and the tax structure.

[52] As stated in [66, pp. 21-22]

[53] As stated in [66, p. 22]

[54] As stated in [66, p. 22]

real interest rates and due to lack of data on the corruption index, the effect of uncertainty on investment have failed to be shown[66, pp. 25-31].

Finally, the explanatory variables used in the paper for consumption booms are presented below:

- Real Per Capita GDP Growth Rate
- Real Interest Rate
- Trade Openness = (Export+Import)/GDP
- Domestic Savings/GDP
- Foreign Aid/GNI
- Debt Service/GDP
- Dependency Ratio = (Population less than 15 years + Population more than 60 years)/Total Employed Population

3.6 Effects of Monetary Policy on Foreign Trade and External Balances for Advanced Economies

In his paper Uhlig[76] has endeavored to estimate the effects of monetary policy on the response of real GDP by imposing sign restrictions on the impulse responses of prices, nonborrowed reserves and the federal funds rate to a monetary policy innovations through a VAR process. The analysis was carried out for The USA. Moreover, apart from real GDP, the GDP deflator, a commodity price index, total reserves, nonborrowed reserves and the federal funds rate at monthly frequencies from January 1965 to December 2003 were among the data used. As a consequence of the model with 12 lags and sign restrictions for 5 periods along with the contemporary ones, it turned out that:

- Contractionary monetary policy innovations have obscure effect on real GDP, as they cause it to hover around (up and down) a band by up to 0.2 % with a probability of 66 %. Besides this, these innovations explain possibly less than $\frac{1}{4}$th of the k-step ahead prediction error variance of real GDP, and would explain less than merely 3 %.
- Except within timescales shorter than six months, just a small part of the forecast error variance in the federal funds rate is attributed to monetary policy shocks. With longer timescales, though, around $\frac{1}{4}$th of the variation in price levels is explained by them.
- When the commodity price index drops more rapidly, the GDP price deflator drops just as slowly after contractionary monetary policy innovations.

Thus, it can be stated that the main contribution (so the difference from the earlier VAR models) of the paper to the literature is the uncertainty of the monetary policy shocks with respect to real output as the other results, in general, confirm the earlier findings.

The other analysis for The USA has been carried out by Bernanke and et al[17]. In this, the authors used factor-augmented vector autoregression, or FAVAR, with thirteen lags with both a two-step method based on estimation of principal components and a Bayesian method based on Gibbs sampling, in order to integrate a wide range of conditioning information, summarized by a small number of factors. In their work where monthly data from the period of Jan 1959 till Aug 2001 was used, it has been found out that, in general, the two methods have led to qualitatively no such different results. Furthermore, after a contractionary monetary policy shock, real output measures drop, price levels after an initial rise, finally go down, monetary aggregates drop, and the currency (the dollar) appreciates. Hence, it could be claimed that a consistent and functional measure of the effect of a monetary policy were attained, especially, in terms of providing an answer to the price puzzle.[55] Moreover, according to the results of variance decomposition analyses, it has also been observed that the effect of a monetary policy innovation would be rather small. An innovation accounts merely for around 10 % and less of the variations in the above variables like real activity and price levels.

The other paper about monetary transmission mechanism applying VAR analysis is that of Dedola and Lippi[26]. The authors' purpose was to analyze the cross-industry and cross-country heterogeneity in terms of their real output responses to monetary policy shocks (stimuli). In their structural VAR analysis 21 industries in five advanced economies were investigated: France, Germany, Italy, The UK and The USA; and monthly data from Jan 1975-Mar 1997[56] has been used. The lags of the models also differ from 2 to 5, depending on the countries. The results have indicated that there are significant cross-industry heterogeneities in the monetary innovations within countries. However, no significant cross-country variability was found. Additionally, using the output elasticities to the monetary policy shocks, it was revealed that the effect of monetary policy is more robust in industries whose financial dependencies (i.e. working capital needs) are higher and borrowing capacity (i.e. smaller asset size and leverage ratio) is lower[57] and which produce durable products[58], (like cars and home appliances, as opposed to non-durables like food). Thus, the non-negligible quantitative role of credit frictions, especially from the angle of financial dependency and borrowing capacity (cost channel) was underlined as well.

Romer and Romer[64] has aimed to contribute to the literature on the effects of monetary policy on output and prices by proposing a new method to isolate monetary policy shocks in The USA. Their method covers first compiling the making a series of

[55]As a conventional outcome of VAR literature, following a contractionary monetary innovation, a rise in the price level is observed opposite to the theory

[56]France's data starts in Jan 1980

[57]These dimensions are called the "cost channels" in the paper.

[58]This dimension is also named as the "traditional demand channel" in the paper.

for Federal Reserve (FED) intentions for the federal funds rate at around FOMC[59] meetings; then as a second step, checking FED forecasts, therefore finding out a measure of planned monetary policy actions which are not caused by information about future economic developments. Moreover, the authors also selected the Jan 1969 - Dec 1996[60] period which was comparatively free of foreseeable and endogenous movements in this respect. Furthermore, they, applied (single equation) regression for new monetary policy measures on prices and output growth separately; and like most of the literature they applied VAR analysis among these where, 36 and 48 lags have been used for the policy measure and 24 lags have been used for prices and output growth as well. The results were in line with the textbook theories. Hence, any contractionary monetary shock, in the baseline model, has led to a statistically significant decrease in both real output and inflation: 1 % shock results in a decrease in industrial production (representing the real output) after five months, after 24 months the drop reaches a maximum 4.3 %; For inflation, the response come with a further delay[61], 1 % shock leads to a fall in inflation rate (represented by the producer price index for finished products) of 2 to 3 % after around 24 months, with a maximum drop of 6 % after 48 months.

The article by Ellis et al[32] is about the UK monetary transmission, and demand and supply shocks over the term 1975 2005. In this, a factor-augmented VAR on quarterly data which comprises industrial production, GDP, household consumption and , several price measures such as the retail price index (RPI), CPI and the GDP deflator, as well as a wide range of narrow and broad money data, asset prices and yields were used. In addition, variables have also been log-differenced in order to get stationarity. Moreover, the authors carried out the analysis in two subperiods split at 1992 which separates the pre and post inflation targeting periods in terms of UK monetary policy (the later term has also been called the great moderation). One of the major outcomes of the analysis has been that while in the pre-1992 period, the response of inflation to a contractionary policy innovation was not statistically significant than nil, (so showing no response), it turned out to be persistently more negative in the post-1992 (the inflation targeting) period. Similarly, long-term bond yields, equity prices and nominal exchange rate have also shown comparatively larger impacts on the monetary innovations in post 1992 than pre-1992 periods. However, as to economic activity measures, such as GDP, aggregate investment and consumption expenditures, as well as industrial production, their responses were not found to be statistically different from each other in these two periods. Thus, it could be stated that UK policy has gone closer to the efficiency frontier where policy shocks might affect price levels at a cost of slighter and less inefficient economic activity contractions. Finally, the results where the prices have turned out to be more sensitive to monetary policy shocks while economic activities have been seemed not to be, have also pointed out a weakening role of bank-based monetary transmission

[59]Federal Open Market Committee

[60]So, the frequency of their analysis is monthly

[61]This is the other main result of this work: the lags in the inflation responses are harder to determine, in several specifications and using several price indices, the responses were started being observed from 6 to 22 months.

channels and a stronger role of substituting financial innovations.

The paper by Muller[53] also focuses on understanding the dynamic effects of government spending on foreign trade in two stages. In the first one through using a structural VAR, the dynamic effects of government spending is analyzed. In the post Bretton Wood period (1973Q1-2003Q4) using quarterly data with 4 lags [53, p. 4], unlike the Mundell-Fleming model, it was found out that for The USA, a temporary rise in government spending leads to a depreciation n nominal currency, an appreciation in terms of trade and an improvement in trade balance. In the second stage, he set up a new Keynesian general equilibrium model to substantiate the above results. Hence, there are two main factors found to be important: first, an accommodating monetary policy to dampen the effects of government spending. Second, low elasticity of substitution between domestic and foreign commodities also played a role here.

In their article, Barakchian and Crowe [14],like Romer and Romer, also tried to propose a new measure for monetary policy innovations that are obtained from FED Funds futures contracts which are less disposed to the problems caused by the more forward-looking monetary policy[62] of the FED, in the post 1988, so called "great moderation" period for The USA. The method is based on using the financial market data from the Chicago Board of Trade for FED Funds futures contracts to get the contemporaneous opinions of the private sector about monetary policy at the time of each FOMC meeting, and use this information as a proxy for the actual reaction function and its elements. After obtaining this new policy shock data, the authors carried out a VAR analysis to see the effects of monetary policy on prices and real output, using the monthly data in Dec 1988 - June 2008 period [63] with 36 lags. Furthermore,it was found out that a monetary innovation led to a lesser but sustained and statistically significant negative effect on real output where it takes almost 24 months for the maximum response. In addition, over a 36 month period almost half of the variance in the real output was also accounted for. The prices, however, were found out to behave unexpectedly. The price puzzle was dominant in the first 24 months. They tended to drop after 48 months. In addition, over a 36 month period just around 20 % of the variance in the prices was also accounted for by the monetary innovations.

Gertler and Karadi[34], in their article, using high frequency identification (HFI) of monetary policy shocks based on a three month ahead funds rate (three month FED futures) surprise as external instrument, (rather than standard Cholesky identification) and one year government bond rate as the policy indicator, analyzed the monetary policy transmission mechanism for The USA, through VAR methodology. They used monthly data for the period July 1979 to June 2012. They found that the monetary innovations resulted in responses in output and inflation[64] in line with

[62]Accordingly, assuming the FED reacts to an expected drop in output growth below the economy's potential by expanding monetary policy in order to offset it, then this monetary expansion would seem to lead to lower growth unless these anticipatory actions are taken into consideration.

[63]Where the log of consumer price index and the log of industrial production were used to represent price levels and real output respectively.

[64]Where the log industrial production and the log consumer price index (CPI) have been used

the theory (one standard deviation surprise in monetary tightening led to around a 0.40% drop in output after 21 months which is statistically significant and roughly a 0.10% drop in CPI after 36 months which is barely significant though). Besides these, however, their major findings were that the monetary innovation also resulted in rather large responses in credit costs as well which was mainly as a consequence of responses of both credit spreads and term premia which were generally missing in the baseline models of monetary transmission (a 0.2% increase in one year government bond rate has resulted in around 0.07% and 0.15 % rises mortgage rates and corporate bond rates respectively, plus these were also statistically significant). Moreover, in their work, forward guidance (as a tool for a monetary policy) was also revealed as an important contribution to the robustness of monetary policy transmission (although its stand-alone effect was less powerful compared with the aforementioned results of the monetary innovations).

3.7 Effects of Monetary Policy on Foreign Trade and External Balances for Emerging Economies

Wong and Carranza, in their article[78] tried to analyze the interrelations between the current account and the capital account in emerging market economies, as it has been observed that following the beginning of the rapid globalization of capital markets in the late 1980s, with high capital mobility, especially for emerging economies current account instabilities comes into the picture, (1994 Mexico crisis, 1997 Asian crisis etc).

Theoretically, it is assumed that first, the foreign exchange market reacts faster than other domestic markets to external shocks, and second, the CA is more responsive to changes in real exchange rate than to changes in real interest rates, while capital account, under a given expected exchange rate, would be equally responsive to both. Within this environment, it is normally witnessed that when capital account shocks occurs, the short-run real exchange rate would move away from the long-run equilibrium real exchange rate. The breakdown, intensity, and use of capital inflows will decide if, and to what extent, inconsistency exists between the short-run and the long-run real exchange rate. Moroever, as empirically observed, normally, short term funds are not used to increase the productivity, so exports (unlike FDIs) generally lead to depreciation of currency in the long run.

Empirically to analyze the real world, a bivariate vector-autoregression (VAR) model is applied to test causal relations between the current account and the capital account in four emerging market economies (Argentina, Mexico, Thailand, The Philippines). Furthermore, there are two periods compared, with and without capital account restrictions. According to the results, for all four countries Granger causality from capital account to current account was found; after the capital account openness, however, with the capital account restrictions in place, there was no such causality found. When it comes to the Granger causality from current account to capital account, with capital account restrictions in place, for Argentina, there is a

to represent for the real output and the prices respectively.

Granger causality, but this is not the case for the rest of the countries. With capital account restrictions removed, there is a Granger causality from current account to capital account found for Thailand and The Philippines, but not for Argentina and Mexico.

Finally, in order to get a better perception of the relationship, the paper uses the orthogonalized impulse-response function to investigate the current account responses to shocks in the capital account in the four countries during the open capital account flow period. Starting from a situation where the current account is in equilibrium, it is found that in all cases a positive once-and-for-all shock by one standard deviation in the capital account balance is followed almost immediately by a deterioration of the current account balance as well.

One of the main models, in the post 1999 period, which incorporated the monetary approach to foreign trade is the work of Tomvsik[75]

$$IMP = a_0 + a_1 GDP + a_2(P_d/P_m) + a_3(M/P_{domestic} - kGDP) + a_4 FDI + a_5 Days + AR(p) + e$$

where GDP is gross domestic product, $P_{domestic}$ is a domestic price index, P_d is an import price index, (P_d/P_m) is real money imports M domestic supply, k is an inverse value of the money velocity, FDI is the inflow of foreign direct investment, $Days$ represents the number of working days in a month, $AR(p)$ represents the autoregression process of the import function, that is, the dependence of the imports in a current period on the lagged import values, and e is an error.

The part $(M/P_{domestic} - kGDP)$ in the equation again, represents the excess of money supply over money demand. It is included in the export function model due to the expected reciprocal relation between the money market imbalance and exports, the monetary concept of the balancing process in the balance of payments. The increase in domestic GDP leads to an increase in the demand for real money balances in the money market as a result of the excess of money demand over money supply. This situation encourages exports because the economic subjects try to reestablish the balance of their real money balances through a decrease in consumption, and producers are forced to export domestic production that has not been consumed. In contrast, a situation where money supply exceeds money demand leads to a decrease in exports.

As for the data, year-on-year percentage changes in the monthly data, using the first-difference time series were applied. Furthermore, for the one-equation models, the ordinary least squares method could be used to obtain estimates of the regression parameters. He also tested the time lag impacts, not only of the independent variable but also of the dependent variables and he conducted a large number of regression estimates in an attempt to find the most suitable value for the lag of individual explanatory and dependent variables.

As for the results: the estimate of import elasticity was as follows: price elasticity $0.58 - 2.18$, income elasticity $0.92 - 1.44$, and money market elasticity (real money supply) $1.50 - 3.37$. The income elasticity of imports derived from these values reached $2.45 - 4.76$ under the conditions of fully accommodated money supply.

The analysis of the aggregate Czech export function indicated the highest elasticity to be price elasticity, at $2.51 - 4.05$, together with income elasticity, at $2.41 - 3.74$.

A weaker sensitivity of Czech exports was observed with respect to exchange rate changes, that is, exchange rate elasticity was in the range of $1.12 - 1.81$. The value of the last tested elasticity-money market elasticity-was insignificant in the export analysis, ranging from -0.06 to -0.01. The analysis of the aggregate Czech export function showed that Czech exports are strongly influenced by foreign income and by the ratio of foreign and export prices, and less influenced by the exchange rate.

In other recent papers in this area, the Autoregressive Distributed Lag (ARDL) approach has also been used, to get the long run relationships among the variables of interest. Some of these studies are those of Bahmani-Oskooee M. and Z. Ardalan[58] [10]

The motivation for Aristovnik's article [7] comes from the significance of the current account (CA) deficit, and there are three main factors stated to account for this: First, CA balance, reflecting the saving-investment ratio, is closely related to the position of the fiscal balance and private savings that are critical factors of economic growth. Second, as CA balance makes up over time of a countrys stock of net claims on (or liabilities to) the rest of the world, it reflects the inter-temporal decisions of economic actors. Third, a CA balance by being the difference between the exports and imports of a country, reflects the total sum of domestic residents transactions with foreigners in the commodity markets.

Moreover, for an emerging economy (like the Eastern Europe countries) which is in a catch up process (on an advanced ones) to finance a huge amount of productive investment domestic savings are normally not enough; hence foreign savings comes into effect (which equals CA deficit). Thus, in particular for these sorts of countries, growth is associated with a larger increase in investments than savings. Hence, the process of joining to the EU and EURO zone that requires meeting Maastricht criteria leads to a tradeoff which needs very careful handling.

This work comprises a panel analysis using the annual data of 24 countries (in Eastern Europe and the former Soviet Union) within the period 1992-2003, and the following general form is estimated for two models, Model A with 26 countries, and Model B with 14 countries:

$$CA_{it} = \alpha_i + \gamma_t + \beta CA_{it-1} + \lambda x_{it} + u_i + \varepsilon_{it}$$

where the dependent variable is CA balance (negative values indicate a deficit) for the ith unit at time t, and the vector of independent variables, (X_i), covers real GDP growth (GDPG), openness (OPEN), relative income (RELY), general government budget balance (GOVB), external debt (EXTDEBT), and EU-15 GDP growth (GDP-EU) for the extended form Model A; and general government budget balance (GGBB), relative dependency (RELDEP), the real effective exchange rate (REER), and terms of trade (TOT) for the reduced form Model B. The vectors α and β are vectors of coefficients, y_t stands for time-specific effects peculiar to a specific period but constant for all countries, and u_i and ε_t denote a two-part error term.

As a dynamic panel data model is estimated, the most appropriate technique would be the generalized method of moments (GMM-IV) estimator. However, to ensure the robustness of the estimates, due to the rather small number of observations, three other econometric techniques are also employed: a fixed effects model,

in other words, a least square dummy variable (LSDV) model; a feasible generalized least squares model (FGLS); OLS the Parks-Kmenta and Beck-Katz panel-correlated standard error model (OLS-PCSE).

The results are generally consistent with theoretical and empirical analyses. So there is a moderate level of persistent CA deficit apart from the behavior of its determinants. **CA has a memory of one year** and the size of this partial regression coefficient is around $(0.19 - 0.33)$. Plus, an increase in the domestic **output growth rate (GDPG)** expands the current account deficit (1% rise in GDP growth leads to about 0.54% rise in the current account deficit) which is consistent with theoretical expectations that domestic economic growth accelerates demand for foreign commodities so deteriorates the current account balance. Furthermore, **relative income (RELY)** also has an effect on CA balance. A per capita income of 10% below the average of the EU-15 deteriorates CA by approximately 0.64%. Intuition suggests that less-developed countries are assumed to grow faster than average rate, so they borrow against future income, in line with the hypothesis of the stages of development. Moreover, parallel with the twin deficit hypothesis, **government budget balance (GOVB)** seems to have a positive effect on CA balance (1% rise in the government budget balance leads to around 0.30 - 0.40% rise in CA balance. Next, **age Dependency Ratio (RELDEP)** as a demographic factor (ratio of the number of people younger than 15 and older than 65 in the total population) also has negative and statistically significant results for the FGLS and OLS-PCSE estimators. This finding is related to the life-cycle hypothesis, in which younger and older populations save less. Concerning external economic conditions, **Openness of an economy**, however, is weakly and negatively related to its CA balance; it is statistically insignificant too. **Real exchange rate (REER)**, on the other hand, has a positive and statistically significant, effect on CA deficit, confirming the predictions of the Mundell-Fleming model. Real appreciation of the domestic currency by 10% decreases the CA balance by around 0.9%. Furthermore, **terms of trade (TOT)** also has a positive and statistically significant effect on CA balance that is rather consistent with the Harberger-Lauresen-Metzler effect[65]. Improvements in terms of trade by 10% results in lower current account deficit of around 0.6-1.4%. Moreover, **total external debt (EXTDEBT)** with one year lag used to designate a country's net foreign asset position has also a positive and statistically significant relation to CA balance. A 1% rise in total external debt causes about 0.02-0.04% rise in the current account balance in the next year. Finally a rise in **the EU-15 growth rate (GDPG-EU)** results in a drop in the CA deficits of the emerging economies of Eastern Europe and the former Soviet Union, which is also in line with the theory. A 1% rise in the EU-15 growth rate leads to an improvement of around 0.75 and 1.25% in CA balance.

Finally, in this analysis in particular Model B is relevant, where CA is regressed on: $CA_{-1}, RELDEP(log), GOVB, REER(log)TOT(log)$.

[65]The Harberger-Lauresen-Metzler effect predicts that positive transitory terms-of trade shocks lead to an improvement in current income that is greater than that in permanent income. Hence, an increase in savings follows, and an improvement in current account positions occurs.

3.8 Studies about Turkey

After the 2001 crisis, and the following switch to the (managed) floating currency regime, in particular after 2003, it has been observed that while TL on real (inflation adjusted) terms has appreciated, the foreign trade deficit originated current account deficit of Turkey has noticeably been risen. This has triggered discussions on the sustainablity of this picture, (some criticisms have been levelled at the Central Bank of Turkey-CBTR- as to if the policy interest rates were too high leading to this appreciation), so several papers have been published aiming to answer what are the determinants of the current account deficit in Turkey, and especially what is the role of prices: real exchange rate, import and export prices[56, p. 1].

Initially, perhaps one of the main papers is that of Aydın, Saygılı and Saygılı[8]. Using quarterly data from 1987 Q1 to 2005 Q4, and the Kalman filter approach; they tried to estimate parameter values of the export demand and supply function. In this work they set up an export supply function which was determined by imports quantity index and real unit labor cost based effective exchange rate (as it reflects the cost of production better than that of the consumer price index based exchange rate). Moreover their export demand function also contained the foreign income and consumer price index based real effective exchange rate. All variables were in log form, and the result of the analysis has shown that, in particular for the period 2001-2005, import elasticity of export supply was around 0.4 (So a 1% increase in imports leads to a 0.4% increase in exports). Furthermore, real unit labor cost based effective exchange rate elasticity of export supply is around 0.13 (sign of the parameter is negative). In addition, the income and consumer price index based real effective exchange rate elasticities of export demand turned out respectively to be 0.43 and -0.09 [8, pp. 42-49].

Similar export demand and supply analysis has been carried out by Vural and Zortuk[77]. They used annual data for 19822009 and analyzed Turkeys export performance in a simultaneous equation model (3SLS). The focus of the work is the search for the effect of Foreign Direct Investment(FDI) on Turkish exports. In the export demand function in addition to the above Aydın, Saygılı and Saygılı model, they used a third variable: lagged exports. Moreover, in the export supply equation they used: Turkish export prices relative to domestic prices[66], the domestic demand pressure (proxied by the gross fiscal deficit of the Central Government in % GDP), FDI and lagged export supply. Like Aydın, Saygılı and Saygılı work, they also used all the variables in log form in order to get elasticities. Furthermore, the results of the model show that, relative price elasticity of export was 0.15, domestic demand pressure elasticity elasticity of export was -0.02, FDI elasticity of export was also 0.01 and the coefficient of lagged export was 0.95 as well, and finally all these have been statistically significant[77, pp. 14-22].

The other researchers have mainly used VAR (Vector Autoregressive) analysis, and based on that, Granger causality in order to justify the effect of imports on Turkish exports. The first of these papers is Taştan[74]. He used monthly data covering the period: 1985 M1 to 2009M5. Applying the framework developed by

[66]The unit price of Turkish exports divided by the wholesale price index for Turkey.

Geweke (1982, 1984)[67], Hosoya (1991, 2001)[68] and Breitung-Candelon (2006)[69] as well as basic frequency-domain techniques, in the analysis it has been found that there was a material causality, conditional on imports, from industrial production index to exports (in business cycle frequencies). Moreover, there has also been another significant Granger-causality, conditional on exports from imports to the industrial production index (in the longer term).Hence, the import-led growth and the growth-driven exports hypotheses have been supported by these results [74, pp. 87-96].

Another piece of work using Granger causality which indirectly indicates the dependency of exports (to growth in Turkey) belongs to Ceviker and Taş[18]. Their work covered a longer period: 1962 to 2008 and intended to examine the relationship between Turkish economic growth and her export diversification. Using log values of annual export, GDP, and the Normalized Hirshman index for export diversification, it turned out that there was Granger causality from economic growth to export and from export to export diversification. However, there was no Granger causality found out from export diversification to exports, and economic growth[18, pp. 1-8].

The causality from imports to exports has also been shown by applying another technique. Variance Decomposition in the paper by Kurt and Berber[46] whose main purpose was to investigate the relationships and dynamic interactions between openness and economic growth. In the related part of this work which covers the period 1989Q1 to 2003Q4 and uses log values with three variables: export, import and growth; a 1 standard deviation shock in exports just in the second period resulted by 12% from imports, and in the 6 period analysis this effect remains at 9% levels, moreover this effect of imports was greater than that of growth which was around the level of 5%. In imports, however, the effect of exports was quite small and did not pass the level of 5%. As expected, imports were affected materially by growth (even in the first period this effect was 48% then up to 56%). Therefore, it can be asserted that there was a unidirectional causality from imports to exports[46, pp. 57-77].

As for another technique, the Error Correcting Model, it is the paper of Akta[3] which has applied it to show the effect of imports on exports. This work used the data from 1996M1 to 2006 M6. Here again logarithmic values of the real export, import and GDP (base 1996) were used. In this study 3 cointegration relations were found out, (as for the most of the studies, it is rare to find a series without

[67]Geweke, J. (1982), Measurement of Linear Dependence and Feedback Between Multiple Time Series, Journal of American Statistical Association, 77, 304-324. Geweke, J., (1984a), Measures of Conditional Linear Dependence and Feedback Between Time Series, Journal of American Statistical Association, 79, 907-915. Geweke, J., (1984b), Inference and Causality in Economic Time Series Models, Handbook of Econometrics, vol. II., Z. Griliches ve M.D. Intriligator (eds) ch. 19, Elsevier Science.

[68]Hosoya, Y. (1991). The Decomposition and Measurement of the Interdependence Between Second-order Stationary Process, Probability Theory and Related Fields, 88, 429-444.; Hosoya, Y. (2001), Elimination of third-series effect and defining partial measures of causality, Journal of Time Series Analysis, 22, 537554.

[69]Breitung, J. and B. Candelon (2006), Testing for Short- and Long-run Causality: A Frequency Domain Approach, Journal of Econometrics, 132, 363-378.

a unit root, so as to be used in levels). Error Correction Model is applied for data in levels. Hence, according to the results, in the long run there is unidirectional causality from imports to exports from exports to imports, from growth to exports and from growth to imports as well while in the short run there is also a two-way causality relationship among exports, imports and economic growth. Finally, though the statistically significance results have been shared, the estimated coefficients were not presented in the paper[3, pp. 35-44].

Likewise, the quite detailed work on the structure of the Turkish export sectors of Oz[1] has also supported the dependency of the exports in particular on raw and intermediate goods levels. Besides this, the inward processing regime which gained importance in particular after the Customs Union in 1996 has had a quite significant effect on this dependency[1, pp. 12-39].

4 THEORETICAL BACKGROUND

4.1 SHORT TERM EQUATIONS

4.1.1 Loan Market Equilibrium

Defining o_r as required reserve ratio for the banks, then useable funds of the banking sector:

$$L^s = l^s(r_l, r, \sigma, o_r) \tag{4.1}$$

where, r_l has (+); o_r, σ and r all have (-) effects. Moreover r_l stands for interest rate of the loans, r, represents all other interest rates in the economy and σ symbolizes the riskiness, while L^s also stands for loan supply.

As to L^d which stands for Loan demand:

$$L^d = ld(rl, r, Y) \tag{4.2}$$

where, rl has (-), r has (+) and Y has (+) effect

So in equilibrium,

$$l^d(r_l, r, Y) = L^s = l_s(rl, r, \sigma, o_r) \tag{4.3}$$

4.1.2 Money Market (LM) Equilibrium

Money supply is represented by:

$$MS = MS(Mb(OMO), o_r) \tag{4.4}$$

where Mb stands for Monetary base which is affected by several factors including emissions and open market operations (OMO) and has (+) o_r has (-) effect, and Money demand is also symbolized by:

$$MD = d^d(r, Y) \tag{4.5}$$

where, r has (-) and Y has (+) effect and represents gross domestic product, then Money market equilibrium becomes:

$$MD = dd(r, Y) = MS = MB^s(o_r) \tag{4.6}$$

4.1.3 Foreign Exchange Market Equilibrium

Where current account deficit (NX) is mainly dependent on real exchange rate ε which is equal to net capital flow (CF) which also depends on net interest rate differences between local and world interest rates ($r*$).

$$NX(\varepsilon, Y) = CF(r - r*, \sigma) \tag{4.7}$$

where, ε and Y has (-); r has (+) and $r*$ has (+) while σ has (-) effect.

4.1.4 Good Market (IS) Equilibrium

Aggregate demand (Y) can be broken up into the sum of consumption demand, investment demand, government demand, and net foreign expenditure demand:

$$Y = C + I + G + NX \tag{4.8}$$

Where, C is aggregate consumer spending (a difference between disposable income and taxes), I is planned investments, and G is government spending.

Now, if we substitute the 3rd equation into the 4th, then:

$$Y = C + I + G + CF(r - r*, \sigma) \tag{4.9}$$

If we also consider the effect of loans in this equation, in addition to the reverse relation of interest rates with the investment expenditures, as the loans positively affect the consumption and investment expenditures, so there is also a negative relation of the loan interest rates with the aggregate consumption. Moreover, as interest rates increase, real exchange rate appreciates and there starts a funds inflow into the country (assuming the riskiness of the country constant), which will be balanced by an increase in current account deficit then, there is a negative relation of the interest rates with the aggregate demand resulting from the Foreign Exchange Market Equilibrium, although some part of this effect is offset in a drop in aggregate demand which causes a drop in current account deficit.

Furthermore, as can be observed, with the inclusion of the loans, the effect of the monetary policy on the economy becomes more powerful. Even if the traditional interest rate channel is not effective enough, with the contribution of the loan channel, the aggregate demand would be changed. Thus, any changes in monetary policy, compared with the traditional (Mundell Fleming open economy with the floating exchange rate) model have an effect on loans which, in turn, lead to more significant changes in consumption and investment expenditures.

4.2 LONG TERM (STEADY STATE) EQUATIONS

4.2.1 Loan Market Equilibrium

$$L^s = l^s(r_l, r, \sigma, o_r) \tag{4.10}$$

where, r_l has (+), r has (-) and σ (-) effect, plus, σ stands for risk premium. As to L^d:

$$L^d = l^d(r_l, r, Y) \tag{4.11}$$

where, r_l has (-), r has (+) and Y has (+) effect. Note that, in the long run as price levels change, then r_l and r stands for the real ones, thus $r = \frac{(1+r_{nom})}{(1+\Pi)}1$, where Π stands for inflation rate and r_{nom} is nominal r; the same equation holds true for r_l. As in the short run prices are assumed to be sticky, not changing, so nominal rates are equal to the real ones.

Hence in equilibrium, loan growth depends on real interest rates net of risk premium:

$$l^d(r_l, r, Y) = L^s = l^s(r_l, r, \sigma, o_r) \tag{4.12}$$

4.2.2 Money Market (LM) Equilibrium

$$MD = d^d(r, Y) \tag{4.13}$$

where, r has (-) and Y has (+) effect, then money market equilibrium becomes (where r and Y represent real ones); Plus m oney supply basically depends on Monetary base and deposits as well:

$$MD = d^d(r, Y) = MS = MS(Mb(OMO), o_r) \tag{4.14}$$

4.2.3 Foreign Exchange Market Equilibrium

Where current account deficit (NX) is mainly dependent on real exchange rate, which is equal to net capital flow (CF) which also depends on net interest rate differences between local and world interest rates ($r*$) net of risk premium.

$$NX(\varepsilon, Y) = CF(r - r*, \sigma) \tag{4.15}$$

where, ε and Y have (-); r has (+) and $r*$ has (+) while σ has (-) effect. Besides this, it is assumed that relative ppp also holds, which states a relationship between the rate of change in nominal exchange rate and the rate of change between the price level of domestic and foreign economies.

$$\frac{\Delta\varepsilon_{nom}}{\varepsilon_{nom}} = (\frac{\Delta p}{p}) - (\frac{\Delta p*}{p*}) \tag{4.16}$$

4.2.4 Good Market (IS) Equilibrium

$$Y = C + I + G + NX \tag{4.17}$$

Finally, $Y = \bar{Y}$, Aggregate supply equals full employment level of income.

In the long run, as the aggregate supply function of an economy is assumed to be constrained by its production capacity, irrespective of the price level, and its price

level is also subject to change (flexible prices), short run equilibriums adjust to their long run equivalents.

When there is a monetary expansion (contraction) in an economy assumed to be at its steady state, then, in *the short run*, as the money and affected loan *supplies* increase (drop), domestic interest decreases (rises), in order to balance the demand with the increased (decreased) supplies in both loan and money market. This leads to an increase (decrease) in investment and consumption expenditures. Moreover, as domestic interest rates drop (rise), in the foreign exchange market real exchange rate depreciates (appreciates), which leads to a funds outflow from (inflow into) the country, which will be balanced by an increase (decrease) in current account balance. Hence, a rise, (drop) in all consumption, investment and current account balance is also observed. Finally, the magnitude of these changes depends also on the related elasticities of these parameters.

In **the long run**, however, as the aggregate supply function of an economy is constrained by its production capacity, in line with the rise (drop) in input prices, in particular wages, price levels of the economy increase (decrease). This results in decrease (increase) in real money and loan supply, and also causes interest rates to rise (drop). Moreover, for an open economy, there is also a foreign exchange rate pass through effect as well. Depreciation (Appreciation) of exchange rate contributes to the rise (drop) in input prices like raw materials, and semi processed inputs for the production, so accelerates the process of decrease (increase) in real money and loan supply, and the rise (drop) in interest rates. In the foreign exchange market, real exchange rate appreciates (depreciates), which leads to a funds inflow into (outflow from) the country, which will be balanced by a deficit (surplus) in current account balance. Therefore, a drop (rise) in all consumption, investment and current account balance is also witnessed, while, an increase (decrease) in price levels, real and nominal interest rates, is also observed. However, it is not certain whether we can predict the change in the nominal exchange rate, as appreciation (depreciation) of the exchange rate is counter balanced by the rise (drop) in price levels, when we compare the short run versus long run effects.

In the end, this economy comes back at its long term equilibrium. Compared with the initial equilibrium, price levels, nominal foreign exchange rates and nominal interest rates will be higher (lower) and real exchange rates and the interest rates will be the same, ceteris paribus. Finally, like the short run, the magnitude of these changes depends also on the related elasticities of these parameters, in the long run.

Therefore, as has been seen, with the inclusion of the loans, the effect of the monetary policy on the economy becomes more powerful, both in the short run and the long run convergence. Likewise, a drop (rise) in the riskiness of the economy leads to funds inflow into (outflow from) the economy, and causes a currency appreciation (depreciation). Moreover, as the riskiness drops (rises), loan supply also increases (decreases), which results in an increase (decrease) in consumption and investment expenditures, so leads to a rise (drop) in aggregate demand. Thus, the overall effect is a deficit (surplus) in current account balance, while the effect on national income is uncertain, depending on the relative elasticities.

5 THE VARIABLES

The data used in this study are in quarterly frequency and comprise the period between Q2-1998 and Q2 2014.

(REER) TL Real Effective Exchange rate: It measures the development of the real value of TL (local currency) against the basket of the trading partners of Turkey (the country). The data is obtained from Bruegel, a European think tank specializing in economics, (*www.bruegel.org*), and show no seasonality.

(GR_REER)Growth of TL Real Effective Exchange rate: It shows the growth of (REER) TL Real Effective Exchange rate calculated through natural logarithms, and the data has no unit root so is stationary. It is an endogenious variable in VAR analysis. It has an expected negative relation with foreign trade and current account balance and a positive relation with real interest rates.

(GDPGW2) Turkish Trade Partners Growth rate (No seasonality) It is the quarterly GDP growth rate of Turkeys foreign trade partners. The rate is calculated according to the weight of a country in the period of Q2 1998 till Q2 2014. The countries comprised hold over 77% share in Turkeys foreign trade. There are several sources, including the OECD and individual statistics of the countries concerned. The data is stationary, shows no seasonality and it is an exogenious variable in VAR analysis.

(ENDEX) Inflation Index: It stands for the 50% CPI (Consumer Price Index) and 50% WPI (Wholesale Price Index) weighted index which is obtained from TSI (Turkstat) and the base is 2003. It is not seasonally adjusted. The reason for the choice of CPI is that it had been the focal point for the inflation targeting policy of the CBTR which comprises the main part of this study. As to the choice of WPI, the reason has been to capture the producer prices as well, in order for completeness, as the index has been used to convert all nominal TL data into real data after it has been seasonally adjusted so equal weight has been assigned to both indices as well. Hereby, instead of this index, it could be argued that GDP Deflator could have been used instead. On this point, in the relevant period of this study, both (seasonally adjusted) indices were compared and they have turned out to be quite close to each other as the correlation coefficient between them is 99.93%. Thus, the difference between these two alternatives would not lead to material results. Moreover, the index has been used for the nominal data, in particular the loans for which using the CPI & WPI index would also intuitively make sense, as GDP data and its components are provided in seasonally adjusted and real terms by TUIK (so they have been used as such).

(ENDEX_RL) Inflation Index Seasonally Adjusted: It stands for the 50% CPI (Consumer Price Index) and 50% WPI (Wholesale Price Index) weighted index

seasonally adjusted through the Tramo Seat method which is the main tool used in this work.

(FDI_NOM) Foreign Direct Investment Nominal: It stands for the net foreign direct investment in nominal million TR (converted from original USD, the rates used in conversion are derived from CBTR -The Central Bank of Turkey-). The source is the CBTR. The data shows no seasonality.

(FDI_RL) Real Foreign Direct Investment: It stands for the seasonally adjusted real net foreign direct investment in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal net foreign direct investment data into the real one. The data is not stationary.

(GR _FDI_RL) Growth of Real Foreign Direct Investment: It stands for the growth of seasonally adjusted real net foreign direct investment in million TL calculated through natural logarithms. The data is stationary and used as an exogenous variable in VAR analysis.

(RAT_FDI) Ratio of Foreign Direct Investment to GDP: It stands for the ratio of quarterly seasonally adjusted real net foreign direct investment over quarterly seasonally adjusted real gross domestic product. The data is not stationary and used as an exogenous variable in VAR analysis.

(FTB_NOM) Foreign trade balance Nominal: It represents the nominal, and seasonally adjusted foreign trade balance in million TL (converted from original USD, the rates used in conversion are derived from CBTR). The source is TSI (Turkstat).

(FDB_RL) Real Foreign trade balance: It stands for seasonally adjusted real foreign trade balance in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal net foreign trade balance data into real ones. The data has unit root without time trend but with time trend marginally stationary, and by nature it is mean reverting, (so theoretically assumed as stationary as well) and used as an endogenous variable in VAR analysis. Furthermore it has an expected negative relation with real interest rate and loans.

(GR _FTB_RL) Growth of Real Foreign trade balance: It stands for the growth of seasonally adjusted real foreign trade balance calculated through arithmetic percentage. The data is stationary and used as an endogenous variable in VAR analysis. Furthermore it has an expected negative relation with real interest rate and loans.

(RAT_FTB) Ratio of Real Foreign trade balance to GDP: It stands for the ratio of quarterly seasonally adjusted real foreign trade balance to quarterly seasonally adjusted real gross domestic product. The data is stationary and used as an endogenous variable in VAR analysis. Furthermore it has an expected negative relation with real interest rate and loans.

(BRENT_NOM) Brent Crude Oil Nominal: It represents the per barrel price of Brent crude oil in nominal TL (converted from original USD, the rates used in conversion are derived from CBTR). The source is Bloomberg. The data shows seasonality.

(BRENT_RL) Real Brent Crude Oil Real: It represents the seasonally adjusted real per barrel price of Brent crude oil in TL. ENDEX_RL is used to convert

the seasonally adjusted nominal per barrel price of Brent crude oil data into real data. The data is stationary. It is also used as an exogenous variable in VAR analysis.

(GR_BRENT_RL) Growth of Real Brent Crude Oil - Real: It represents growth of the seasonally adjusted real per barrel price of Brent crude oil calculated through arithmetic percentage, and the data has no unit root so is stationary. It is used as an exogenous variable in VAR analysis.

(CAB_NOM) Current Account balance Nominal: It represents the nominal, current account balance in million TL (converted from original USD, the rates used in conversion are derived from the CBTR). The source is TSI (Turkstat).

(CAB_RL) Current Account balance Real: It represents the seasonally adjusted real current account balance in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal net foreign direct investment data into the real one. The data has unit root without a time trend but with a time trend stationary, and by nature it is mean reverting, (so theoretically assumed to be stationary as well) and used as an endogenous variable in VAR analysis. Furthermore it has an expected negative relation with real interest rate and loans.

(GR_CAB_RL) Growth of Current Account balance: It stands for the growth of seasonally dusted real current account balance calculated through arithmetic percentage. The data is stationary and used as an endogenous variable in VAR analysis. Furthermore it has an expected negative relation with real interest rate and loans.

(RAT_CAB) Ratio of Current Account balance to GDP: It stands for the ratio of quarterly seasonally adjusted real current account balance over quarterly seasonally adjusted real gross domestic product. The data has unit root without a time trend but with a time trend stationary, and by nature it is mean reverting, (so theoretically assumed to be stationary as well) and used as an endogenous variable in VAR analysis. Furthermore it has an expected negative relation with real interest rate and loans.

(CDS_TUR) Credit Default Swap Turkey: It represents the credit default swaps for Turkey in basis points for 5 year maturity. The source is Bloomberg, and it shows no seasonality.

(CONLN_NOM) Consumer Loans Nominal: It stands for the Turkish Consumer loans volume including credit card receivables in million TL and nominal terms. Furthermore the source is the CBTR and the data shows seasonality as well.

(CONLN_RL) Consumer Loans Seasonally Adjusted: It stands for the the seasonally adjusted real Turkish Consumer loans volume including credit card receivables in million TL. The Tramo Seat method is used in the seasonally adjustment process and ENDEX_RL is used to convert the seasonally adjusted nominal Turkish Consumer loans volume including credit card receivables data into the real one. The data is not stationary.

(GR_CONLN_RL) Growth of Consumer Loans - Real: It represents growth of the seasonally adjusted real Turkish Consumer loans volume including credit card receivables calculated through natural logarithm and the data has no unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with the foreign trade and current account balance and

real interest rates.

(RAT_CONLN) Ratio of Consumer Loans Real to GDP: It represents the ratio of the seasonally adjusted real Turkish Consumer loans volume including credit card receivables to quarterly seasonally adjusted real gross domestic product and the data has unit root so is not stationary.

(RAT_DIF_CONLN) Difference of the Ratio of Consumer Loans Real to GDP: It represents the first difference[70] of the ratio of the seasonally adjusted real Turkish Consumer loans volume, including credit card receivables to quarterly seasonally adjusted real gross domestic product and the data has unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with foreign trade and current account balance and real interest rates.

(CONOTHLN_NOM) Consumer and Business Loans Nominal: It stands for the Turkish Business and Consumer loans volume including credit card receivables in million TL and nominal terms. Furthermore, the source is the CBTR and the data shows no seasonality.

(CONOTHLN_RL) Consumer and Business Loans Real: It represents the seasonally adjusted real Turkish Business and Consumer loans volume including credit card receivables in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal Turkish Business and Consumer loans volume, including credit card receivables data into the real one. The data is not stationary.

(GR_CONOTHLN_RL) Growth of Consumer and Business Loans - Real: It represents growth in the seasonally adjusted real Turkish Business and Consumer loans volume including credit card receivables calculated through natural logarithm and the data is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with foreign trade and current account balance and and real interest rates.

(RAT_CONOTHLN) Ratio of Consumer and Business Loans to GDP: It represents the ratio of the seasonally adjusted real Turkish Business and Consumer loans volume including credit card receivables to quarterly seasonally adjusted real gross domestic product and the data has unit root so is not stationary.

(RAT_DIF_CONOTHLN) Difference of the Ratio of Consumer and Business Loans to GDP: It represents the first difference of the ratio of the seasonally adjusted real Turkish Business and Consumer loans volume including credit card receivables to quarterly seasonally adjusted real gross domestic product, and the data has unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with foreign trade and current account balance and real interest rates.

(DCRISIS) Crisis Dummy: It is used to identify the US recession (ignited by the subprime mortgage crisis) period according to the definition used by the National Bureau of Economic Research (12/2007 to 06/2009).

[70]The first difference is the change in a variable and calculated as the difference the values of a variable in the current period (time t) and the previous period (time t-1). Hence, it could be stated that it is the difference between the one-period lags of a variable.

(EMBI) Emerging Markets Bond Index: It represents the JP Morgan Emerging Markets Bond Global Diversified Index (JPEIGLSP Index). The source is Bloomberg. EMBI has no seasonality and it has unit root so is not stationary.

(OECD_CLI) OECD Composite Leading Indicators: It represents the OECD Composite Leading Indicators amplitude_adjusted. The source is the OECD database. The OECD_CLI has no seasonality and it has unit root so is not stationary.

(NOM_ON) TL Market Overnight Interest Rates Nominal: It represents TL market overnight interest rates annually compounded in nominal terms. The source is the EUROSTAT database, and the data shows no seasonality as well.

(FX_RSD) Relative Standard Deviation of Nominal FX Rate: It represents relative standard deviation of daily nominal equally weighted USD and EUR FX rates basket against TL. The source is the CBRT (Indicative Exchange Rates Announced at 15:30). The data is stationary and has no seasonality. It has been used as an exogenous variable to control Turkish market volatility, as FX rates are one of the main factors affecting the decision making process of the economic actors in a quite an open economy like Turkey.

(GR_NOMON) TL Market Overnight Interest Rates Nominal: It represents the growth in TL nominal market overnight interest rates annually compounded through natural logarithm and the data is stationary.

(OTHLN_NOM) Business Loans Nominal: It stands for the Turkish Business loans volume in million TL and nominal terms. Furthermore the source is the CBTR and the data shows seasonality as well.

(OTHLN_RL) Business Loans Real: It represents the seasonally adjusted real Turkish Business loans volume in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal Turkish Business loans volume data into the real one. The data is not stationary.

(GR_OTHLN_RL) Growth in Business Loans - Real: It represents growth in the seasonally adjusted real Turkish Business loans volume calculated through the natural logarithm method and the data has no unit root, so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with the foreign trade and current account balance and real interest rates.

(RAT_OTHLN) Ratio of Business Loans to GDP: It represents the ratio of the seasonally adjusted real Turkish Business loans volume to quarterly seasonally adjusted real gross domestic product and the data has unit root so is not stationary.

(RAT_DIF_OTHLN) Difference of the Ratio of Business Loans to GDP: It represents the first difference of the ratio of the seasonally adjusted real Turkish Business loans volume to quarterly seasonally adjusted real gross domestic product, and the data is stationary.

(PORTFI_NOM) Net Portfolio Investments Nominal: It stands for the net portfolio investments in million TL and nominal terms (converted from original USD, the rates used in conversion are derived from the CBTR). Furthermore, the source is the CBTR and the data shows no seasonality.

(PORTFI_ RL) Net Portfolio Investments Real: It represents the seasonally adjusted real net portfolio investments in million TL. ENDEX_RL is used to convert the data into the real one. The data is stationary.

(PRFD-L_NOM) Non bank private sector long term foreign debt stock gross Nominal: It stands for the gross long term foreign debt stock of the non bank private sector portfolio in million TL and nominal terms (converted from original USD, the rates used in conversion are derived from the CBTR). Furthermore the source is TURKSTAT and the data shows no seasonality as well.

(PRFD-L_RL) Non bank private sector long term foreign debt stock gross Real: It represents the seasonally adjusted real gross long term foreign debt stock of the non bank private sector portfolio in million TL. ENDEX_RL is used to convert the data into the real one. The data is not stationary.

(GR_PRFD-L_RL) Growth in Non bank private sector long term foreign debt stock gross Real: It represents the growth in seasonally adjusted real gross long term foreign debt stock of the non bank private sector portfolio volume calculated through the natural logarithm method and the data has no unit root so is stationary. It is used as an exogenous variable in VAR analysis.

(PRFD-S_NOM) Non bank private sector short term foreign debt stock gross Nominal: It stands for the gross short term foreign debt stock of the non bank private sector portfolio in million TL and nominal terms (converted from original USD, the rates used in the conversion are derived from the CBTR). Furthermore the source is TURKSTAT and the data shows seasonality as well.

(PRFD-S_ RL) Non bank private sector short term foreign debt stock gross Real: It represents the seasonally adjusted real gross short term foreign debt stock of non bank private sector portfolio in million TL. ENDEX_RL is used to convert the data into the real one. The data is not stationary.

(GR_PRFD-S_RL) Growth in Non bank private sector short term foreign debt stock gross Real: It represents the growth in seasonally adjusted real gross short term foreign debt stock of non bank private sector portfolio volume calculated through natural logarithm and the data has no unit root so is stationary. It is used as an exogenous variable in VAR analysis.

(PRFD_NOM) Non bank private sector total foreign debt stock gross Nominal It stands for the gross total foreign debt stock of the non bank private sector portfolio in million TL and nominal terms (converted from original USD, the rates used in conversion are derived from the CBTR). Furthermore the source is TURKSTAT and the data shows no seasonality.

(PRFD_RL) Non bank private sector total foreign debt stock gross Real: It represents the seasonally adjusted real gross total foreign debt stock of the non bank private sector portfolio in million TL. ENDEX_RL is used to convert the data into the real one. The data is not stationary.

(GR_PRFD_RL) Growth in Non bank private sector total foreign debt stock gross Real: It represents the growth of seasonally adjusted real gross total foreign debt stock in the non bank private sector portfolio volume calculated through the natural logarithm method and the data has no unit root so is stationary. It is used as an exogenous variable in VAR analysis.

(RAT_PRFD-S) Ratio of Non bank private sector short term foreign debt stock to GDP: It represents the ratio of the seasonally adjusted real non-bank private sector short term foreign debt stock volume to quarterly seasonally adjusted

real gross domestic product and the data has a unit root so is not stationary.

(RAT_DIF_PRFD-S) Difference of the Ratio of Non bank private sector short term foreign debt stock to GDP: It represents the first difference of the ratio of the seasonally adjusted real Turkish business loans volume to quarterly seasonally adjusted real gross domestic, and the data is stationary.

(PUBLN_NOM) Public Loans Nominal: It stands for the Turkish public loans volume in million TL and nominal terms. Furthermore, the source is the CBTR and the data shows seasonality as well.

(PUBLN_RL) Public Loans Real: It represents the seasonally adjusted real Turkish public loans volume in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal Turkish public loans volume data into the real one. The data is not stationary.

(GR_PUBLN_RL) Growth in Public Loans - Real: It represents growth in the seasonally adjusted real Turkish public loans volume calculated through natural logarithm and the data has no unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected no relation with foreign trade and current account balance and real interest rates.

(RAT_PUBLN)) Ratio of Real Public loans to GDP: It represents the ratio of the seasonally adjusted real Turkish public loans volume to quarterly seasonally adjusted real gross domestic product and the data has unit root so is not stationary.

(RAT_DIF_PUBLN) Difference of the Ratio of Real Public loans to GDP: It represents the first difference of the ratio of the seasonally the seasonally adjusted real Turkish public loans volume to quarterly seasonally adjusted real gross domestic product, and the data is stationary. Furthermore, it has an expected negative relation with foreign trade and current account balance and real interest rates.

(TOTLN_NOM) Total Loans Nominal: It stands for the Turkish Total loans volume in million TL and nominal terms. Furthermore the source is the CBTR and the data shows seasonality as well.

(TOTLN_RL) Total Loans Real: It represents the seasonally adjusted real Turkish total loans volume in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal Turkish Total loans volume data into the real one. The data is not stationary.

(GR_TOTLN_RL) Growth in Total Loans - Real: It represents growth in the seasonally adjusted real Turkish total loans volume calculated through the natural logarithm method and the data has no unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with foreign trade and current account balance and real interest rates.

(RAT_TOTLN)) Ratio of Real Total loans to GDP: It represents the ratio of the seasonally adjusted real Turkish public loans volume to quarterly seasonally adjusted real gross domestic product and the data has unit root so is not stationary.

(RAT_DIF_TOTLN) Difference of the Ratio of Real Public loans to GDP: It represents the first difference of the ratio of the seasonally adjusted real total Turkish loans volume to quarterly seasonally adjusted real gross domestic product, and the data is stationary. Furthermore, it has an expected negative relation with

foreign trade and current account balance and real interest rates.

(CI_RL) Real Consumption and Investment Expenditures Seasonally Adjusted: It stands for the real consumption and investment expenditures 2003 base (seasonally and calendar day adjusted) in million TL. The source is TURKSTAT. Original 1998 based series are converted to 2003 via Turkish CPI indexes.

(GR_CI_RL) Growth in Real Consumption and Investment Expenditures: It represents growth in the seasonally adjusted real consumption and investment expenditures calculated through natural logarithms and the data has no unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with foreign trade and current account balance and positive relation with the consumer and business loans which have negative relation with real interest rates.

(RAT_CI) Ratio of Real Consumption and Investment Expenditures to GDP: It stands for the ratio of real consumption and investment expenditures 2003 base (seasonally and calendar day adjusted) to quarterly seasonally adjusted real gross domestic product. Moreover the data is not stationary.

(RAT_DIF_CI) Difference of the Ratio of Real Consumption and Investment Expenditures to GDP: It represents the first difference of the ratio of real consumption and investment expenditures 2003 base (seasonally and calendar day adjusted) to quarterly seasonally adjusted real gross domestic product, and the data is stationary. Furthermore, it has an expected negative relation with foreign trade and current account balance and a positive relation with the consumer and business loans which have negative relation with real interest rates.

(CIG_RL) Real Consumption, Investment and Government Expenditures to GDP: It stands for the ratio of real consumption, investment and government expenditures 2003 base (seasonally and calendar day adjusted) in million TL, the source is TURKSTAT. Original 1998 based series are converted to 2003 via the Turkish CPI indexes.

(GR_CIG_RL) Growth in Real Consumption, Investment and Government Expenditures: It represents growth in the seasonally adjusted real consumption, investment and government expenditures calculated through natural logarithm and the data has no unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with foreign trade and current account balance and positive relation with the total loans which have a negative relation with real interest rates.

(C_RL) Real Consumption Expenditures Seasonally Adjusted: It stands for the ratio of real consumption expenditures 2003 base (seasonally and calendar day adjusted) in million TL, the source is TURKSTAT. Original 1998 based series are converted to 2003 via Turkish CPI indexes. Furthermore, the data is not stationary.

(GR_C_RL) Growth of Real Consumption Expenditures: It represents growth in the seasonally adjusted real consumption calculated through natural logarithm and the data has no unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with foreign trade and current account balance and positive relation with the consumer loans which have a negative relation with real interest rates.

(RAT_C) Ratio of Real Consumption Expenditures to GDP: It stands for the ratio of real consumption expenditures 2003 base (seasonally and calendar day adjusted) to quarterly seasonally adjusted real gross domestic product. Moreover the data is stationary, so has no unit root. Furthermore, it has an expected negative relation with foreign trade and current account balance and a positive relation with the consumer loans which have negative relation with real interest rates.

(G_RL) Real Government Expenditures Seasonally Adjusted: It stands for the real government expenditures 1998 base (seasonally and calendar day adjusted) in million TL, the source is TURKSTAT. Original 1998 based series are converted to 2003 via the Turkish CPI indexes.

(GR_G_RL) Growth of Real Government Expenditures: It represents growth in the seasonally adjusted real government expenditures calculated through natural logarithm and the data has no unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with foreign trade and current account balance and a positive relation with the public loans which have a no material relation with real interest rates.

(RAT_G) Ratio of Real Government Expenditures to GDP: It stands for the ratio of real government expenditures 2003 base (seasonally and calendar day adjusted) to quarterly seasonally adjusted real gross domestic product. Moreover the data is stationary, so has no unit root. Furthermore, it has an expected negative relation with foreign trade and current account balance and a positive relation with the public loans which have no material relation with real interest rates.

(I_RL) Real Investment Expenditures Seasonally Adjusted: It stands for the real investment expenditures 2003 base (seasonally and calendar day adjusted) in million TL, the source is TURKSTAT. Original 1998 based series are converted to 2003 via the Turkish CPI indexes.

(GR_I_RL) Growth of Real Investment Expenditures: It represents growth in the seasonally adjusted real investment expenditures calculated through natural logarithm and the data has no unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation with foreign trade and current account balance and a positive relation with the business loans which have a negative relation with real interest rates.

(RAT_I) Ratio of Real Investment Expenditures to GDP: It stands for the ratio of real investment expenditures 2003 base (seasonally and calendar day adjusted) to quarterly seasonally adjusted real gross domestic product. Moreover the data is stationary, so has no unit root. Furthermore, it has an expected negative relation with foreign trade and current account balance and a positive relation with the business loans which have a negative relation with real interest rates.

(GDP_RL) Real Gross Domestic Expenditures Seasonally Adjusted: It stands for the real gross domestic expenditures 2003 base (seasonally and calendar day adjusted) in million TL. The source is TURKSTAT.

(GR_GDP_RL) Growth of Gross Domestic Expenditures: It represents growth in the seasonally adjusted real gross domestic expenditures calculated through natural logarithm and the data has no unit root so is stationary. It is used as an endogenous variable in VAR analysis. Moreover it has an expected negative relation

with foreign trade and current account balance and a positive relation with the all sort of loans which have a negative relation with real interest rates.

(M1_NOM) M1 Nominal: It represents nominal M1 in million TL. The source is the CBTR. The data shows seasonality.

(M1_RL) Real M1: It represents the seasonally adjusted real M1 in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal M1 data into the real one. The data is not stationary.

(GR_M1_RL) Growth of Real M1: It represents the growth in the seasonally adjusted real M1 calculated through natural logarithm, and the data has no unit root so is stationary. It is used as an exogenous variable in VAR analysis.

(M2_NOM) M2 Nominal: It represents for nominal M2 in million TL. The source is the CBTR. The data shows no seasonality.

(M2_RL) Real M2: It represents the seasonally adjusted real M2 in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal M2 data into the real one. The data is not stationary.

(GR_M2_RL) Growth of Real M2: It represents the growth in the seasonally adjusted real M2 calculated through natural logarithm, and the data has no unit root so is stationary. It is used as an exogenous variable in VAR analysis.

(OMO_NOM) OMO Nominal: It represents nominal net Open Market Operations volume in Turkey in million TL. The source is the CBTR. The data shows no seasonality.

(OMO_RL) Real OMO Real: It represents the real net Open Market Operations volume in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal OMO data into the real one. The data is stationary. Furthermore, it is used as an exogenious variable in VAR analysis.

(RAT_OMO) Ratio of OMO to GDP: It represents the ratio of the real net Open Market Operations volume to quarterly seasonally adjusted real gross domestic product. The data is stationary. Furthermore, it is used as an exogenous variable in VAR analysis.

(PUB_DEF_NOM) Central Government Budget Cash Deficit Nominal: It represents the nominal central government budget cash deficit in million TL. The source is the Turkish Treasury. The data shows no seasonality.

(PUB_DEF_RL) Real Central Government Budget Cash Deficit: It represents the seasonally adjusted real central government budget cash deficit in million TL. ENDEX_RL is used to convert the seasonally adjusted nominal central government budget cash deficit data into the real one. The data is stationary. Moreover it is used as an exogenous variable in VAR analysis.

(RAT_PUB_DEF) Ratio of Real Central Government Budget Cash Deficit to GDP: It represents the ratio of real central government budget cash deficit to quarterly seasonally adjusted real gross domestic product. The data is stationary. Moreover it used as an exogenous variable in VAR analysis.

(RLON2) TL real Overnight Market interest rate - ex ante: It represents the ex-ante TL real Overnight market interest rate. Annually compounded rates are converted into real ones with the ex ante annual inflation expectations (through questionnaires). The source for the nominal interest rates is the EUROSTAT database,

and the inflation expectations are from the CBTR. The data is not stationary, but, by its nature, it is mean reverting, (so theoretically assumed as stationary as well), and has no seasonality as well. Moreover it is used as the main exogenous variable representing the monetary policy in the analysis, as the short term interest rates had been used as the main policy tool by the CBRT in its inflation targeting regime to ensure price stability from Q1 2001 to Q4 2010. Then besides the price stability, in order to obtain financial stability, the CBRT has added other tools to the short term interest rates like reserve requirement ratios, open market operations etc as well.[42, pp.2-5].

(RLON2DIF) Difference of TL real Overnight Market interest rate - ex ante: It represents the first difference of the ex-ante TL real Overnight market interest rate. Annually compounded rates are converted into real ones with the ex ante annual inflation expectations (through questionnaires). The data is stationary and has also no seasonality.

(R_GLOB) Global Interest Rate [Equally weighted USD and EUR Basket real Overnight LIBOR interest rate - ex ante]: It represents the ex-ante 50 % - 50 % weighted USD and EUR real Overnight LIBOR market interest rate basket. Annually compounded rates are converted into real ones with the ex-ante annual inflation expectations: for EUR (The ECB Survey of Professional Forecasters [71] is used. The source is the EUROSTAT database) and the annual anticipated inflation (retrieved from the yield differences of the treasury inflation-protected securities [TIPS] with the fixed income government bonds) for USD (The source is the Federal Reserve bank of Cleveland database [72]). The data is not stationary, but by its nature it is mean reverting, (so theoretically assumed as stationary as well). Moreover, it has been used as an exogenous variable.

(TR_GR_2Q) 2 Quarter Lagged GDP Growth of Turkey: It represents the 2 quarter lagged GDP growth of Turkey. The data is stationary, and it is used as the exogenous variable in VAR analysis. No seasonality is found out.

(TR_GR_4Q) 4 Quarter Lagged GDP Growth of Turkey: It represents the 4 quarter lagged GDP growth of Turkey. The data is stationary, and it is used as the exogenous variable in VAR analysis. No seasonality is found out.

(VIX) Volatility Index: It is the Chicago Board Options Exchange Volatility index. The data is stationary, and has no seasonality. In addition, it used as the exogenous variable in VAR analysis.

(GR_OECD_2Q) OECD 2 Quarter lagged GDP Growth rate: It is the 2 quarter lagged quarterly GDP (gross domestic production) growth rate of the OECD member countries. OECD member countries have around 70% to 50% share in Turkeys foreign trade between Q2-1998 and Q2 2014. The source is OEDC and data is stationary and has no seasonality. It is an exogenous variable in VAR analysis[73].

[71]It is a quarterly survey of expectations for the rates of inflation for Eurozone countries.

[72]www.clevelandfed.org

[73]Although this variable has not been used in the thesis tables and the charts, the results have not been materially different when GR_OECD_2Q was used instead of TR_GR_2Q. The reason for this outcome is that the variables are quite close to each other as the correlation coefficient between them is above 95%

(GR_OECD_4Q) OECD 4 Quarter lagged GDP Growth rate: It is the 4 quarter lagged quarterly GDP (gross domestic production) growth rate of the OECD member countries. OECD member countries have around 70% to 50% share in Turkeys foreign trade between Q2-1998 and Q2 2014. The source is the the OEDC and the data is stationary, and has no seasonality. It is an exogenous variable in VAR analysis.

(GR_TRPR_2Q) 2 Quarter lagged Turkish Trade Partners Growth rate: It is the 2 quarter lagged quarterly GDP growth rate of Turkeys foreign trade partners. The rate is calculated according to the weight of a country in the period of Q2-1998 to Q2 2014. The countries comprised hold over 77% share of Turkeys foreign trade. There are several sources, including the OECD and individual statistics of the countries. The data is stationary, has no seasonality and it is an exogenous variable in VAR analysis.

(GR_TRPR_4Q) 4 Quarter lagged Turkish Trade Partners Growth rate: It is the 2 quarter lagged quarterly GDP growth rate of Turkeys foreign trade partners. The rate is calculated according to the weight of a country in the period of Q2-1998 to Q2 2014. The countries comprised share an over 77% share of Turkeys foreign trade. There are several sources, including the OECD and individual statistics of the countries. The data is stationary and it is an exogenous variable in VAR analysis.

(RR_TL_DIFF) Reserve Requirement Ratio Difference of TL Liabilities with maturities of up to 3 month and More than 1 year: It is the reserve requirement ratio difference for TL Liabilities with maturities of up to 3 months and TL liabilities with maturities of more than 1 year[74]. Banks have to keep and deposit with the CBTR a percentage of their TL liabilities as reserve requirement. This is also a monetary policy tool of the CBTR. Moreover, according to the recent study by Alper et all[4] covering the period from June 2010 to December 2015, it has been found that using the reserve requirement ratio as a tool, the CBRT has an impact on the liquidity positions of the banks (independent of the interest rate policy), so also on the loan supply. The source of the data is the CBTR. The data is not stationary and it is an exogenous variable in VAR analysis.

(RR_FX_DIFF) Reserve Requirement Ratio Difference of FX Liabilities with maturities of up to 3 month and More than 1 year: It is the reserve requirement ratio difference for foreign currency (FX) liabilities with maturities of up to 3 month and FX liabilities with maturities more than 1 year[75]. Banks have to keep and deposit with the CBTR a percentage of their FX liabilities as reserve requirement. This is also a monetary policy tool of the CBTR. The source of the data is the CBTR. The data is stationary and it is an exogenous variable in VAR analysis.

[74]As the ratio of the liabilities with shorter maturities is lower than that of the liabilities with longer maturities, the data is less than or equal to 0

[75]As the ratio of the liabilities with shorter maturities is lower than that of the liabilities with longer maturities, the data is less than or equal to 0

6 RESULTS

6.1 Effect of Credit (Loan) Transmission Channel of Monetary Policy on FTB

This analysis has been carried out for the period between 2001 Q3 and 2014 Q2. Following the seasonality checks[76] via Tramo-Seats methodology, the related series have been seasonally adjusted. Then, as stated in the preceding section, stationarity checks have also been completed in order to carry out three time series models: VAR, ECM and ARDL in this study. Besides these, the analysis has been performed on both real values of the variables which is called the "level" analysis, and the ratio of real values to real GDP which is also called the "ratio" analysis.

Moreover, in the literature, there are two main papers which can provide insight into selecting the lag order of the models, as the interest rate pass through the duration of The CBRT in the relevant period has been among their major findings. The first one is by Aydın (2007)[9]. In this study, which was conducted for the monthly data in the period from June 2001 to September 2005, it was found out that bank loan rates were affected by the central bank. So, The CBTR has a control over these which has manifested its consequences within a quarter. Furthermore, this reaction was even more rapid after the third quarter of 2003, as it has took merely 1.2, 2.9, 1.7 and 0.9 months for corporate, housing, cash and automobile loans respectively to respond to a shock[9, pp. 1-21]. In the other paper[43], it was also found that a contemporaneous 0.1 percentage point drop in the output gap was the response for a one percentage point rise stimulus in real interest rates as of the end of the second quarter of 2005. Likewise, a one percentage point rise in the output gap was assessed to lead to a 0.35 percentage point rise in the quarterly rate of inflation in the next quarter as well[43][77]. Thus, in line with these results and also considering the total number of observations (being 52), so as to prevent any possible (unnecessary) degree of freedom issues, the lag order of 1 has been chosen in this study (Therefore, this on average allows us to capture any effect of the policy by 4.5 months).

Furthermore, in VAR models, especially at impulse-response analyses where the order of the variables are important, the theoretical model stated in section 4 (Theoretical Background) has been fixed upon for the ordering. In summary, any given interest rate shock first affects loans which influence expenditures which then finally

[76]The main tests used to detect the seasonality are the Friedman test and Kruskall-Wallis tests.
[77]as stated in [15, p. 476]

changes real exchange rate and foreign trade balance (Therefore, in the level analysis, the growth of GDP has also been used following the related expenditure, such as consumption for consumer loans; however, in the ratio analyses, only the ratio of the associated expenditure has been used as using the ratio of GDP to GDP is not relevant for technical reasons, from this angle, for the ratio model of the total loans the ratio of [C+I] to GDP has been used as well.). Moreover, the exogenous variables are also crisis dummy (used after structural break tests and it stands for the USA mortgage crisis period), *RR_TL_DIFF, RR_FX_DIFF*, open market operations, (these three variables have been used to control other monetary policy tools of The CBRT), *FX_RSD* (as stated in the Variables section, used to control the volatility in the Turkish economy and *GR_ TRPR_2Q* has been used to control the growth in the trading partners of Turkey which has an effect on Turkish foreign trade balance. Moreover, since the private sector has an access to foreign loan markets as a substitute for local loan markets, growth in the private sector's short term foreign debt stock has also been used as an endogenous variable in the models for business and total loans.

According to the results of the Impulse Response analyses of (unrestricted) VAR models on the impact of the monetary policy on FTB via loan channel, several points are observed. The first one is that the response of real interest rate to its own shock dies out quite late in all loan types and in both level and ratio models. The reason for this stickiness would be that the real interest rate variable is not stationary indeed. Due to its mean reverting characteristic, it has been assumed to be stationary and used in the models and all the models have satisfied the stability condition (therefore, no roots of the equations have lain outside the unit circle, and this condition has supported the use of real interest rate in the unrestricted VAR models). As a consequence of a feature of the analysis period where the real interest rates have dropped from almost 27 % to 0 %, most probably these results would have come out.

The other result of the models is that to an innovation in a real interest rate, both in ratio and level analyses almost all loans have responded negatively; hereby, the only exception has been the public loans in level model, where the response of the public loans has not been statistically significant.

As for the reaction of the aggregate expenditures to the *RLON2* shock through the related loan channel, it has been witnessed that the results are mixed. Initially, in both level and ratio analyses, government expenditures have not shown any significant response. However, business loans responded negatively (in the 3rd quarter after a shock) in the work on levels, but nothing significant was seen in the work on ratios. On the other hand, consumption expenditures, while they have reacted negatively in the ratio analysis, their reactions have not been significant in the level analysis. Thus, rather consistent with these results, total aggregate expenditures (CIG, and CI) have not manifested any meaningful response either in both level and ratio models.

Besides these, the significant positive responses of FTB and the growth in the real effective exchange rate in response to a real interest rate shock are also noticeable. This outcome has been spotted in all loans and in the models. The relevant graphs

are presented in Appendix, chapter 9.1 and 9.2 for ratio and level models respectively.

Moreover, further VAR analyses have also been performed using all stationary variables, where the first difference of *RLON2*, *REER* and the ratio of *FTB* have been used[78], in order to satisfy the technical conditions of this analysis fully. However, the main drawback of this methodology (in other words using differenced terms) is that to obtain a long run equilibrium solution for the model is not possible. The results have not been as robust as the previous VAR model. But it could be summarized that the transmission of monetary shocks in consumer and total loan channels seem to take place which can be observed in both the ratio and the level models. In addition, while the transmission has been observed as working in the level model for the other (business)loan channel, this has not been supported in the ratio model. Finally, for the public loan channel, monetary shocks have also not been transmitted neither in the ratio, nor in the level model as well. The related graphs are also presented in Appendix, chapter 9.3 and 9.4 for ratio and level models, in that order.

There are also various results of the ARDL models concerning the impact of the monetary policy on FTB via the loan channel. Initially, both models for all loans have significant and meaningful (having negative coefficients) convergence with the Bounds test indicating long run relationships where, apart from the public loans whose Bounds test results are significant at a 5 % level, the results of the Bounds tests of the rest of the loans are significant at a 1 % level. Moreover, in line with this theory, for both the business and total loans, I and CIG[79] have an expected statistically meaningful long run negative coefficients, in both level and ratio models. However, this has not been observed for consumer and public loan models, although in the short run, consumption expenditures have turned out to attain significant and negative coefficients in both models. This significant and negative short term effect for aggregate expenditures has also been witnessed in both total loan models. But, neither business loan, nor public loan models have manifested such a short term significant effect of the related aggregate expenditure on FTB.

Furthermore, in ratio analyses for both consumer and public loans, the single long run significant variable is real interest rate with a positive coefficient, though this has not been observed in the level analysis where for the consumer loan model, there is no variable having a statistically meaningful coefficient. However, for the public loan model in the level analysis, there are two significant variables: *CIG* with a negative and *REER* with a positive coefficient. A similar picture has been noticed in both level and ratio analyses for the total loans, as well. This could, perhaps be explained by the process where funds inflow into the country leading to appreciation of *REER* and an increase in aggregate demand, and finally a foreign trade deficit (a financial account surplus resulting in a current account deficit, according to the balance of payments identity).

One last interesting point to underline in the long run would be that, in both ratio and level models of business and the ratio models of total loans, while the loans have significant and negative coefficients, short term foreign debt of the private sector

[78] In the level analysis, the growth rate of *FTB* has been used in terms of consistency with the rest of the related variables.

[79] *CI* in ratio model

has a significant and positive effect on FTB. This phenomenon, might indicate that foreign debts have been used as a substitute for domestic loans, in particular, where there is a contraction in domestic loan supply. Or it could also be possible that these loans have mainly been used to finance export facilities, like "inward processing"[80], or maybe both are true. Besides these, in the short run, both business and total loans in both models have significant and negative coefficients. In addition, in the ratio models, real interest rate also has statistically important and negative coefficients in business and total loan analyses, while consumer loans also have a significant and positive coefficient. Finally, *REER* in both models for business loans has turned out to have (unlike in the long run where it is positive) a negative and significant coefficient. This result would be justified by the process that any local monetary contraction causes appreciation in real interest rates and contraction in aggregate expenditures through a loan channel, so leads to an improvement in FTB, as stated in the theoretical background.

Moreover, among the fixed variables in these ARDL models, volatility in Turkey (represented by the relative standard deviation in nominal FX Rate) and the reserve requirement ratio difference of TL Liabilities (between TL Liabilities with maturities up to 3 month and TL liabilities with maturities of more than 1 year, and the tool has begun to be applied since 2011 Q1, before that a single ratio had been applied of around 6 % but afterwards, while the ratio of the liabilities with maturities longer than 1 year has stayed at around the 6 % level, that of liabilities with maturities shorter than 3 months has risen gradually up to the level of 11.5 %) have significant long and short run effects on FTB. It has been observed that except in the long term for consumer loans for ratio analysis, an increase in domestic volatility leads to a deteriorating effect for FTB in all loan channels for both level and ratio models. Likewise, it has also been witnessed that an increase in TL reserve requirement ratio difference, except in the long run for total loans, results in a deterioration in FTB as well. The other fixed variable worths mentioning is the growth rate of Turkey's trading partners with two quarter lag. In particular, for consumer and public loan models in both level and ratio analyses this variable has significant long term negative effect on FTB. In addition, this effect of the trading partners has been seen more deeply, as it has a significant negative impact not only in both the short and long run on the consumer and public loans, but also in the short and long run on total loan models, although the significance level here is just 10 %. However, in ratio analysis, the impact of the trading partners is observed to be robust only in the short run for the total loan model. It has not been found to be significant neither for the long run in terms of total loans, nor the short run in terms of public loans. Apart from these, there is also one more single significant long run effect of the fixed variables: the crisis dummy in the level model for consumer loans where, the effect is negative on FTB and robust merely at a 10 % level.

The main results of the ARDL models have been presented in the following tables: Table 6.1 and 6.2.

[80]This is system which allows Turkish manufacturers to get raw materials and intermediate goods which are used in the production of exported goods without paying customs duty or being subject to commercial policy measures.

EFFECT OF REAL INTEREST RATE ON LOANS IN LEVEL

ARDL ANALYSIS

		Business Loans (#)		Consumer Loans		Public Loans		Total Loans	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
DYNAMIC VAR.	RLON2	-0.66 **	-0.47***	-21043 *	-816312 *	-1547	-15715 ***	-0.61 **	-0.37 **
		(0.31)	*(0.12)*	*11959*	*480843*	*393*	*4066*	*(0.27)*	*(0.15)*
	COINTG	-0.99 ***		-0.03 ***		-0.25 ***		-0.72 ***	
		(0.15)		*(0.00)*		*(0.05)*		*(0.14)*	
FIXED VARIABLES	DCRISIS	-0.04	-0.01	1692	19130	393	2735 ***	-0.03	-0.01
		(0.03)	*(0.03)*	*(1360)*	*(28922)*	*(317)*	*(1000)*	*(0.03)*	*(0.03)*
	OMO	0.00	0.00	0.03	0.15	0.00	0.01	0.00	0.00
		(0.00)	*(0.00)*	*(0.03)*	*(1.54)*	*(0.01)*	*(0.04)*	*(0.00)*	*(0.00)*
	RR_TL_DIFF	1.28	0.95	-57	-982468	9253	47316	1.20	1.02
		(1.11)	*(1.02)*	*(44576)*	*(1306064)*	*(9732)*	*(32681)*	*(0.97)*	*(1.28)*
	RR_FX_DIFF	-2.06	-0.49	-625	1096892	-6441	-86170 *	-1.66	-0.46
		(2.69)	*(1.48)*	*(114412)*	*(2546608)*	*(23552)*	*(49092)*	*(2.36)*	*(1.84)*
	FX_RSD	-0.41	-0.81	12357	-72361	5923 **	28142 *	-0.19	-0.81
		(0.29)	*(0.50)*	*(11359)*	*(551011)*	*(2530)*	*(16356)*	*(0.25)*	*(0.63)*
	GR_TRPR_2Q	1.06	2.11 ***	46299	2151404	-18026 **	-33307	0.52	2.13 **
		(0.93)	*(0.75)*	*(37162)*	*(2147217)*	*(8501)*	*(25060)*	*(0.81)*	*(0.94)*
	Constant		0.07 ***		170131 *		5477 ***		0.07 **
			(0.02)		*(88834)*		*(727)*		*(0.03)*
BOUNDS Test			12.40 ***		7.50 ***		7.40 ***		6.94 ***

*Level of significance according to: * 10%, ** 5%, *** 1%.*

 # Growth of business loans is used

Table 6.1: Effects of Loans Channel To FTB in Level, ARDL Analysis

EFFECTS OF LOANS CHANNEL TO FTB IN RATIO
ARDL ANALYSIS

		FTB		FTB		FTB		FTB	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
DYNAMIC VARIABLES	RLON2	-0.15 **	-0.02	-0.05	0.00 *	-0.03	-0.11 **	-0.13 **	-0.07
		(0.06)	*(0.04)*	*(0.07)*	*0.19*	*(0.06)*	*0.15*	*(0.05)*	*(0.01)*
	OTHLN	-0.16 ***	-0.04 ***						
		(0.04)	*(0.01)*						
	CONLN			0.23 **	0.00				
				(0.09)	*0.04*				
	PUBLN					0.52	0.00		
						(0.36)	*0.59*		
	TOTLN							-0.04 *	0.00
								(0.02)	*(0.04)*
	PRFD-S	-0.04	0.57 **					-0.06	0.66 **
		(0.17)	*(0.22)*					*(0.18)*	*(0.29)*
	I	-0.14	-0.41 ***						
		(0.16)	*(0.08)*						
	C			-0.40 ***	0.00				
			-	*(0.14)*	*(0.05)*				
	G					0.40	0.00		
						(0.29)	*(0.03)*		
	CI (#)							-0.42 ***	-0.35 ***
								0.10	*0.10*
	REER	-0.001 *	0.000	0.000	0.000	0.000	-0.001	0.000	-0.001
		(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*0.00*
	COINTG	-1.26 ***		-0.74 ***		-0.79 ***		-0.95 ***	
		(0.16)		*(0.13)*		*(0.15)*		*(0.14)*	
FIXED VARIABLES	DCRISIS	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	-0.01
		(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*
	OMO	-0.04 *	-0.03	-0.06 **	-0.10	-0.02	-0.04	-0.05 **	-0.06
		(0.02)	*(0.03)*	*(0.03)*	*(0.07)*	*(0.03)*	*(0.06)*	*(0.02)*	*(0.04)*
	RR_TL_DIFF	0.67 ***	0.47 ***	0.67 ***	0.96 ***	0.51 **	0.74 **	0.43 **	0.34
		(0.20)	*(0.17)*	*(0.23)*	*(0.30)*	*(0.24)*	*(0.27)*	*(0.20)*	*(0.24)*
	RR_FX_DIFF	-0.42	-0.51 *	-0.13	-0.58	-0.01	-0.60	-0.25	-0.29
		(0.50)	*(0.29)*	*(0.55)*	*(0.43)*	*(0.54)*	*(0.42)*	*(0.50)*	*(0.40)*
	FX_RSD	-0.34 ***	-0.25 ***	-0.16 **	-0.20	-0.20 ***	-0.25	-0.27 ***	-0.22 *
		(0.07)	*(0.09)*	*(0.07)*	*(0.17)*	*(0.07)*	*(0.17)*	*(0.07)*	*(0.12)*
	GR_TRPR_2Q	-0.07	-0.08	-0.62 ***	-1.04 ***	-0.27	-0.55 **	-0.28 *	-0.34
		(0.16)	*(0.15)*	*(0.20)*	*(0.28)*	*(0.20)*	*(0.27)*	*(0.16)*	*(0.21)*
	Constant		-0.07		-0.03		-0.08		0.11
			(0.05)		*(0.23)*		*(0.06)*		*(0.11)*
BOUNDS Test			8.11 ***		5.56 ***		4.08 **		6.26 ***

*Level of significance according to: * 10%, ** 5%, *** 1%.*

 # CI is used as CIG/GDP leads to a value very close to 1.

Table 6.2: Effects of Loans Channel To FTB in Ratio, ARDL Analysis

6.2 Effect of Aggregate Expenditures on Foreign Trade Balance

One of the main results of the analysis is that foreign trade balance is affected by the change in all the aggregate expenditure types. This has been observed in both real values (levels) and the ratios to GDP analysis.

According to ARDL analysis, apart from G, where there is a significant long run relation, the coefficient of G for FTB is around -1.01 & -1.10 (*Hereby the results are*

presented in order of: first levels then ratio analyses respectively, unless otherwise is stated in the rest of the section) and the convergence as cointegration term is around -.64 & -.50; only the short term relation seems insignificant and the coefficient quite small and even unexpectedly positive (-0.22 & 0.26), for both I and C. There is both long and short term negative relation with a significant convergence. To demonstrate, C has both a significant short run (its coefficient is around -0.31 & -0.50) and long run relation with FTB (its coefficient is around -0.23 & -1.00) with a significant convergence (the coefficient is -0.83 & -0.55). As to I, it has also got both a significant short run (its coefficient is around -0.88 & -0.88) and long run relation with FTB (its coefficient is around -0.72 & -0.58) with a significant convergence (the coefficient is -0.55 & -0.61).

Besides these, in both level and ratio analyses, there are two fixed variables observed to have robust both long and short run effects for two expenditure channels. The first one is the growth rate of Turkey's trading partners. It has a negative impact on FTB for consumption and public expenditure models. The other fixed variable is the reserve requirement ratio difference of TL Liabilities. The increase in the difference has a negative influence on FTB in investment and consumption models as well. Additionally, open market operations as another fixed variable has also stood out having a robust negative long and short run impact on FTB in consumption expenditures in both level and ratio models. The related tables (Table 6.3 and 6.4) are also presented below:

EFFECT OF AGGREGATE EXPENDITURES ON FTB IN LEVEL ARDL ANALYSIS

		FTB		FTB		FTB	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
DYNAMIC VARIABLES	I	-0.88 ***	-0.55***				
		(0.12)	*(0.07)*				
	C			-0.31***	-0.23 ***		
				(0.06)	*(0.03)*		
	G					-0.22	-1.01***
						(0.30)	*(0.18)*
	COINTG	-0.72 ***		-0.83 ***		-0.64 ***	
		(0.12)		*(0.13)*		*(0.10)*	
FIXED VARIABLES	DCRISIS	-78	-810	1095	-292	1181	-200
		(998)	*(1296)*	*(1046)*	*(1160)*	*(1222)*	*(1790)*
	OMO	0.00	-0.01	-0.06 **	-0.10 *	-0.03	-0.08
		(0.02)	*(0.06)*	*(0.02)*	*(0.05)*	*(0.03)*	*(0.08)*
	RR_TL_DIFF	99076 ***	120334 **	114579 ***	143871 ***	68741 *	146079 **
		(35441)	*(46288)*	*(34275)*	*(42052)*	*(39714)*	*(65655)*
	RR_FX_DIFF	14493	-73061	-15112	-119457 *	10105	-204452 **
		(78653)	*(63587)*	*(79016)*	*(59675)*	*(93803)*	*(94683)*
	FX_RSD	-7407	-2345	-12498 **	-12663	-3153	10048
		(5185)	*(12887)*	*(5213)*	*(12361)*	*(6015)*	*(20064)*
	GR_TRPR_2Q	-31353	-28694	-72918 ***	-140065 ***	-81496 **	-202464***
		(27999)	*(32878)*	*(26430)*	*(28744)*	*(31082)*	*(44877)*
	Constant		3787 **		13262 ***		8470**
			(1829)		*(2469)*		*(3183)*
	BOUNDS Test		8.30***		10.52 *		8.00***

*Level of significance according to: * 10%, ** 5%, *** 1%.*

Table 6.3: Effect of Aggregate Expenditures On FTB in Level, ARDL Analysis

EFFECT OF AGGREGATE EXPENDITURES ON FTB IN RATIO ARDL ANALYSIS

		FTB		FTB		FTB	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
DYNAMIC VARIABLES	I	-0.88 ***	-0.58 ***				
		(0.15)	*(0.18)*				
	C			-0.50 ***	-1.00 ***		
				(0.13)	*(0.29)*		
	G					0.26	-1.10 *
						(0.28)	*(0.57)*
	COINTG	-0.61 ***		-0.55 ***		-0.50 ***	
		(0.10)		*(0.10)*		*(0.08)*	
FIXED VARIABLES	DCRISIS	0.00	-0.01	0.00	-0.01	0.01	-0.01
		(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*
	OMO	-0.02	-0.03	-0.08 ***	-0.20 **	-0.05 **	-0.15
		(0.02)	*(0.08)*	*(0.03)*	*(0.10)*	*(0.03)*	*(0.12)*
	RR_TL_DIFF	0.59 **	0.79 **	0.66 **	1.02 **	0.35	0.93
		(0.24)	*(0.40)*	*(0.25)*	*(0.42)*	*(0.26)*	*(0.56)*
	RR_FX_DIFF	0.04	-0.43	-0.02	-0.24	0.27	-1.03
		(0.55)	*(0.58)*	*(0.60)*	*(0.65)*	*(0.60)*	*(0.85)*
	FX_RSD	-0.03	0.07	-0.05	0.01	0.01	0.22
		(0.04)	*(0.12)*	*(0.04)*	*(0.14)*	*(0.04)*	*(0.18)*
	GR_TRPR_2Q	-0.26	-0.20	-0.59 ***	-1.23 ***	-0.58 ***	-1.56***
		(0.20)	*(0.34)*	*(0.21)*	*(0.32)*	*(0.20)*	*(0.46)*
	Constant		0.03		0.65 ***		0.07
			(0.03)		*(0.20)*		*(0.08)*
	BOUNDS Test		7.59 ***		8.59 ***		6.48 ***

*Level of significance according to: * 10%, ** 5%, *** 1%.*

Table 6.4: Effect of Aggregate Expenditures On FTB in Ratio, ARDL Analysis

Furthermore, as all FTB and aggregate expenditures are in levels I(1), using VECM analysis is also possible, and the results of this analysis have yielded similar results supporting the aforementioned findings of ARDL analyses. Although G has no significant short term relation with FTB, it has a significant long term relation and error correction terms (respectively -0.93 & -0.56; and -0.52 & 0.44). Likewise, C has not got significant short term relation with FTB either, but it also has a significant long term relation and error correction terms (respectively -0.23 & -0.28; and -0.70 & 0.75). On the other hand, I not only has a significant long term relation and error correction terms (respectively -0.53 & -0.42; and -0.65 & 0.56), but also a significant short term relation (-0.63 & -0.57) as well. Furthermore, the following two tables (Table 6.5 and Table 6.6) summarize the results.

Moreover, almost in line with the ARDL models, rather similar exogenous vari-

ables have appeared to have a significant effect on FTB. The growth rate of Turkey's trading partners, except in investment model in levels, has a robust and negative impact on FTB. In addition, the reserve requirement ratio difference of TL Liabilities also has a significant and negative effect on FTB in all ratio models (even though in investment and consumption models the significance level is 10 %). However, in level analyses, the statistically meaningful effect has not been noticed in both investment and consumption models. Thus, it is only the government expenditure ratio analysis where this exogenous variable has become robust with a negative impact on FTB. Finally, in government expenditures, at the level model, the reserve requirement ratio difference of FX Liabilities also has a significant and negative effect, while in the ratio model domestic volatility has a robust and positive impact on FTB as well. The tables below, tables: Table 6.5 and 6.6, show the summarized y results of these analyses.

EFFECT OF AGGREGATE EXPENDITURES ON FTB IN LEVEL ECM ANALYSIS

		FTB		FTB		FTB	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
ENDOGENOUS VAR.	I	-0.63 ***	-0.53 ***				
		(0.20)	*(0.07)*				
	C			-0.02	-0.22 ***		
				(0.10)	*(0.03)*		
	G					-0.11	-0.93 ***
						(0.32)	*(0.16)*
	Constant	236		1510 ***		1393 *	
		(680)		*(737)*		*(732)*	
	COINTG	-0.65 ***		-0.70 ***		-0.52 ***	
		(0.18)		*(0.15)*		*(0.11)*	
	FTB	0.00		0.07		0.06	
		(0.17)		*(0.15)*		*(0.13)*	
EXOGENOUS VARIABLES	DCRISIS	504		247		-307	
		-833		*(821)*		*(856)*	
	OMO	-0.03		-0.04		-0.03	
		(0.04)		*(0.04)*		*(0.04)*	
	RR_TL_DIFF	51319		92940		77201 ***	
		(37966)		*(38403)*		*(36557)*	
	RR_FX_DIFF	-18477		-81602		-97507 **	
		(49216)		*(50764)*		*(51660)*	
	FX_RSD	7561		2907		6290	
		(9300)		*(9496)*		*(9325)*	
	GR_TRPR_2Q	-9583		-87218 ***		-99510 ***	
		(25589)		*(27868)*		*(29268)*	

*Level of significance according to: * 10%, ** 5%, *** 1%.*

Table 6.5: Effect of Aggregate Expenditures On FTB in Level, ECM Analysis

EFFECT OF AGGREGATE EXPENDITURES ON FTB IN RATIO
ECM ANALYSIS

		FTB		FTB		FTB	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
ENDOGENOUS VARIABLES	I	-0.56 ***	-0.42 ***				
		(0.22)	*(0.04)*				
	C			0.26 *	-0.95 ***		
				(0.16)	*(0.26)*		
	G					-0.04	-0.55 ***
						(0.31)	*(0.07)*
	Trend				0.00		
					(0.00)		
	Constant	235.5		0.01			
		-680.3		*(0.0)*			
	COINTGRT	-0.55 ***		-0.52 ***		-0.44 ***	
		(0.13)		*(0.11)*		*(0.10)*	
	FTB	-0.02		-0.02 ***		0.07	
		(0.15)		*(0.13)*		*(0.14)*	
EXOGENOUS VARIABLES	DCRISIS	0.00		0.00		0.00	
		(0.01)		*(0.01)*		*(0.01)*	
	OMO	-0.06		-0.07		-0.06	
		(0.05)		*(0.05)*		*(0.05)*	
	RR_TL_DIFF	0.40 *		0.41 *		0.47 **	
		(0.24)		*(0.23)*		*(0.24)*	
	RR_FX_DIFF	-0.19		-0.26		-0.41	
		(0.33)		*(0.33)*		*(0.34)*	
	FX_RSD	0.08		0.06		0.10 **	
		(0.06)		*(0.06)*		*(0.05)*	
	GR_TRPR_2Q	-0.23 ***		-0.51 ***		-0.54 ***	
		(0.11)		*(0.18)*		*(0.12)*	

*Level of significance according to: * 10%, ** 5%, *** 1%.*

Table 6.6: Effect of Aggregate Expenditures On FTB in Ratio, ECM Analysis

These results have also been supported by the Granger Causality tests. In particular the tests carried out for ratios have indicated that for all growth of *C, I, G* Granger causes FTB (However, there has not been any Granger causality from FTB to aggregate expenditures). Moreover, it has been observed in the test for levels that the growth of *I* Granger causes FTB. In addition, the growth *C+I* and *C+I+G* has been found to Granger cause FTB as well.

6.3 Effect of Real Interest Rate on Loans

Quite similar results to the ones between FTB & Aggregate Expenditures have been found out between the real interest rate & the loans. According to ARDL analysis, apart from the public loans which have only significant negative long run relation with ex-ante real interest rate (the coefficients of the level and the ratio analyses

are -15.7 k and -0.07), consumer, other (the growth rate through natural logarithms, rather than real values are used in level analysis for the other loans) and total loans all have significant long and short run negative relations, in both level and ratio models (the long term coefficients for ratio analyses of consumer, other and total loans are -2.83, -9.94 and -11.09, and short term coefficients are -0.15, -0.37 and -0.55).

Moreover, as to the fixed variables, one noticeable point is that in both level and ratio models for public loans, domestic volatility (in the short and the long run) and the crisis dummy (in the long run) have a positive and significant influence and the growth rate of Turkey's trading partners has a significant negative short run influence (in ratio analysis, furthermore a robust negative long run effect has also been observed). Thus, this would indicate that public loans might have been used to mitigate the effects of possible negative developments within the economy. A similar impact of the crisis dummy (both in the long and the short run) together with the long run significant positive impact of the growth rate of Turkey's trading partners have also been witnessed for consumer loans in the ratio analysis, although these results have not been observed in the level model. In the level models, furthermore, the growth rate of the trading partners has stood out as a robust and positive long run factor in business and total loans, and a decrease in the reserve requirement ratio difference of FX Liabilities has a positive long run effect for public loans. Similarly in the ratio models a decrease in the reserve requirement ratio difference of FX Liabilities also has a positive long run effect for both business and total loans. Lastly, in total loans the crisis dummy and the growth rate of the trading partners have robust long run impact as well. The results have been summarized in the following Table 6.7 and Table 6.8.

EFFECT OF REAL INTEREST RATE ON LOANS IN LEVEL
ARDL ANALYSIS

		Business Loans (#)		Consumer Loans		Public Loans		Total Loans	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
DYNAMIC VAR.	RLON2	-0.66 **	-0.47***	-21043 *	-816312 *	-1547	-15715 ***	-0.61 **	-0.37 **
		(0.31)	(0.12)	11959	480843	393	4066	(0.27)	(0.15)
	COINTG	-0.99 ***		-0.03 ***		-0.25 ***		-0.72 ***	
		(0.15)		(0.00)		(0.05)		(0.14)	
FIXED VARIABLES	DCRISIS	-0.04	-0.01	1692	19130	393	2735 ***	-0.03	-0.01
		(0.03)	(0.03)	(1360)	(28922)	(317)	(1000)	(0.03)	(0.03)
	RRL_OMO	0.00	0.00	0.03	0.15	0.00	0.01	0.00	0.00
		(0.00)	(0.00)	(0.03)	(1.54)	(0.01)	(0.04)	(0.00)	(0.00)
	ZR_TL_3MLONG_DIF	1.28	0.95	-57	-982468	9253	47316	1.20	1.02
		(1.11)	(1.02)	(44576)	(1306064)	(9732)	(32681)	(0.97)	(1.28)
	ZR_YP_3MLONG_DIF	-2.06	-0.49	-625	1096892	-6441	-86170 *	-1.66	-0.46
		(2.69)	(1.48)	(114412)	(2546608)	(23552)	(49092)	(2.36)	(1.84)
	FX_RSD	-0.41	-0.81	12357	-72361	5923 **	28142 *	-0.19	-0.81
		(0.29)	(0.50)	(11359)	(551011)	(2530)	(16356)	(0.25)	(0.63)
	WR2_GR_2Q	1.06	2.11 ***	46299	2151404	-18026 **	-33307	0.52	2.13 **
		(0.93)	(0.75)	(37162)	(2147217)	(8501)	(25060)	(0.81)	(0.94)
	Constant		0.07 ***		170131 *		5477 ***		0.07 **
			(0.02)		(88834)		(727)		(0.03)
BOUNDS Test			12.40 ***		7.50 ***		7.40 ***		6.94 ***

*Level of significance according to: * 10%, ** 5%, *** 1%.*
 # Growth of business loans is used

Table 6.7: Effect of Real Interest Rate On Loans in Level, ARDL Analysis

EFFECT OF REAL INTEREST RATE ON LOANS IN RATIO
ARDL ANALYSIS

		Business Loans		Consumer Loans		Public Loans		Total Loans	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
DYNAMIC VAR.	RLON2	-0.37 ***	-9.94 *	-0.15 **	-2.83 ***	-0.02	-0.07 **	-0.55 ***	-11.09 ***
		(0.13)	(5.87)	(0.06)	(0.50)	(0.02)	(0.03)	(0.15)	(3.13)
	COINTG	-0.04 ***		-0.07 ***		-0.29 ***		-0.05 ***	
		(0.00)		(0.01)		(0.06)		(0.00)	
FIXED VARIABLES	DCRISIS	0.00	0.18	0.02 ***	0.24 ***	0.00	0.02 **	0.02	0.52 *
		(0.01)	(0.27)	(0.01)	(0.09)	(0.00)	(0.01)	(0.02)	(0.26)
	OMO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		(0.01)	(0.00)	-	(0.00)	-	-	-	(0.00)
	RR_TL_DIFF	0.21	8.54	-0.14	-4.08	0.06	0.27	0.08	1.38
		(0.47)	(12.52)	(0.23)	(3.01)	(0.08)	(0.23)	(0.56)	(8.86)
	RR_FX_DIFF	-2.05 *	-38.30 *	0.04	2.08	-0.02	-0.37	-2.09	-29.17 **
		(1.18)	(22.43)	(0.58)	(4.79)	(0.19)	(0.34)	(1.42)	(13.21)
	FX_RSD	0.04	-1.48	0.09	0.12	0.05 **	0.23 *	0.17	0.13
		(0.12)	(5.15)	(0.06)	(1.33)	(0.02)	(0.12)	(0.14)	(4.24)
	GR_TRPR_2Q	0.47	22.75	0.17	6.03 *	-0.15 **	-0.32 *	0.52	24.80 *
		(0.39)	(19.21)	(0.19)	(3.38)	(0.07)	(0.18)	(0.47)	(13.22)
	Constant		1.71 **		0.66 ***		0.03 ***		2.15
			(0.72)		(0.09)		(0.01)		(0.39)
BOUNDS Test			15.23 ***		6.06 ***		9.63 ***		18.14 ***

*Level of significance according to: * 10%, ** 5%, *** 1%.*

Table 6.8: Effect of Real Interest Rate On Loans in Ratio, ARDL Analysis

As for VECM analysis[81], however, in both ratio and level models, there is not any convergence (Although error correction terms are negative, they are not statistically robust), so no long run relation has been observed. A probable explanation for this outcome would be that the fall in interest rates has started to affect consumption expenditures, in particular via mortgage loans, only after they have fallen below a threshold level (Ratio of monthly installments to monthly income). However on the other hand, an expected negative long run relation and convergence has been detected for the rest of all business, public and total loans (the long term relation and error correction coefficients for ratio analyses of business, public and total loans are respectively -0.32 & -0.64, -0.05 & -0.28 and -12.40 & -0.03). One last noticeable finding would be that real interest rate has a statistically significant short run (rather unexpectedly) positive relationship on public loans. A possible reason for this result could also be the effects of counter cyclical policies implemented.

Furthermore, in both level and ratio models, similar results have been witnessed in exogenous variables. The growth rate of the trading partners has a robust and positive effect on the business and total loans, while a negative effect on the public loans. , f Finally, the crisis dummy has a positive and significant role in the public loan model as well. The following two tables (Table 6.9 and Table 6.10) summarize the results.

EFFECT OF REAL INTEREST RATE ON LOANS IN LEVEL
ECM ANALYSIS

		Business Loans (#)		Consumer Loans		Public Loans		Total Loans	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
ENDG. VAR.	RLON2	-3782	-9336559 ***			7766 ***	-13301 ***	8988	-4432908***
		(28468)	(2372762)			(2641)	(3305)	(37732)	(1066748)
	COINTG	-0.01 ***		No convergence		-0.26 ***		-0.01 ***	
		(0.00)				(0.07)		(0.00)	
EXOGENOUS VAR.	DCRISIS	-1974				590 ***		-1249	
		(1962)				(199)		(2580)	
	OMO	0.12				0.00		0.12	
		(0.11)				(0.01)		(0.15)	
	RR_TL_DIFF	101857				12894		94503	
		(80140)				(7199)		(105612)	
	RR_FX_DIFF	-207357				-19026		-205037	
		(117395)				(11136)		(154824)	
	FX_RSD	19032				2766		21346	
		(33000)				(3094)		(43129)	
	GR_TRPR_2Q	94409 *				-14074 **		136054 *	
		(51512)				(5759)		(69516)	

*Level of significance according to: * 10%, ** 5%, *** 1%.*

Table 6.9: Effect of Real Interest Rate On Loans in Level, ECM Analysis

[81]Since both real interest rate and the loans are I(1), the conditions to carry out this analysis are satisfied.

EFFECT OF REAL INTEREST RATE ON LOANS IN RATIO
ECM ANALYSIS

		Business Loans		Consumer Loans		Public Loans		Total Loans	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
ENDG. VAR.	RLON2	-0.22	-0.32 **			0.05 *	-0.05 **	0.19	-12.40 ***
		(0.34)	(0.13)			(0.02)	(0.02)	(0.20)	(2.10)
	COINTG	-0.64 ***		No convergence		-0.28 ***		-0.03 ***	
		(0.18)				(0.07)		(0.01)	
EXOGENOUS VARIABLES	DCRISIS	0.03				0.00 **		0.02	
		(0.02)				(0.00)		(0.01)	
	OMO	0.12				0.00		0.05	
		(0.22)				(0.01)		(0.12)	
	RR_TL_DIFF	0.16				0.07		0.24	
		(0.89)				(0.06)		(0.51)	
	RR_FX_DIFF	-0.44				-0.08		-1.11	
		(1.37)				(0.09)		(0.81)	
	FX_RSD	-0.03				0.04		-0.01	
		(0.41)				(0.03)		(0.26)	
	GR_TRPR_2Q	1.84 ***				-0.12 *		0.85 **	
		(0.66)				(0.06)		(0.42)	
	Constant					0.00		0.01	
						(0.00)		(0.01)	

*Level of significance according to: * 10%, ** 5%, *** 1%.*

Table 6.10: Effect of Real Interest Rate On Loans in Ratio, ECM Analysis

Besides these, the results of VAR analysis closely support these results. In particular, the impulse response results of the ratio analyses have shown that both business and consumer loans, as well as total loans show significant negative reactions to real interest rate shocks (at a 5% level). Public loans, in the meantime, though have no significant negative reaction observed in neither level nor ratio analyses. Likewise, the impulse response results of the level analyses have also shown that while consumer, business and total loans show a significant negative reaction at a 5% level, public loans show no significant negative reaction to the interest rate shocks which are not statistically significant (at a 5% level)[82]. The related graphs are presented in Appendix, chapter 9.5 as well.

Furthermore, the Granger Causality test for the effect of real interest rates on loans has shown for real interest rates Granger causes of only the growth of other (business) loans (observed both in level and ratio analyses). However, there has not been any Granger causality found on neither separately growths of consumer and public loans, nor on the growth of total or private loans[83].

6.4 Effect of Loans on Aggregate Expenditures

As to the relations of aggregate expenditures to the changes in the loans, the results of ARDL analysis have indicated that there is a long run relationship between other

[82]These are the responses of Monte Carlo 1000 repetitions
[83]Total loans excluding public loans

(business)[84] and consumer loans and aggregate investment and consumption expenditures respectively. Both level and ratio analyses have yielded supportive results (the cointegration coefficients for other loans, in order, are -0.16 and -0.25; while that of consumer loans are -0.21 and -0.60 respectively). Furthermore, for consumer loans in level analysis both short and long term coefficients have been found to be significant (respectively they are 0.76 and 0.37) while in ratio analysis only the short term coefficient is significant and it is 0.39. For business loans, although level and ratio analyses have shown a significant short term relation, only in level analysis is there a significant (at a 10 % level) long run relation while there is no such relation in ratio analysis (the coefficient of the significant long run model is also 0.04). Finally for the effect of public loans on aggregate government expenditures, in level analysis there has been no significant convergence found. On the other hand, in ratio analysis comparatively with the rest of the loans, just a slim relation has been observed: in this, the coefficient of the significant (at a 10 % level) long run relation is also 0.49.

Besides these, in the level analysis, there are two fixed variables observed to have robust both long and short run effects. The first one is the growth rate of Turkey's trading partners. It has a positive impact on FTB in the investment model. The other fixed variable is volatility in Turkey. It has a negative influence on FTB in the total loans model. This volatility also has a statistically meaningful negative short run impact on I and C as well. Additionally, open market operations as another fixed variable has stood out having a negative short run impact on C and CIG in the related models. In addition, in the ratio models, the impact of these fixed variables has been witnessed more evidently. Domestic volatility has a significant short and long run effect on all expenditures except I. Interestingly, OMO and the growth rate of the trading partners have a robust but opposite effect for I and C: they have a positive short and long impacts for the former and short and long impacts for the latter in the related models. Finally, the crisis dummy has also a negative effect on C. The following tables (Table 6.11 and Table 6.12) consist of the brief results of the analyses.

[84]For the investment expenditures in level analysis, the sum of other and consumer loans has been used.

EFFECT OF LOANS ON AGGREGATE EXPENDITURES IN LEVEL
ARDL ANALYSIS

		I (#)		C		G		CIG	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
DYNAMIC VAR.	CONOTHLN	0.13 **	0.04 *						
		(0.02)	*(0.02)*						
	CONLN			0.76 ***	0.37 ***				
				(0.11)	*(0.08)*				
	PUBLN					0.15	-2.01		
						(0.19)	*(50.30)*		
	TOTLN							0.43 ***	0.09
								(0.05)	*(0.12)*
	COINTG	-0.16 ***		-0.21 ***		0.00 **		-0.11 ***	
		(0.03)		*(0.05)*		*(0.00)*		*(0.02)*	
FIXED VARIABLES	DCRISIS	-876	-3396	-1865	-7103	-545	-48153	-1868	-14984
		(760)	*(4159)*	*(1685)*	*(7208)*	*(529)*	*(615355)*	*(2242)*	*(19412)*
	OMO	0.02	0.20	-0.11 ***	-0.34	0.01	1.61	-0.08 *	-0.43
		(0.0)	*(0.2)*	*(0.0)*	*(0.3)*	*(0.0)*	*(20.3)*	*(0.0)*	*(0.7)*
	RR_TL_DIFF	-14237	-61177	42847	179445	32727 *	1925722	32567	43940
		(24363)	*(128004)*	*(54706)*	*(239801)*	*(17527)*	*(25455347)*	*(73308)*	*(569764)*
	RR_FX_DIFF	53665	280493	-55977	2601	-37056	-2470146	40698	619754
		(63628)	*(194615)*	*(143273)*	*(351566)*	*(42.0 k)*	*(30549740)*	*(195240)*	*(851649)*
	FX_RSD	-8007 *	-61161	-16727 *	-109259	-3681	-1188517	-44888 ***	-481309 *
		(4056)	*(38192)*	*(8910)*	*(76382)*	*(2932)*	*(14375713)*	*(13219)*	*(253453)*
	GR_TRPR_2Q	38325 *	257156 **	-38670	-118710	5764	-1686703	-14350	-237153
		(20130)	*(92980)*	*(46480)*	*(206559)*	*(15247)*	*(22031592)*	*(63273)*	*(468022)*
	Constant		17271 ***		82167 ***		147690		137992 ***
			(3097)		*(6631)*		*(1728425)*		*(23508)*
	BOUNDS Test		4.19 **		4.00 **		1.33		4.51 **

*Level of significance according to: * 10%, ** 5%, *** 1%.*

 # Sum of consumer and other loans are used for the model for aggregate investment

Table 6.11: Effect of Loans On Aggregate Expenditures in Level, ARDL Analysis

EFFECT OF LOANS ON AGGREGATE EXPENDITURES IN RATIO
ARDL ANALYSIS

		I		C		G		CI (#)	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
DYNAMIC VAR.	OTHLN	0.07 ***	0.01						
		(0.03)	*(0.03)*						
	CONLN			0.39 ***	0.00				
				(0.08)	*(0.02)*				
	PUBLN					0.13	0.49 *		
						(0.16)	*(0.27)*		
	TOTLN							0.17 ***	-0.01
								(0.04)	*(0.02)*
	COINTG	-0.25 ***		-0.60 ***		-0.33 ***		-0.33 ***	
		(0.04)		*(0.09)*		*(0.10)*		*(0.05)*	
FIXED VARIABLES	DCRISIS	0.00	-0.01	0.00	-0.01 *	0.00	0.00	0.00	-0.01
		(0.01)	*(0.02)*	*(0.01)*	*(0.01)*	*(0.00)*	*(0.01)*	*(0.01)*	*(0.02)*
	OMO	0.05 **	0.23 *	-0.08 ***	-0.13 **	0.00	-0.01	-0.04	-0.07
		(0.02)	*(0.13)*	*(0.02)*	*(0.06)*	*(0.01)*	*(0.06)*	*(0.03)*	*(0.14)*
	RR_TL_DIFF	-0.13	-0.54	0.09	0.15	0.06	-0.06	-0.09	-0.51
		(0.16)	*(0.57)*	*(0.20)*	*(0.29)*	*(0.12)*	*(0.27)*	*(0.26)*	*(0.73)*
	RR_FX_DIFF	0.13	1.07	-0.37	0.27	-0.19	-0.43	-0.23	1.28
		(0.42)	*(0.89)*	*(0.49)*	*(0.42)*	*(0.28)*	*(0.42)*	*(0.66)*	*(1.09)*
	FX_RSD	-0.04	-0.27	-0.09 ***	-0.17 *	-0.04 **	-0.16 *	-0.20 ***	-0.72 **
		(0.03)	*(0.17)*	*(0.03)*	*(0.10)*	*(0.02)*	*(0.09)*	*(0.05)*	*(0.27)*
	GR_TRPR_2Q	0.36 ***	1.69 ***	-0.39 **	-0.63 **	-0.02	-0.30	-0.11	0.31
		(0.13)	*(0.45)*	*(0.16)*	*(0.25)*	*(0.10)*	*(0.24)*	*(0.21)*	*(0.56)*
	Constant		0.16 ***		0.71 ***		0.12 ***		0.91***
			(0.02)		*(0.01)*		*(0.01)*		*(0.02)*
BOUNDS Test			5.72 ***		13.83 ***		4.96 **		6.86 ***

*Level of significance according to: * 10%, ** 5%, *** 1%.*

 # CI is used as CIG/GDP leads to a value very close to 1.

Table 6.12: Effect of Loans On Aggregate Expenditures in Ratio, ARDL Analysis

As all loan types and aggregate expenditures are in levels I(1), using VECM analysis is also possible. It can be stated that the results are quite in line with those of ARDL analysis. Initially, there is a significant convergence in aggregate consumption and consumer loans in the short and long terms which has been observed in both level and ratio analysis (The related error correcting terms are 0.24 and 0.58). Moreover, in level analysis both long and short term significant relations have been found (the related coefficients for the effects of consumer loans on consumption expenditures are 0.34 and 0.68). In addition, although there is a significant short term effect of consumer loans on consumption expenditures (the coefficient is 0.27), there has not been a significant long term relation observed in ratio analysis. A somewhat similar result has been obtained for other (business) loans for aggregate investment expenditures. There is a significant convergence between them for both level and ratio analysis (the related error correcting terms are 0.02 and 0.21), and in the level analysis a significant long term relation has been witnessed (the coefficient for the effect of other loans over investment expenditures is 0.90) though in ratio analysis, just like consumer loans, no significant coefficient has been found. For the short term relation, unlike the effect of consumer loans on consumption expenditures, there has

not been any significant coefficient detected between other loans and investment expenditures. As to the effect of public loans over aggregate government expenditures, however, there has been no converging or and cointegrating relations have been found out in either both level or and ratio analyses. Similarly no there has not been any converging or and cointegrating relations have been witnessed in the total loans on *CIG* in the level model either.

For exogenous variables, domestic volatility has stood as most prominent. In both level and ratio analyses and for all converging models, it has a negative and significant short run effect. Just like ARDL ratio models, OMO and the growth rate of the trading partners have a robust but opposite effect for I and C: they have a positive impact on the former and a negative impact on the latter in the related models. Apart from these, in level analysis the crisis dummy has been observed as having a significant short run impact on I as well. Moreover, the tables below (Table 6.13 and Table 6.14) contain the summarized results.

EFFECT OF LOANS ON AGGREGATE EXPENDITURES IN LEVEL ECM ANALYSIS

		I		C		G		CIG	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
ENDOGENOUS VARIABLES	Other Loans	-0.06	0.90 ***						
		(0.04)	(0.22)						
	Consumer Loans			0.68 ***	0.34 ***				
				(0.21)	(0.07)				
	Public Loans								
	Total Loans								
	Trend								
	Constant				-82118 ***				
					(4104)				
	Cointegration	-0.02 ***		-0.24 ***		No convergence		No convergence	
		(0.01)		(0.07)					
	I	0.45 ***							
		(0.14)							
	C			0.03					
				(0.14)					
	G								
	CIG								
EXOGENOUS VARIABLES	DCRISIS	-1446 ***		-970					
		(580)		(1183)					
	OMO	0.03		-0.07					
		(0.03)		(0.06)					
	RR_TL_DIFF	26977		27446					
		(23172)		(49611)					
	RR_FX_DIFF	20159		8534					
		(37316)		(74540)					
	FX_RSD	-10532 *		-35244 ***					
		(5788)		(13381)					
	GR_TRPR_2Q	15456		705					
		(12575)		(28408)					

*Level of significance according to: * 10%, ** 5%, *** 1%.*

Table 6.13: Effect of Loans On Aggregate Expenditures in Level, ECM Analysis

EFFECT OF LOANS ON AGGREGATE EXPENDITURES IN RATIO
ECM ANALYSIS

		I		C		G		CI	
		Short Run	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run
ENDOGENOUS VARIABLES	Other Loans	-0.01	-0.02						
		(0.03)	*(0.03)*						
	Consumer Loans			0.27 ***	0.00				
				(0.11)	*(0.01)*				
	Public Loans								
	Total Loans							0.07	-0.02
								(0.06)	*(0.03)*
	Trend								0.00
									(0.00)
	Constant		0.16 ***		-0.71 ***			0.00	
			(0.02)		*(0.01)*			*(0.00)*	
	Cointegration	-0.21 ***		-0.58 ***		*No convergence*		-0.15 ***	
		(0.06)		*(0.11)*				*(0.07)*	
	I	0.27 ***							
		(0.11)							
	C			0.03					
				(0.11)					
	G								
	CI							0.11	
								(0.13)	
EXOGENOUS VARIABLES	DCRISIS	0.00		0.00				0.00	
		(0.00)		*(0.00)*				*(0.01)*	
	OMO	0.04 *		-0.07 *				-0.03	
		(0.03)		*(0.03)*				*(0.05)*	
	RR_TL_DIFF	-0.09		-0.02				-0.07	
		(0.13)		*(0.16)*				*(0.24)*	
	RR_FX_DIFF	0.14		0.27				0.13	
		(0.20)		*(0.25)*				*(0.35)*	
	FX_RSD	-0.06 *		-0.14 ***				-0.22 ***	
		(0.03)		*(0.04)*				*(0.07)*	
	GR_TRPR_2Q	0.34 ***		-0.17 *				0.03	
		(0.08)		*(0.10)*				*(0.17)*	

In Ratio analysis CI is used as CIG/GDP leads to a value very close to 1.
*Level of significance according to: * 10%, ** 5%, *** 1%.*

Table 6.14: Effect of Loans On Aggregate Expenditures in Ratio, ECM Analysis

On the other hand, the results of the Granger Causality tests have shown rather mixed results. The growth in other loans and the growth of I Granger causes of each other. This has been found in both level and ratio analyses[85] (if a % 5 significance level is based, then in ratio analysis the growth in other loans Granger causes growth of I, as the p value for the test for Granger causality of growth of I over growth in other loans is 0.066). For consumer loans, in levels, the growth in C Granger causes the growth of consumer loans, however there has not been any Granger causality

[85]Moreover There is also a Granger causality from the growth of I to the growth in the sum of consumer and other loans as well, at a 5 % level.

found in ratio analysis. For public loans, like other loans, there is a two way Granger causality between their growth and the growth of G (and just like other loans, if a 5 % significance level is based, then in ratio analysis, the growth of G Granger causes the growth in public loans, as the p value for the test for Granger causality of the growth in public loans over the growth of G is 0.084). As to total loans, it has also been observed that the growth of $C+I+G$ Granger causes the growth in total loans as well.

6.5 Robustness Checks

The robustness check of these results has also been carried out through the inclusion of several related variables to the models, such as: net FDI, global interest rate, oil prices, public deficit, variance in global (VIX[86]), emerging market (EMBI) and Turkey specific risk (CDS[87]), as these variables have been stated as the possible factors with potential to affect FTB balance and/or monetary transmission mechanism in Turkey.

In terms of ARDL analysis, when *Brent* (crude oil price) was controlled, the results for other (business) loans and the total loans slightly changed. In ratio analyses, while in the long run the coefficients of these loans decreased, their "p" values increased however they were still significant at 5 % and 10 % respectively. In addition, *Brent* also turned out to have a negative long run effect on FTB with a 10 % significance level[88]. In the model on levels, though, *Brent* only had a short run noticeable negative impact (at 10 % and 5 % levels). In the long run, while the coefficients of the business loans, *I*, and *Rrl Priv Frn Debt S* dropped somewhat and their standard errors rose, they still stayed significant in the business loans model. In the total loans model, the only affected variable was *REER* which became insignificant. However, it could be stated that the main influence of *Brent* was on the models for both consumer and public loans. In both level and ratio analysis, the Bounds test was conducted and the convergence of the public loans improved materially (surpassed the 1 % level). Furthermore, in the ratio models of both loans, *Brent* itself had a statistically material negative effect on FTB (at 5 % level) as well. In the level analysis, moreover, it had a negative significant influence only in the short run. Apart from these results, the other point worths mentioning is that in the level analysis for public loans, a small drop was observed in the coefficient and the significance level of *rrl_CIG* in the long run. Furthermore, as for EMC models, the main noticeable change occurred in consumer loans, in which both long and short run positive coefficient of consumer loans on consumption expenditures

[86]As explained in the previous section, VIX is defined as the ticker symbol for the Chicago Board Options Exchange (CBOE) Volatility Index, manifesting the market's expectation of 30-day volatility. It is set up via the implied volatilities of a wide range of S&P 500 index options.

[87]As already explained in the "Variables" section, credit default swap is a particular type of swap set up to transfer the credit exposure of fixed income products between two or more parties. It can be defined as, in effect, an insurance against non-payment, while here it is the insurance against the default risk of Turkish sovereign bonds

[88]Increase in the price of Brent crude oil leads to depreciation in foreign trade balance, as rather expected.

lost its significance, although the long run significant convergence between consumer loans and consumption expenditures remained unaffected. Moreover, in the level models, the significance of the ECM terms vanished for both other and total loans in their relation with real interest rate, and the long run relationship coefficient of the real interest rate on public loans changed from negative to positive. However, all these results were still not supported by the ratio analyses. In the unrestricted VAR impulse response analyses, however, there was no material effect observed when *Brent* was controlled (neither in the transmission models nor the models on the effect of real interest rates on loans). As to fixed variables in ARDL models in level, both at the short and long runs, the trade partners' "negative" growth rate impact lost its significance (at 10 %) in the total loans channel. In addition, the negative effects of the crisis dummy (in the long run) and *OMO* (in the short run) also lost their robustness (at 10 %) in the consumer loan channel[89]. Two of these results were supported by the ratio models: in the short run, the negative influence of *OMO* for the consumer loan channel and the trade partners' "negative" growth rate impact on the total loans (both at the 10% level) have disappeared. Besides these, in the short run, *OMO* also lost its negative and significant effect in business loan channel. Additionally, the reserve requirement ratio difference of FX liabilities also had a statistically meaningful (at 10%) positive long run influence on the public loan channel.

Next, unlike *Brent*, when *EMBI* was controlled, both the level and ratio models of consumer and public loans were almost unaffected. The main noticeable change was witnessed in the models for business and other loans where although both coefficients and the statistical significance of I and CIG[90] somewhat decreased in both level and ratio analyses, the expenditures were still robust (their p values being around the 2% level). Besides these, *EMBI* itself also had no significant coefficient as well. Moreover, it was observed that fixed variables in ARDL models were almost not affected by *EMBI*. For both ratio and level models there were just one short run and two long run changes witnessed. For the business loan channel in the long run, the reserve requirement ratio difference of TL liabilities became insignificant in the level analysis, likewise the reserve requirement ratio difference in FX liabilities also turned out to be insignificant in the ratio analysis (they both had a negative and significant effect at a 10 % level in the base models). In addition, in the short run for the total loans of the ratio model, the negative impact (at 10 %) of the growth rate of the trading partners also disappeared. For ECM analysis, however, with the inclusion of *EMBI*in level analysis, a significant convergence and long run positive relation between public loans and government expenditures came out, in contrast to the full transmission model. This result, on the other hand, was not supported via the ratio analysis. Moreover, a possible explanation of this picture is also that, looking at the results of normality tests like Jarque-Bera, which shows the rejection of a normal distribution, so standard errors would lead to erroneous results in setting the convergence decision. Supporting the above results, the main

[89]There was no noticeable change witnessed for the business and public loan channels

[90]*RatCI* in ratio analysis

effect of using *EMBI* as an exogenous control variable was that the response of the investment expenditures to a monetary shock turned out to be insignificant in the monetary transmission model in the ratio analysis. However, in level analysis such an outcome was not detected.

As to *Turkey CDS*, it yielded rather similar results to *Brent*, when *Turkey CDS* is controlled, in level analysis, using the Bounds test, so the convergence of public loans improved considerably (surpassing the 1 % level). Moreover, in the level models of public and consumer loans, *Turkey CDS* had a small but statistically robust negative effect on FTB (at 10 % and 5 %) in both short and long terms. Besides these, in ratio analysis, apart from consumer loans, in all three loan models, *Turkey CDS* had a similar small but statistically strong negative effect (at a 5% level) on FTB, but only in the short run. In addition, the statistical robustness of the business loans and *Rrl Priv Frn Debt S* also decreased in the long run at both level and ratio analyses[91]. The effect of controlling the *Turkey CDS* on total loan models was witnessed mainly in the short run. In both ratio and level models, though both the coefficient and the statistical power of total loans (on FTB) decreased, total loans still maintained their position to be one of statistically significant variable. Moreover, it could be stated that fixed variables in ARDL analyses were not materially influenced by *Turkey CDS*. It is merely the growth rate of the trading partners which, in the business loan channel of the level analysis became significant (at 10 %) with a negative effect in the short run, and another negative and statistically meaningful impact (at 10 %)in the long run in the total loan channel of the ratio analysis. With respect to ECM analyses, the noteworthy outcome is that quite similar to the control of *EMBI*, in level analysis, a significant convergence and long run positive relation between public loans and government expenditures was observed. Moreover, just like the *EMBI* case, this result was not supported by the ratio analysis, and the residuals of the model had a normality issue in residual distribution as well. Besides these, in the ratio analyses the long run significant impact of real interest rate on public loans has disappeared and the ECM term in consumer loans and real interest rate turned out to be significant. However these findings were not confirmed by the level analyses. As to VAR models, almost parallel results to the *EMBI* control were spotted. As *Turkey CDS* was used as an exogenous control variable, in both level and ratio analyses, the response of the investment expenditures to a monetary shock did not become significant in the monetary transmission model. Apart from this result, the results of the other VAR analyses were not materially different.

Thus, it could be claimed that among the control variables, *FDI* has the least impact on the models. There was almost no change in the level models (just a small drop in the absolute value of the negative long run coefficient of public loans was observed, but it is not enough to lose the significance). In addition, in the ratio models, the main effect would be that both the short and long run effect of total loans slightly weakened (however both p values were still less than 2 %), and similarly in the long run another slight decrease in the significance has been observed

[91]Although *Rrl Priv Frn Debt S* turned out to be not statistically significant in level analysis, it stayed statistically significant in ratio analysis, and business loans have also maintained their significance at a 5 % level.

for emphRat CI[92]. Moreover, as for the fixed variables, there were only two long run changes observed. The first one is that RR_TL_DIFF lost its negative significant (at a 10 % level) effect[93] on FTB, and the second one is also that the growth rate of the trading partners turned out to have a statistically meaningful negative impact on FTB in the total loans channel of the ratio model. In terms of ECM analyses, the major change was observed in consumer loans. After the inclusion of *FDI* all long and short run relations together with the convergence between consumer loans and consumption expenditures lost their significance. In addition, the long run significance of the effect of real interest rate on public loans in the ratio model also disappeared although this was not backed by the level analysis. Similar with the ARDL and ECM models, the results of the VAR models did also not noticeably change under the control of *FDI*.

Next, when *VIX* is also used as a control variable, in ARDL transmission models the results of consumer loans did not change; however, the results of the other loans led to mixed conclusions. *REER* for instance, in the level analyses, while its coefficient rose somewhat (so that its p value dropped in parallel) in public loans, an opposite situation resulted in total loans. However, it stayed the same as a statistically meaningful variable. Other than these, *VIX* by itself was a significant variable in the short run with a positive effect on business loans in both level and ratio models and with the same effect on total loans in the level analysis[94]. One more thing worth mentioning is the slight decrease in the (absolute value) coefficient of *RAT_CI*. Yet, like the impact on *REER*, this was not strong enough for *RAT_CI* to lose its statistical significance at the 5 % level. As for ECM models, the main change is that the long run significant impact of real interest rate on public loans disappeared in the ratio model which was not supported by the level analysis though. Besides these, there were four fixed variables in ARDL analyses which showed a noticeable change. The first one is GR_TRPR_2Q; in both the short and long run of the level analysis it lost its significant (10 % level) negative effect on FTB in the total loan channel. Likewise, the crisis dummy also became non-significant (previously it was statistically robust at the 10% level, though it still had a negative coefficient after the inclusion of *VIX*) in the consumer loan channel of the level analysis. Open market operations was the other fixed variable which changed and become an insignificant variable[95] in the short run of the business loan channel at ratio analysis. The final variable was RR_FX_DIFF which, contrary to the other fixed variables, turned out to be significant (at 10%) and have a positive impact on FTB in the long run of the consumer loan channel of the ratio model. As to VAR analyses, just like the control of *Brent*, there were no outstanding changes noticed when *VIX* was controlled.

Afterwards, in order to observe if the effect of fiscal dominance on the transmission mechanism really became weakened and ignorable compared with the pre-2000 era [96], central government budget cash deficit (RAT_PUB_DEF) were also controlled.

[92]Just like with total loans the p value of emphRat CI was still 1.6%.

[93]the new p value was just above 10 %, by being 10.37 %

[94]Hence, an increase in the global volatility positively impacts FTB in Turkey.

[95]Previously it was statistically meaningful at the 10 % level

[96]It has been argued that after May 2006, when global liquidity conditions changed against

The results , in general, supported the negligibility of the fiscal dominance. Although *RAT_PUB_DEF* had itself a significant short and long run negative impact on FTB in both level and ratio analysis for total loans (at a 10 % level), and ratio analysis for public loans together with a statistically robust negative effect in public, business and consumer loan analyses in levels (at 5, 10, and 1 % levels respectively), it should be stated that there was no material change in the coefficients of the variables in the transmission channel in ARDL models. In particular, for this variable, the results of the public loan models attract special attention. From this angle, it would be claimed that even though the coefficients of government expenditures both in short and long run became more negative (as expected), they still stayed insignificant. For the fixed variables at the ratio ARDL models in the long run, for all business, consumer and public loans channels, the reserve requirement ratio difference of FX Liabilities turned out to be robust with a positive effect on FTB (but merely at a 10 % level). These results, however, were not supported by those of level analyses. There, at the short & long runs, trade partners' negative growth rate lost its significance (at 10 %) in the total loans channel. Plus, in the long run for business and consumer loans channels, the reserve requirement ratio difference of TL liabilities and the crisis dummy also lost their significance respectively as well (all of which in the base model were significant just at a 10% levels). As for ECM models, the main observation would be that in the ratio analysis, the long run significant effect of real interest rate on public loans vanished although this was not supported by the level analysis. The material change observed in VAR models, once *RAT_PUB_DEF* is used as a control variable, is the following: In the ratio analysis of the monetary transmission channel of business loans, the reaction of investment expenditures to a monetary shock turned out to be insignificant. However, this change was not witnessed in the level analysis.

The next variable used as a control is the global interest rate *R_GLOB* as the difference between these rates and the rates of an emerging open economy is stated to be one of the factors for funds flowing into and out of that economy, as in like Mundell-Fleming and Dornbusch Sticky Price models [23, pp.175-220] in theory. It has been observed that the major change took has taken place in the ratio analysis analyses, where public loans became has become significant (at 10 % level) in at both the short and long run. However, rather than being the expected negative, the coefficients have turned out to be positive. The other noticeable change is in total loans where previously significant variables of FTB, the real interest rate and total loans have turned out to be not statistically material. The reason for this is that the negative coefficients have decreased in abso- lute value, and the relative standard errors rose have somewhat risen. Apart from these results, it can be summarized

developing countries, Turkey's risk premium rose, and TL depreciated by 20 % against USD. So the CBRT reacted by increasing the policy rate by 4 %, which resulted in an 18 % appreciation of TL. This showed that fiscal dominance had faded away, since if it were effective then, the rise in interest rates would have been perceived as an upsurge in default risk due to a high debt burden, hence would have resulted in a rise in the risk premium of Turkey, thus resulting capital outflows would have led to a depreciation in TL, which would have undermined the conventional functioning of the uncovered interest rate parity theorem.[15, p.477]

that *R_GLOB* had has no other noticeable impacts on the results. Moreover, its own coefficients have also carried no statistically robust values as well. Besides these, for the fixed variables in the ARDL models, the main change took has take place in the total loan channel, where the negative impact of the growth rate of the trading partners on FTB in both the long and short run in the level analysis, and in the short run of the ratio analysis has turned out to be not significant any more (in the base model, all these three variables are significant at a 10 % level). Similarly, the crisis dummy also lost its significance in the consumer loan channel in the level model as well (its significance level is also 10 %). Interestingly, RR_FX_DIFF is the only variable which became statistically meaningful (at 10 %) in the long run for public loans with a positive effect on FTB. As to EMC models, the main noticeable change occurred in consumer loans, where the long run positive coefficient of consumer loans on consumption expenditures lost its significance, although the long run significant convergence between consumer loans and consumption expenditures, and the positive short run impact of the loans on the expenditures remained unchanged. In addition, the ECM term in the consumer loans and the real interest rate ratio model turned out to be significant, however this outcome was not supported by the level analysis. So As the observations for the VAR models were have been rather in line with the findings of the ARDL models. When *R_GLOB* is controlled, the response of government expenditures to a monetary policy innovation becomes significant and negative in the transmission mechanism model in ratio. Moreover, in this model, previously the positive response of the FTB to the monetary policy innovations after the 3^{rd} and 4^{th} quarter, changed and almost became insignificant (being barely significant at a 10 % level). But on the other hand, similar results were not detected in the level analysis, where the inclusion of *R_GLOB* did not lead has not led to a significant difference in the monetary transmission mechanism for the public loan channel. Likewise, when *R_GLOB* was controlled, in the ratio analysis of the effect of real interest rate on loans VAR model, the response of public loans to interest rate shock also became significant and negative. However, as in the case of like the transmission channel case, the level analysis did have not yielded a similar significant result.

Finally, the following two tables (Table 6.15 contains the level analyses, while table 6.16 comprises ratio analyses) present a summary of the overall results.

ANALYSES IN LEVEL

	VECTOR AUTO REGRESSIVE MODEL	ERROR CORRECTION MODEL COINTEGRATION - JOHANSEN	AUTO REGRESSIVE DISTRIBUTED LAG MODEL Short Run	 Long Run
Total Loans	r → Loan growth (-) r → Growth of Real Effective Exchange rate (+) r → Foreign Trade balance (+) r → Loan growth (-) Growth of Total Loans → Growth CIG (-) *tests mixed* Growth of Total Loans → Growth I (-) *tests mixed* Growth of Total Loans → Growth C (-) *tests mixed* Growth of C, I & CIG → Growth FTB (-)	r → I(1); Total Loans → I(1) unit root r → Total Loans (-) in long run Total Loans → I(1) ; I → I(1) unit root Total Loans cointegrated with I (+) I → I(1) ; FTB → I(1) unit root I cointegrated with FTB (-)	r → Loan growth (-) Total Loans → I (+) Total Loans → C (+) Total Loans → CIG (+)	r → Loan growth (-) Total Loans → I (+) No effect, Problem with F & W stat. No effect, Problem with F & W stat.
Other (Business) Loans	r → Loan growth (-) r → Growth of Short term Frn Debt of Priv Sect. (-) r → Growth of I, first period (+), 3rd per (-) r → Growth of Real Effective Exchange rate (+) r → Foreign Trade balance (+) Growth of Other Loans → Growth I (+) *tests mixed*	r → I(1) ; Other Loans → I(1) unit root r → Other Loans (-) in long run Other Loans → I(1) ; I → I(1) unit root Oth. Loans cointegrated I (no Long R effect) I → I(1) ; FTB → I(1) unit root I cointegrated with FTB (-)	r → Loan growth (-) Other Loans → I (+) I → FTB (-)	r → Loan growth (-) Other Loans → I (nill) I → FTB (-)
Consumer Loans (With Credit card Receivabes)	r → Loan growth (-) r → Growth of C (nill) r → Growth of GDP (nill) r → Growth of Real Effective Exchange rate (+) r → Foreign Trade balance (+) Growth of Consmr Loans → Growth I (+) *tests bad !*	r → I(1) ; Consumer Loans → I(1) unit root There is no cointegration Consumer Loans → I(1) ; I → I(1) unit root Cons Loans cointegrated C (+) *normality fails & error terms autocorralated at 2nd lag.* C → I(1) ; FTB → I(1) unit root C cointegrated with FTB (-)	r → Consumer Loans (-) r → Growth of Con Loans (nill) Consumer Loans → C (+) *F& W tests fail* C → FTB (-)	r → Consumer Loans (-) r → Growth of Con Loans (nill) Consumer Loans → C (+) *F& W tests fail* C → FTB (-)
Public Loans	r → Loan growth (nill) r → Growth of G (nill) r → Growth of GDP (+) r → Growth of Real Effective Exchange rate (+) r → Foreign Trade balance (+) Growth of Public Loans → Growth G (+) *tests bad !*	r → I(1); Public Loans → I(1) unit root r → Other Loans (-) in long run r → Other Loans (+) in short run Public Loans → I(1) ; I → I(1) unit root No cointegration G → I(1) ; FTB → I(1) unit root G cointegrated with FTB (-)	r → Public Loans (nill) r → Growth of Public Loans (nill) Public Loans → G (nill) G → FTB (nill)	r → Public Loans (-) r → Growth of Public Loans (-) Public Loans → G (nill) G → FTB (-) *with ecm convergence*

Table 6.15: Summary of the Analyses in Level

ANALYSES IN RATIO

	VECTOR AUTO REGRESSIVE MODEL	ERROR CORRECTION MODEL COINTEGRATION - JOHANSEN	AUTO REGRESSIVE DISTRIBUTED LAG MODEL Short Run	 Long Run
Total Loans	r → Loan growth (-) r → Growth of Real Effective Exchange rate (+) *marginally* r → Foreign Trade balance (+)	r → I(1) ; Total Loans → I(1) unit root r → Total Loans (-) in long run Total Loans → I(1) ; CIG → I(1) unit root Total Loans cointegrated with CIG (+) *all good* Con&oth Loans cointegrated with CI *but nill Long Run effect* CI cointegrated with FTB(-) CIG cointegrated with FTB(-)	r → Loan growth (-) Total Loans → I (+)	r → Loan growth (-) Total Loans → I (nill) *with significant ecm*
Other (Business) Loans	r → Loan growth (-) r → Growth of Sh T Frn Debt of Priv Sect. (nill) r → Growth of I (nill) r → Growth of Real Effective Exchange rate (nill) r → Foreign Trade balance (+) *tests mixed*	r → I(1) ; Other Loans → I(1) unit root r → Other Loans (-) in long run Other Loans → I(1) ; I → I(1) unit root Oth. Loans cointegrated I (no Long R effect) Total Loans cointegrated I (no Long R effect) I → I(1) ; FTB → I(1) unit root I cointegrated with FTB (-)	r → Other Loans (-) r → Other Loan growth (-) Other Loans → I (+) I → FTB (-)	r → Other Loans (-) *ecm not significant* r → Other Loan growth (-) Other Loans → I (nill) *ecm OK* I → FTB (-) *ecm OK*
Consumer Loans (With Credit card Receivabes)	r → Loan growth (-) r → Growth of Con Loan (-) r → Growth of C (-) r → Growth of Real Effective Exchange rate (+) r → Foreign Trade balance (+) *tests are mixed*	r → I(1) ; Consumer Loans → I(1) unit root There is no cointegration C → I(1) ; FTB → I(1) unit root C cointegrated with FTB (-)	r → Consumer Loans (-) r → Growth of Con Loans (-) Consumer Loans → C (+) C → FTB (-)	r → Consumer Loans (-) r → Growth of Con Loans (nill) Consumer Loans → C (nill) *with significant ecm* C → FTB (-)
Public Loans	r → Loan growth (-) r → Growth of G (nill) r → Growth of Real Effective Exchange rate (+) r → Foreign Trade balance (+) *tests bad !*	r → I(1); Public Loans → I(1) unit root r → Other Loans (-) in long run r → Other Loans (+) in short run G → I(1) ; FTB → I(1) unit root G cointegrated with FTB (-)	r → Public Loans (nill) *ecm OK* r → Growth of Public Loans (nill) *ecm significant* Public Loans → G (nill) *ecm fails* G → FTB (+)	r → Public Loans (-) r → Growth of Public Loans (-) Public Loans → G (+) *ecm fails* G → FTB (-) *with ecm significant*

Table 6.16: Summary of the Analyses in Ratio

7 CONCLUSION

In the light of this study, it could be summarized that real interest rates have a significant effect on the growth of all three types of loan (where other monetary policy tools like OMO and reserve requirements are also controlled). Furthermore, it has also been observed that consumer and business loans have significant effects on foreign trade balance, while such an effect has not been observed for public loans, via their effect on government expenditures.

The other main finding of the analysis is that the view that Turkey is an import-dependent developing economy has been supported. Each positive shock to either aggregate investment, consumption or government expenditures has resulted in a depreciation in its foreign trade balance. So, it has been witnessed that Turkish exports and accordingly its economic growth are significantly affected by imports of intermediate and capital goods. From this angle, it could also be noted that Turkey has become quite an open economy and that it benefits from foreign trade and foreign financial leverage (needed to fund its foreign trade deficit) which comes at a price though: dependency, so the fragility of the economy is quite a bit higher. Thus, there is much less room for mistakes for the decision makers.

Furthermore, the results might indicate that in Turkey, investment expenditures are generally funded through loans rather than equity. One possible reason for this phenomenon would be the tax shield obtained from interest costs by the firms, if they finance their investments through loans. The firms can deduct the interest expenditures from their income and pay (at the current 20 % level) less corporate income tax. However, such an option would not have been possible for equity finance in the period analyzed. Moreover, the threshold effect would also be a probable reason for the considerably less robust effect of consumer loans. In other words, it could be possible that a fall in interest rates starts to affect consumption expenditures (especially via mortgage loans) only after they have fallen below a threshold level (Ratio of monthly installments to monthly income). Hence, a one to one relation has not come out in consumer loans.

These results, in general, support the policy change of The CBRT, as a credit channel (from a bank loan perspective) of the Turkish monetary transmission mechanism seems to be working rather strongly, and considering the structural dynamics of the Turkish economy, any monetary expansion would more likely lead to negative consequences for its foreign trade balance. From this angle, in the long run the policies which encourage investments in high-technology and high value added areas, in particular human capital, and an increase in savings should be pursued, so that any expansion will yield at least balanced and sustainable growth. In the short run,

however, measures like putting a cap on individuals total credit limit, or limiting the number of instalments of loans, at least for consumer loans, would be beneficial. Additional measures like increasing the rate of transaction taxes on imported consumer goods could also be worth considering.

A final result could be that in the event of studying the impact of monetary policy on the economy through time series analysis, a very delicate, careful and thorough approach should be applied. In particular, the inherent spurious regression issue of time series analysis, together with the simultaneity of the variables in the quite dynamic environment of a monetary economy can easily lead to misleading results.

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9 APPENDIX

9.1 Impulse Response Tables of VAR on Credit Channel, Ratio Analysis

The graphs[97] are presented in the following order[98]:

Impulse Response Graphics of Total Loans for All Variables
Impulse Response Graphics of Total Loans
Impulse Response Graphics of Other (Business) Loans
Impulse Response Graphics of Consumer Loans
Impulse Response Graphics of Public Loans

[97] Response standard errors has been set up according to Monte Carlo method via 1000 repetitions.

[98] "_GR" terms used in the variables represent the growth of the related variables calculated through the natural logarithm method.

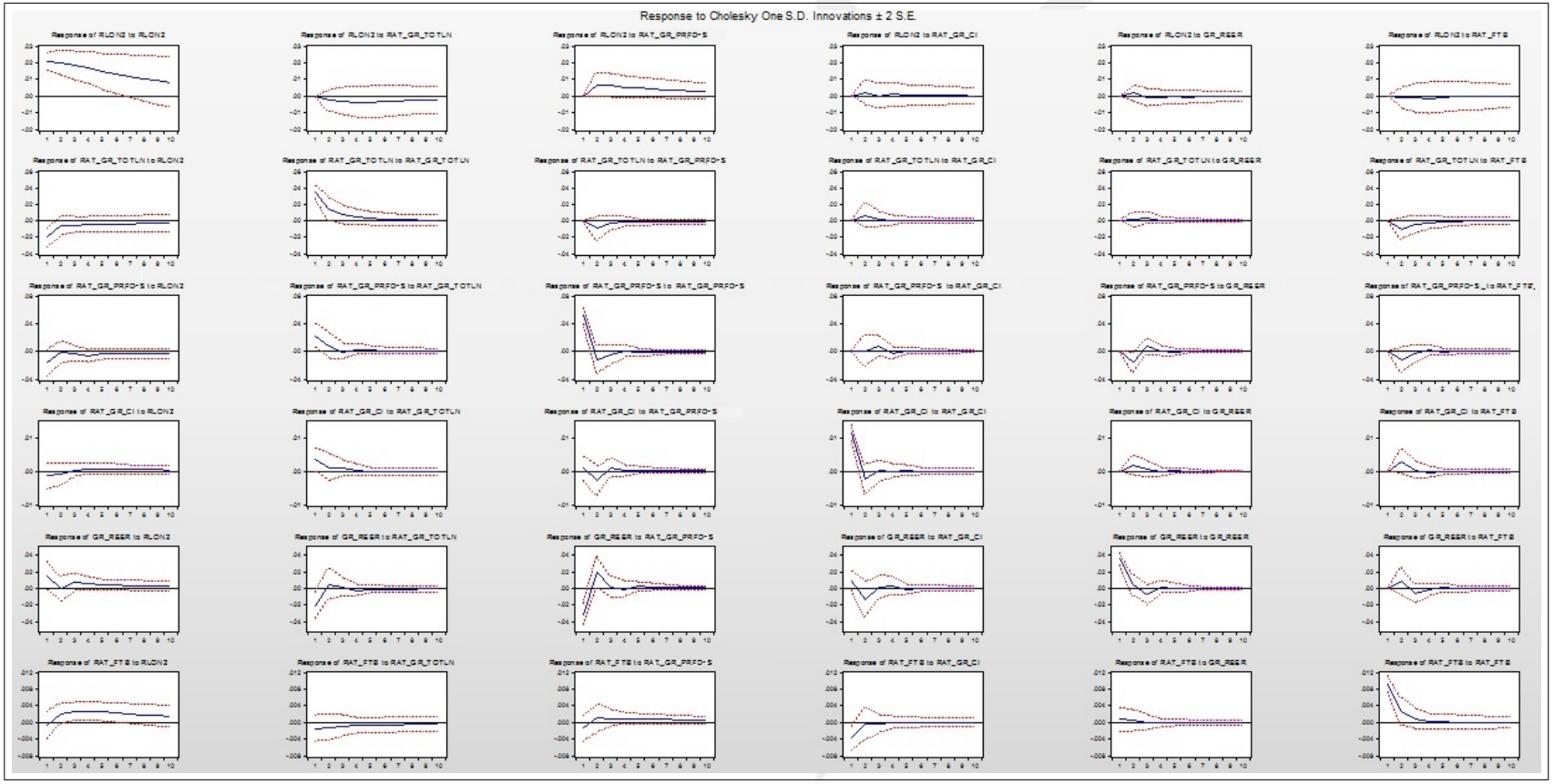

Figure 9.1: Impulse Response Graphics of Total Loans for All Variables, Ratio Analysis

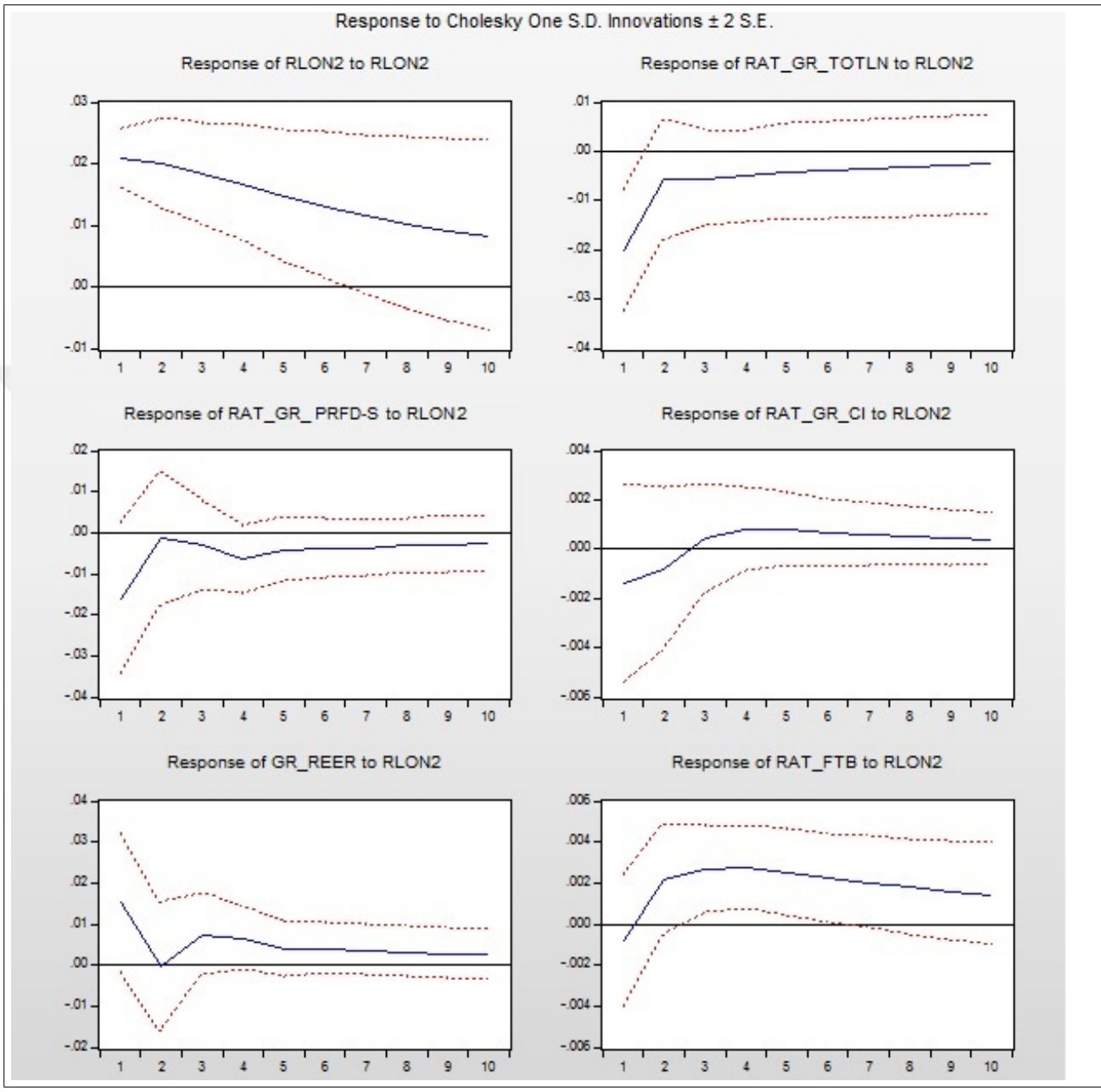

Figure 9.2: Impulse Response Graphics of Total Loans, Ratio Analysis

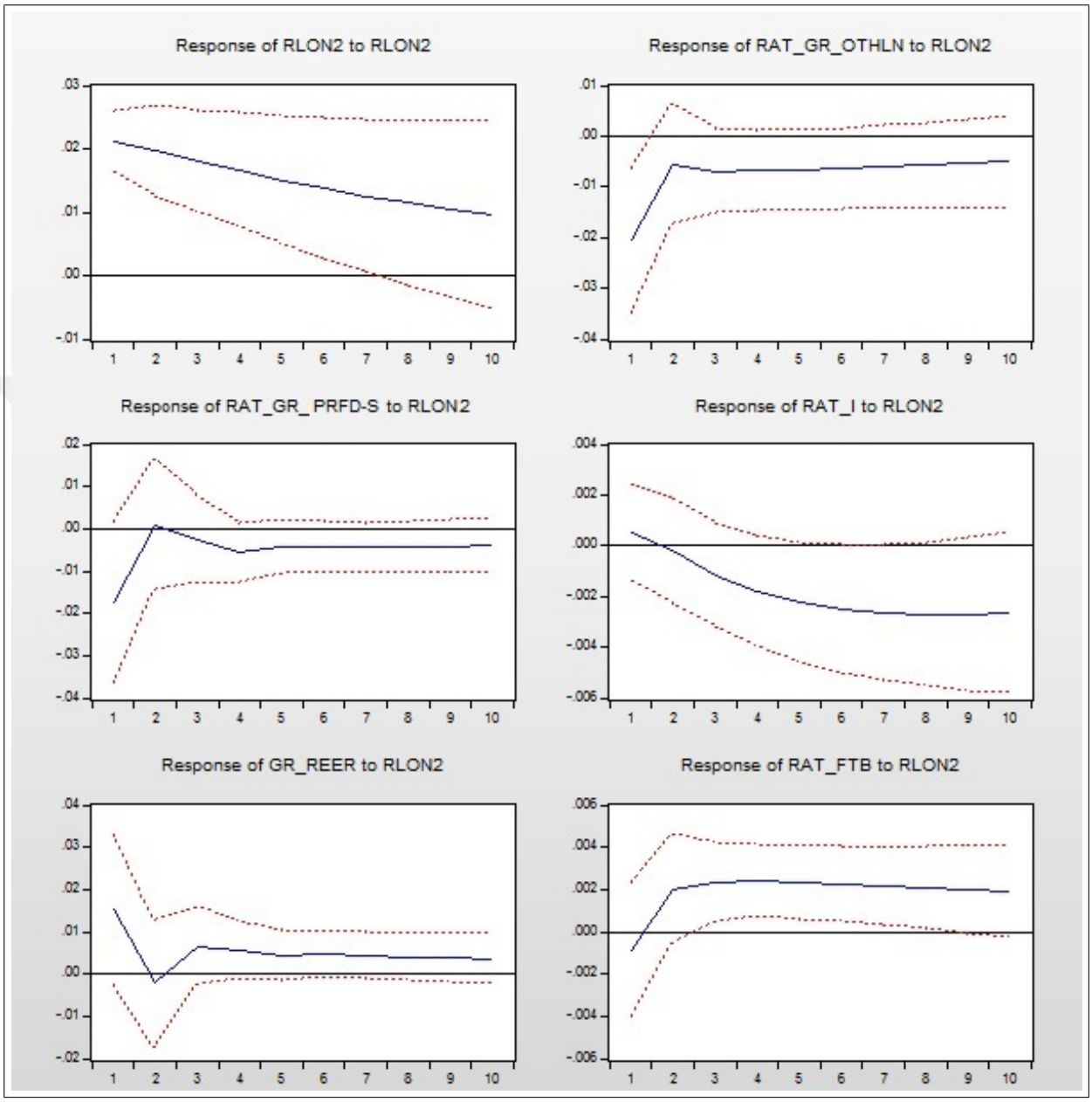

Figure 9.3: Impulse Response Graphics of Other (Business) Loans, Ratio Analysis

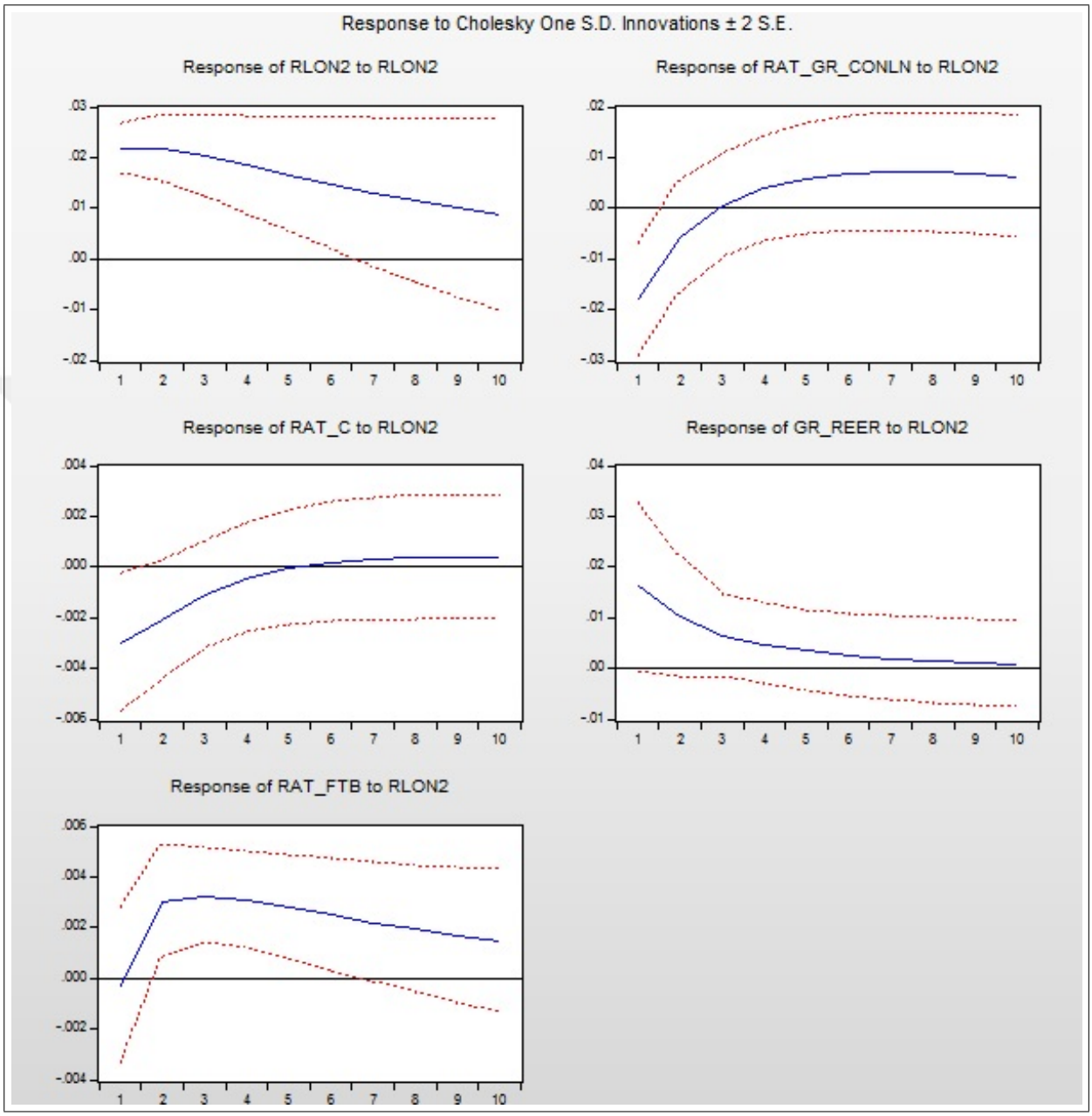

Figure 9.4: Impulse Response Graphics of Consumer Loans, Ratio Analysis

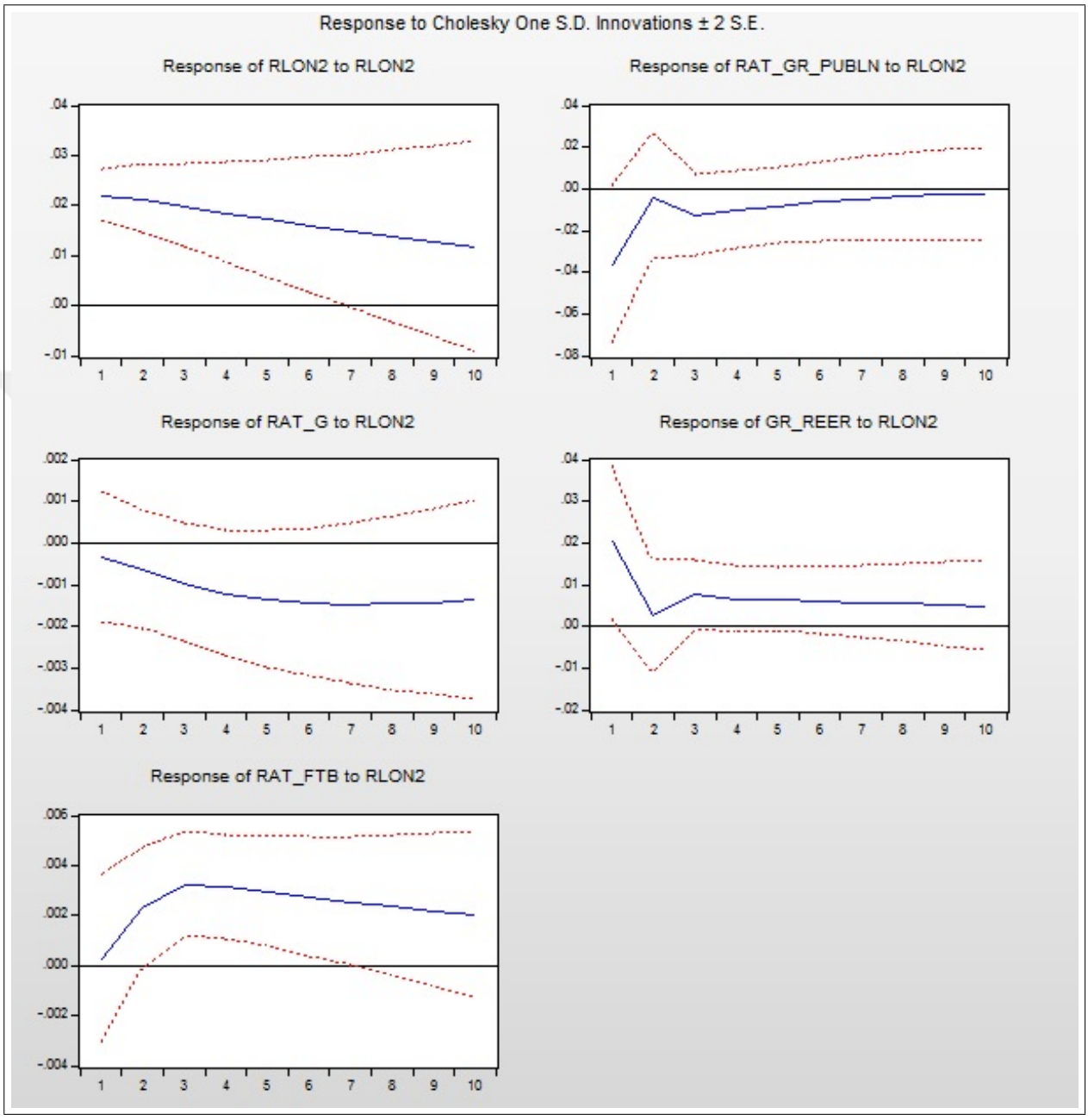

Figure 9.5: Impulse Response Graphics of Public Loans, Ratio Analysis

9.2 Impulse Response Tables of VAR on Credit Channel, Level Analysis

The graphs[99] are presented in the following order:

Impulse Response Graphics of Total Loans for All Variables
Impulse Response Graphics of Total Loans
Impulse Response Graphics of Other (Business) Loans
Impulse Response Graphics of Consumer Loans
Impulse Response Graphics of Public Loans

[99]Response standard errors has been set up according to asymptotic distributions of impulse response functions

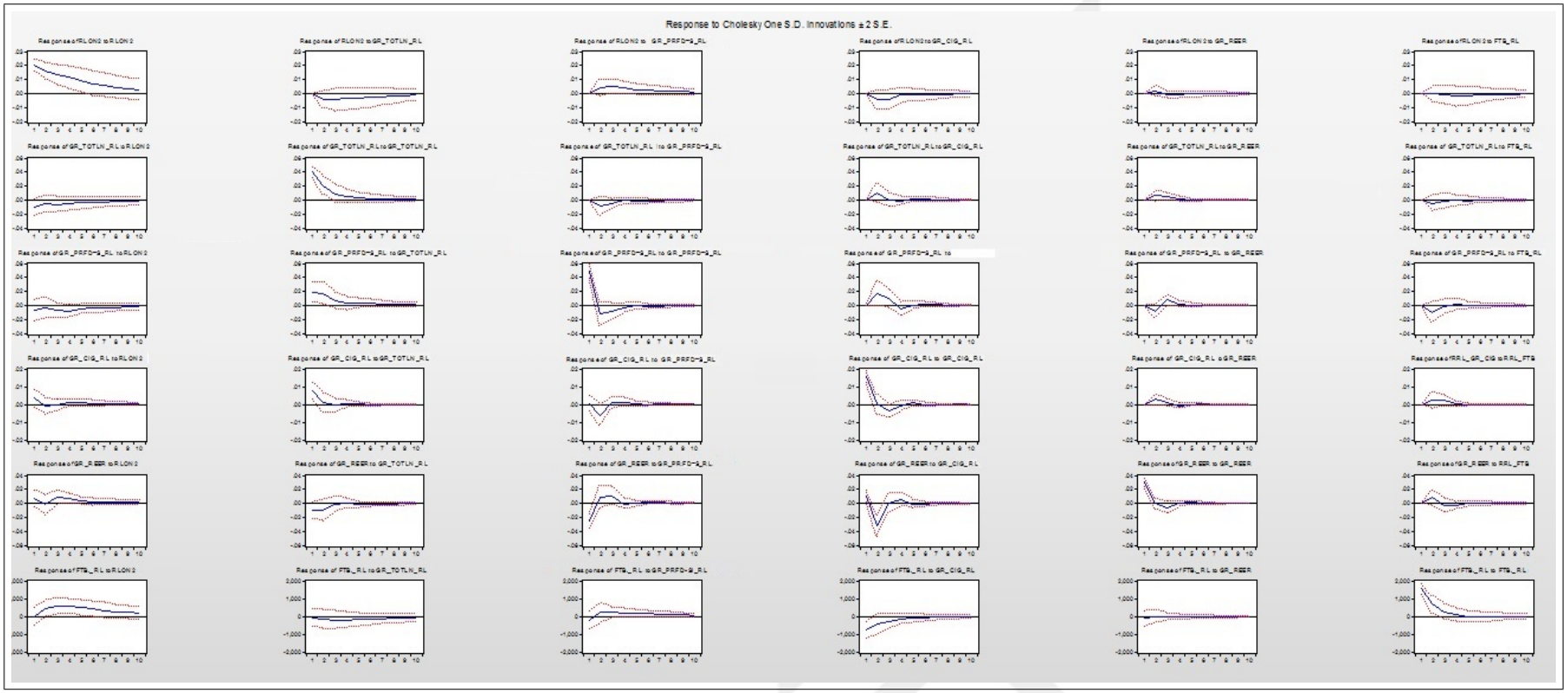

Figure 9.6: Impulse Response Graphics of Total Loans for All Variables, Level Analysis

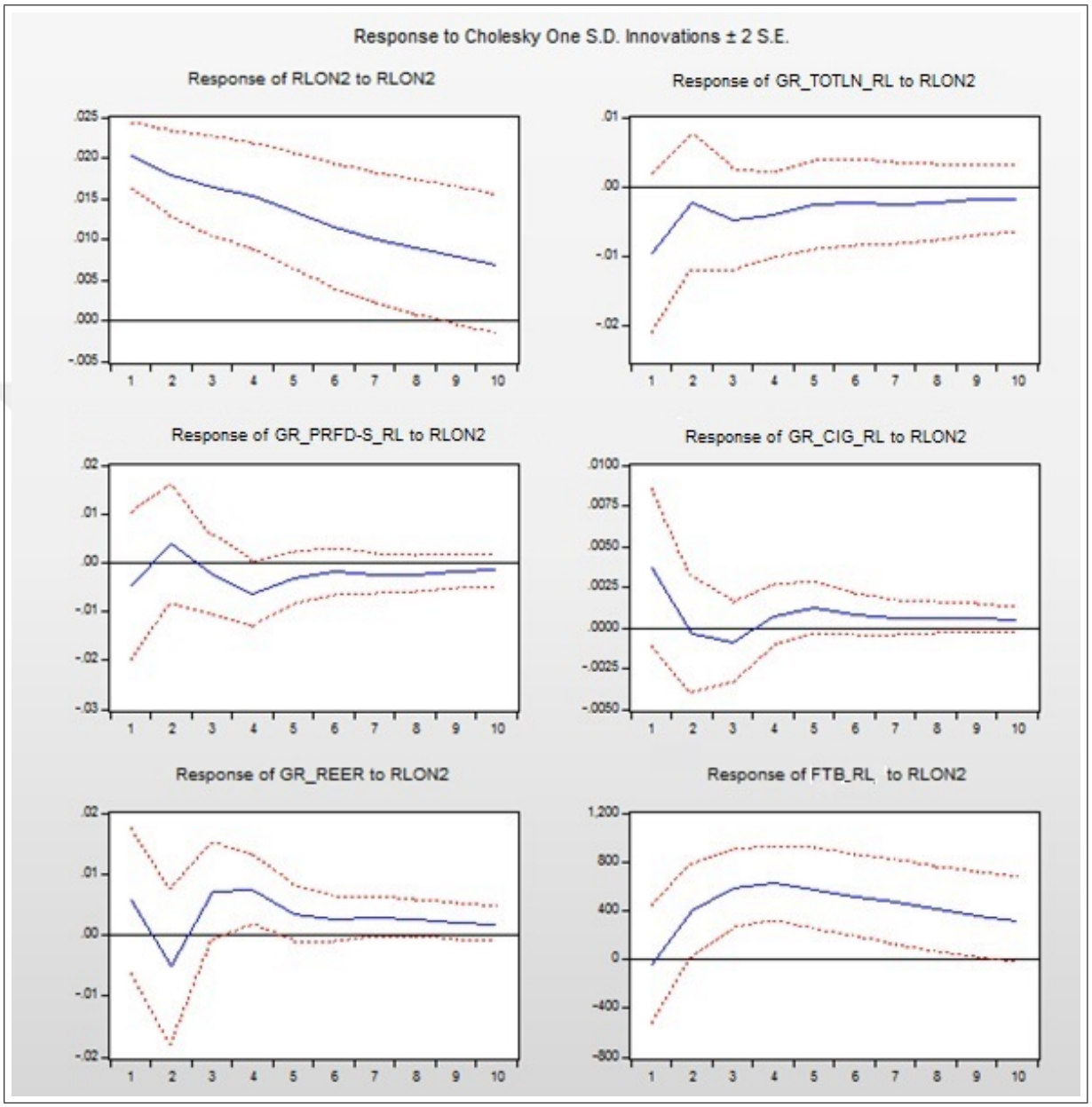

Figure 9.7: Impulse Response Graphics of Total Loans, Level Analysis

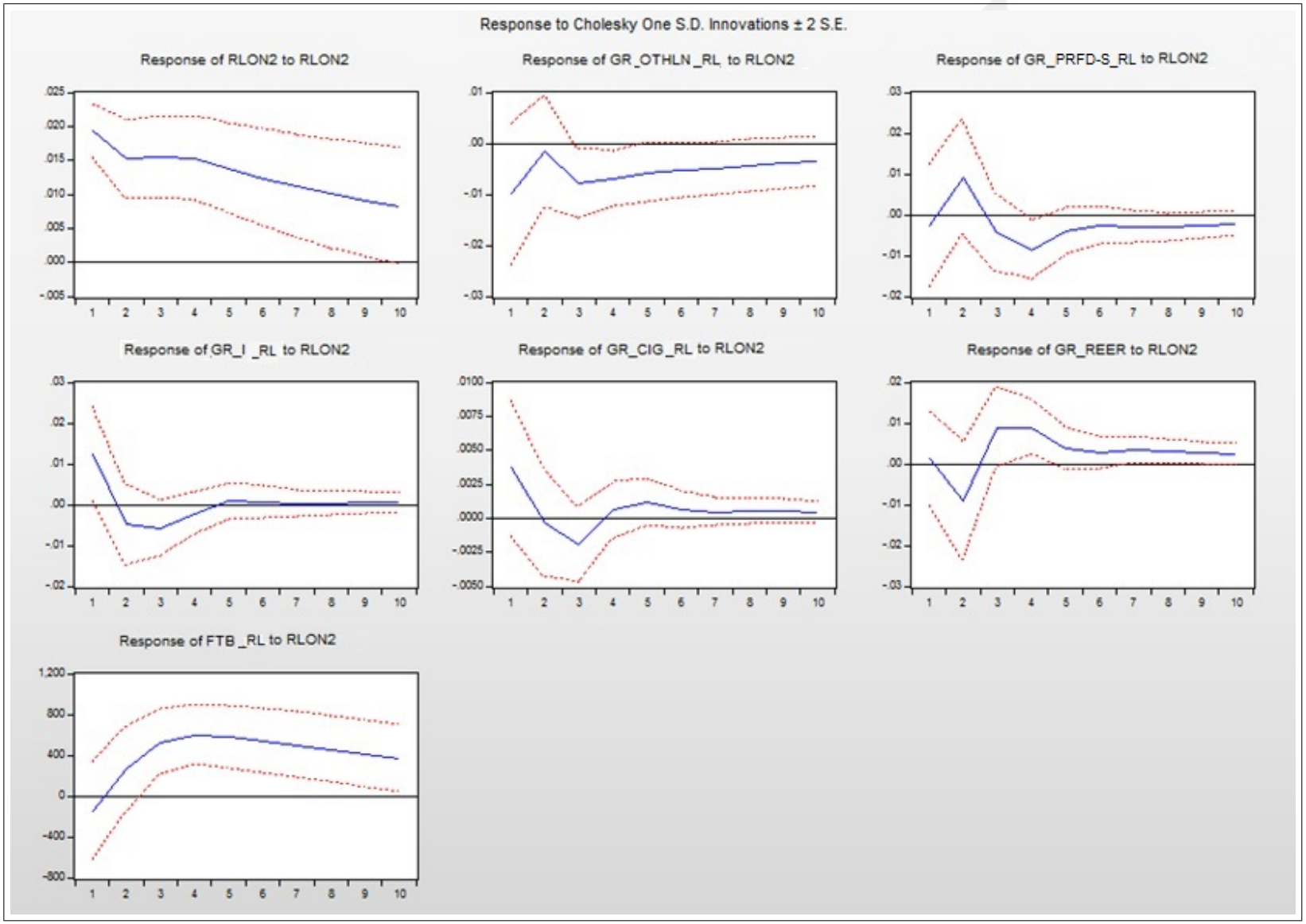

Figure 9.8: Impulse Response Graphics of Other (Business) Loans, Level Analysis

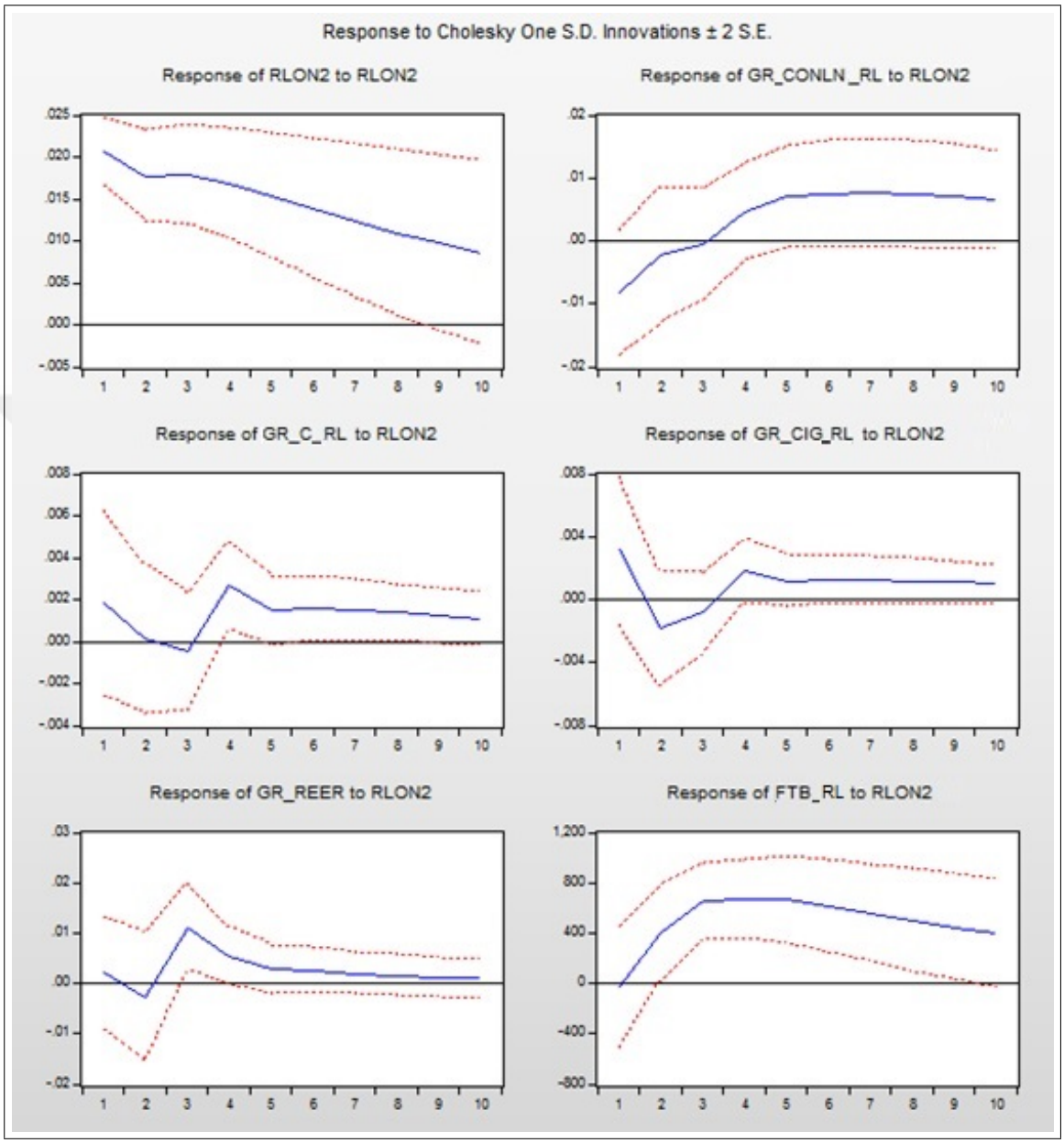

Figure 9.9: Impulse Response Graphics of Consumer Loans, Level Analysis

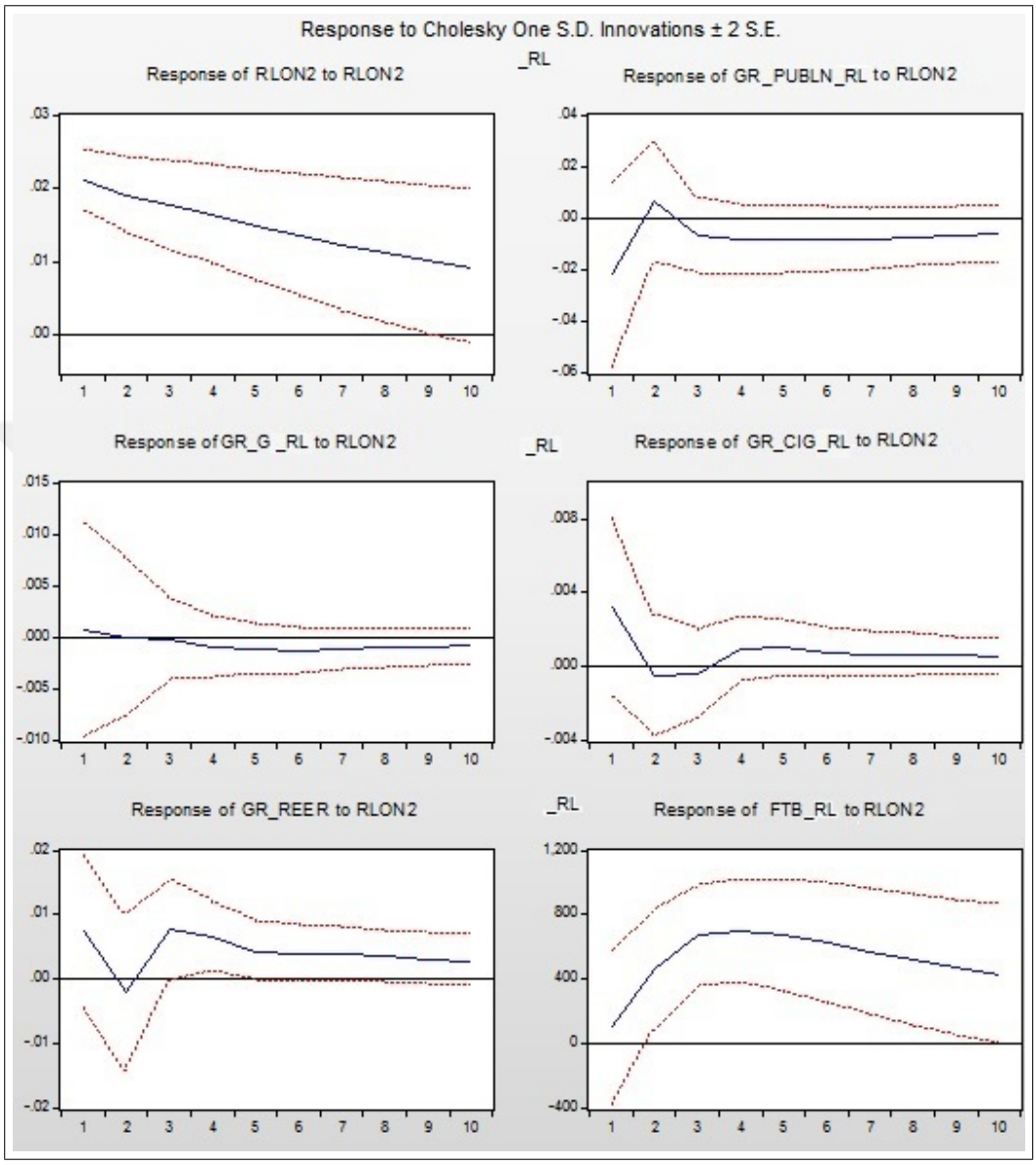

Figure 9.10: Impulse Response Graphics of Public Loans, Level Analysis

9.3 Impulse Response Tables of VAR on Credit Channel with all stationary variables, Ratio Analysis

The graphs[100] are presented in the following order:

Impulse Response Graphics of Total Loans
Impulse Response Graphics of Other (Business) Loans
Impulse Response Graphics of Consumer Loans
Impulse Response Graphics of Public Loans

[100]Response standard errors has been set up according to asymptotic distributions of impulse response functions

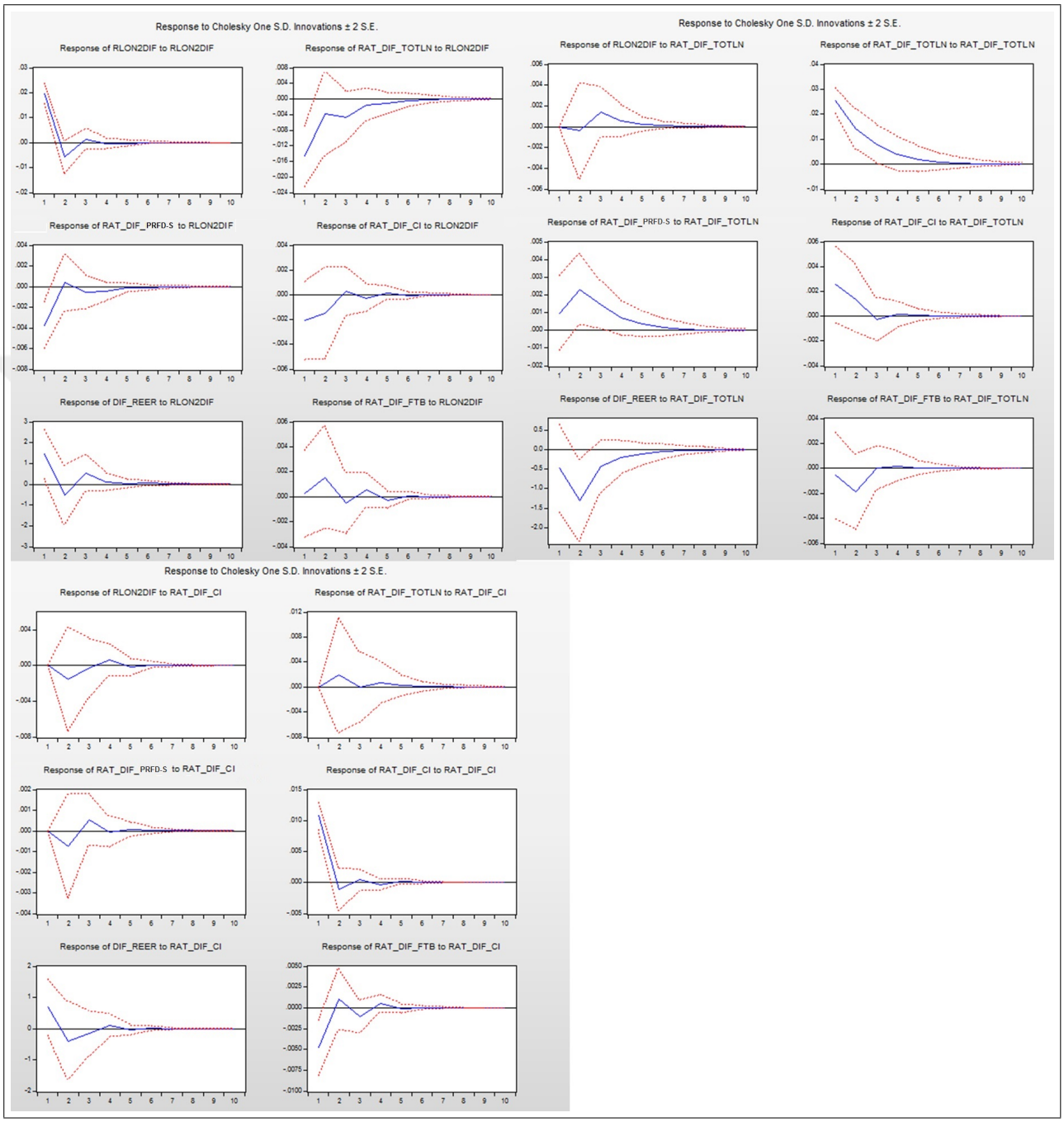

Figure 9.11: Impulse Response Graphics of Total Loans, Ratio Analysis

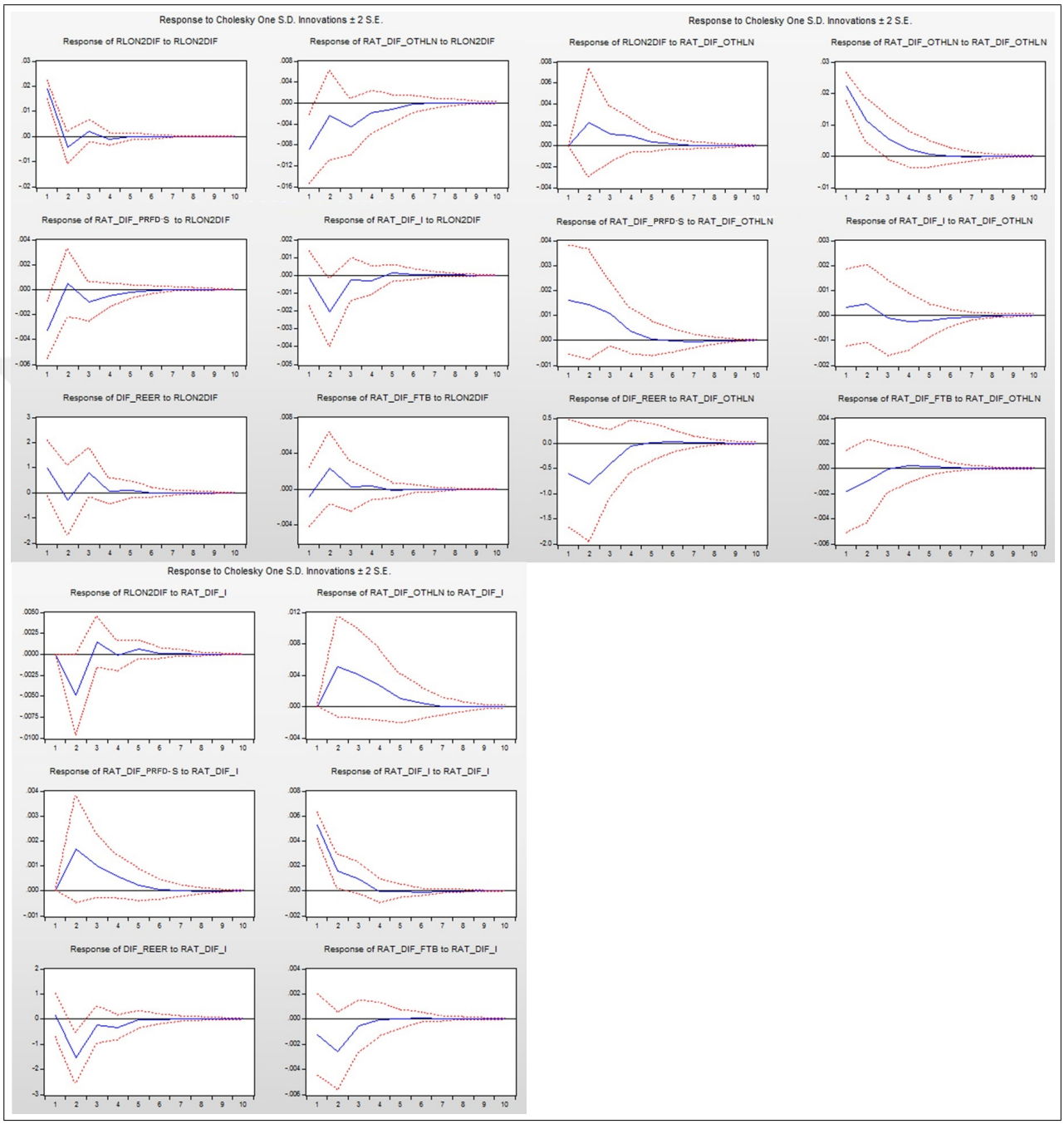

Figure 9.12: Impulse Response Graphics of Other (Business) Loans, Ratio Analysis

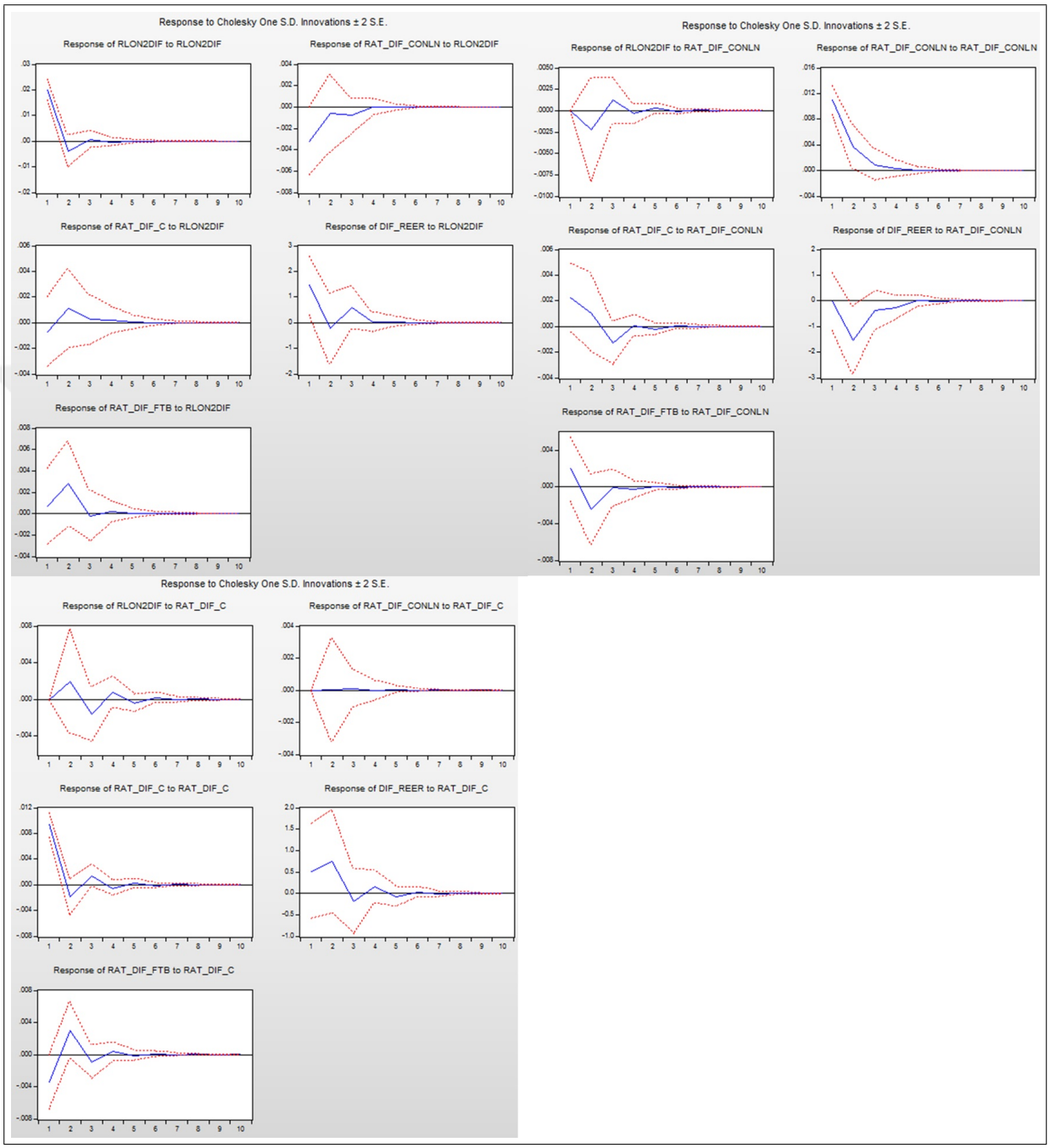

Figure 9.13: Impulse Response Graphics of Consumer Loans, Ratio Analysis

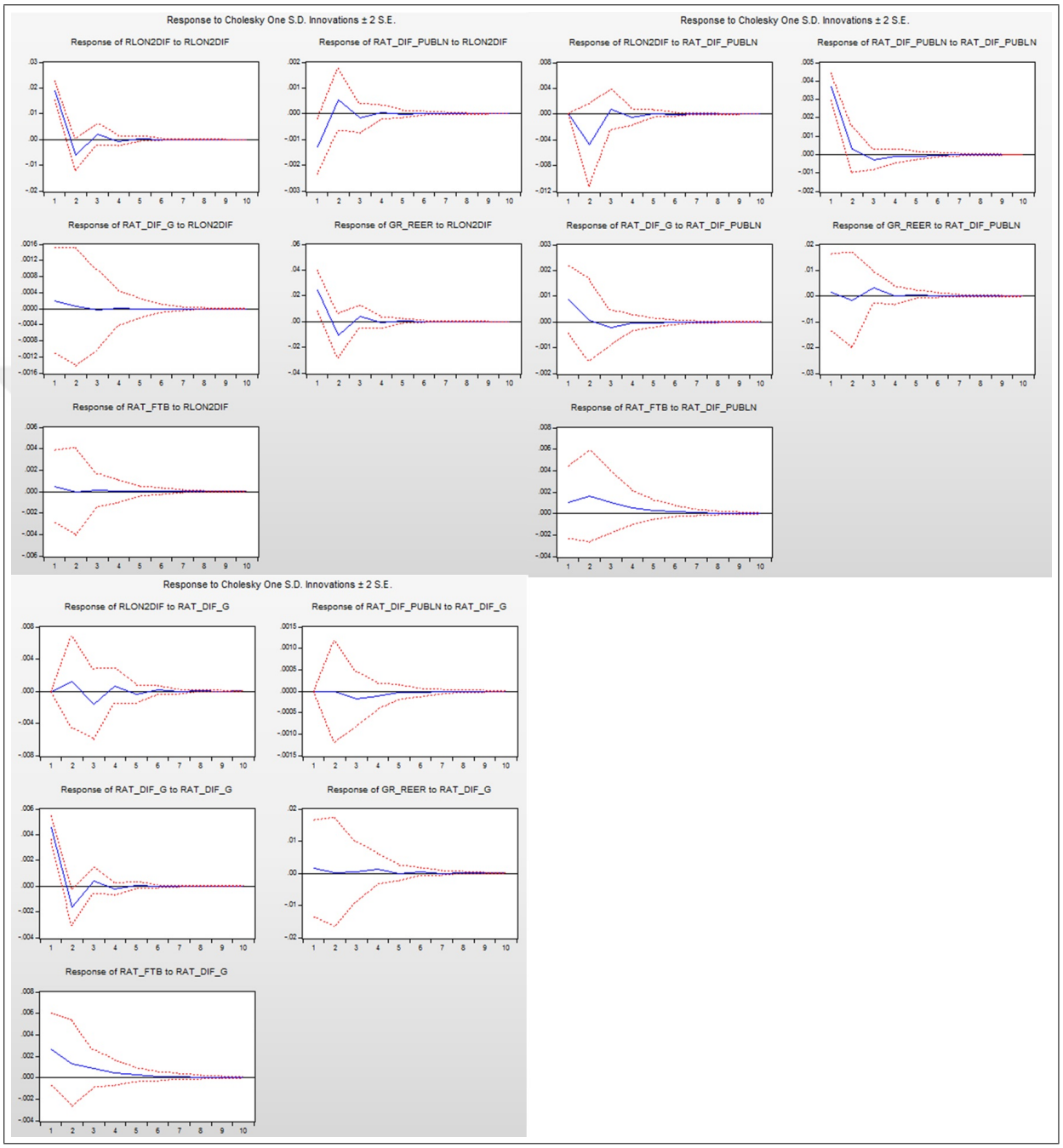

Figure 9.14: Impulse Response Graphics of Public Loans, Ratio Analysis

9.4 Impulse Response Tables of VAR on Credit Channel with all stationary variables, Level Analysis

The graphs[101] are presented in the following order:

Impulse Response Graphics of Total Loans
Impulse Response Graphics of Other (Business) Loans
Impulse Response Graphics of Consumer Loans
Impulse Response Graphics of Public Loans

[101]Response standard errors has been set up according to asymptotic distributions of impulse response functions

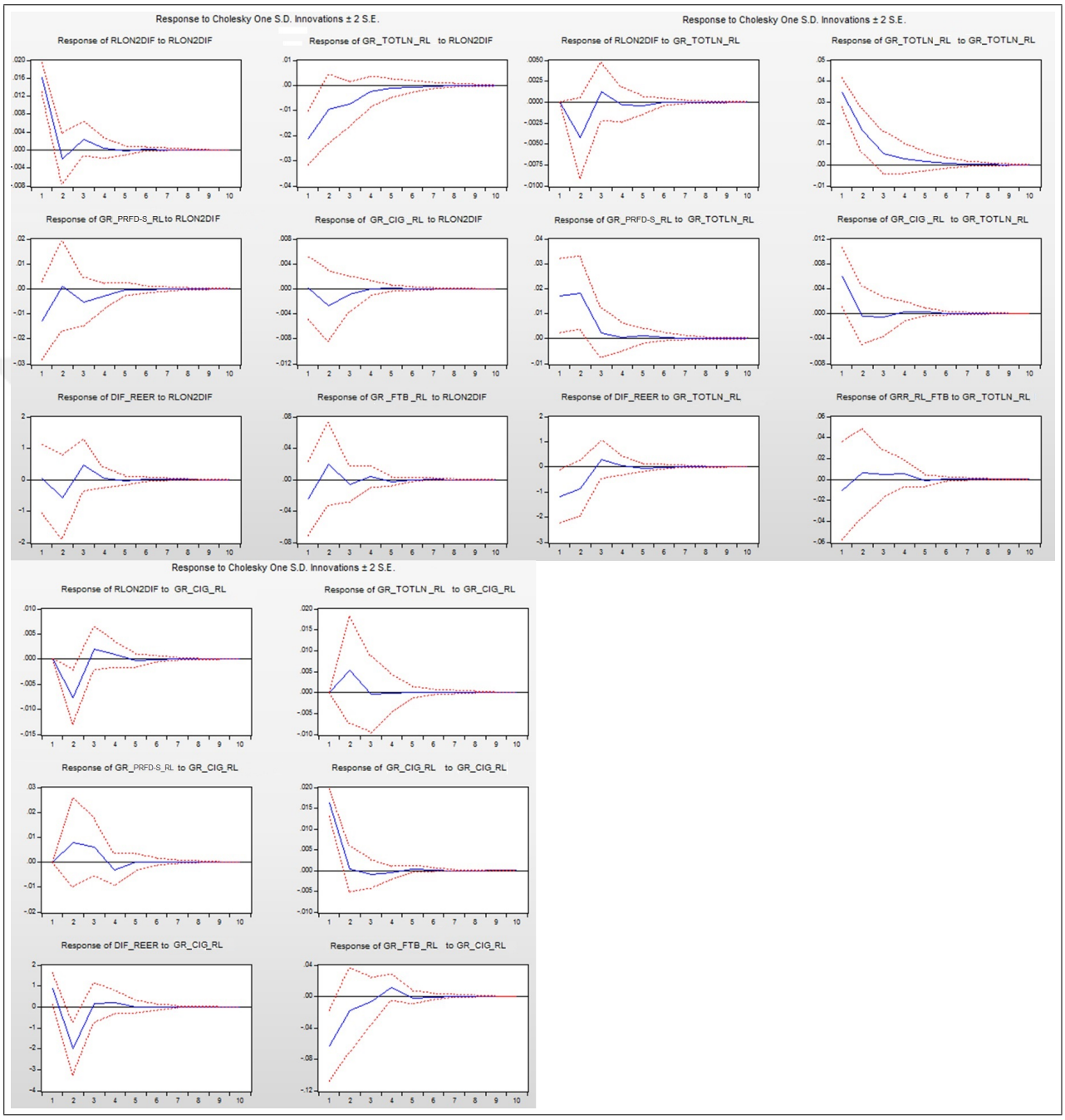

Figure 9.15: Impulse Response Graphics of Total Loans, Level Analysis

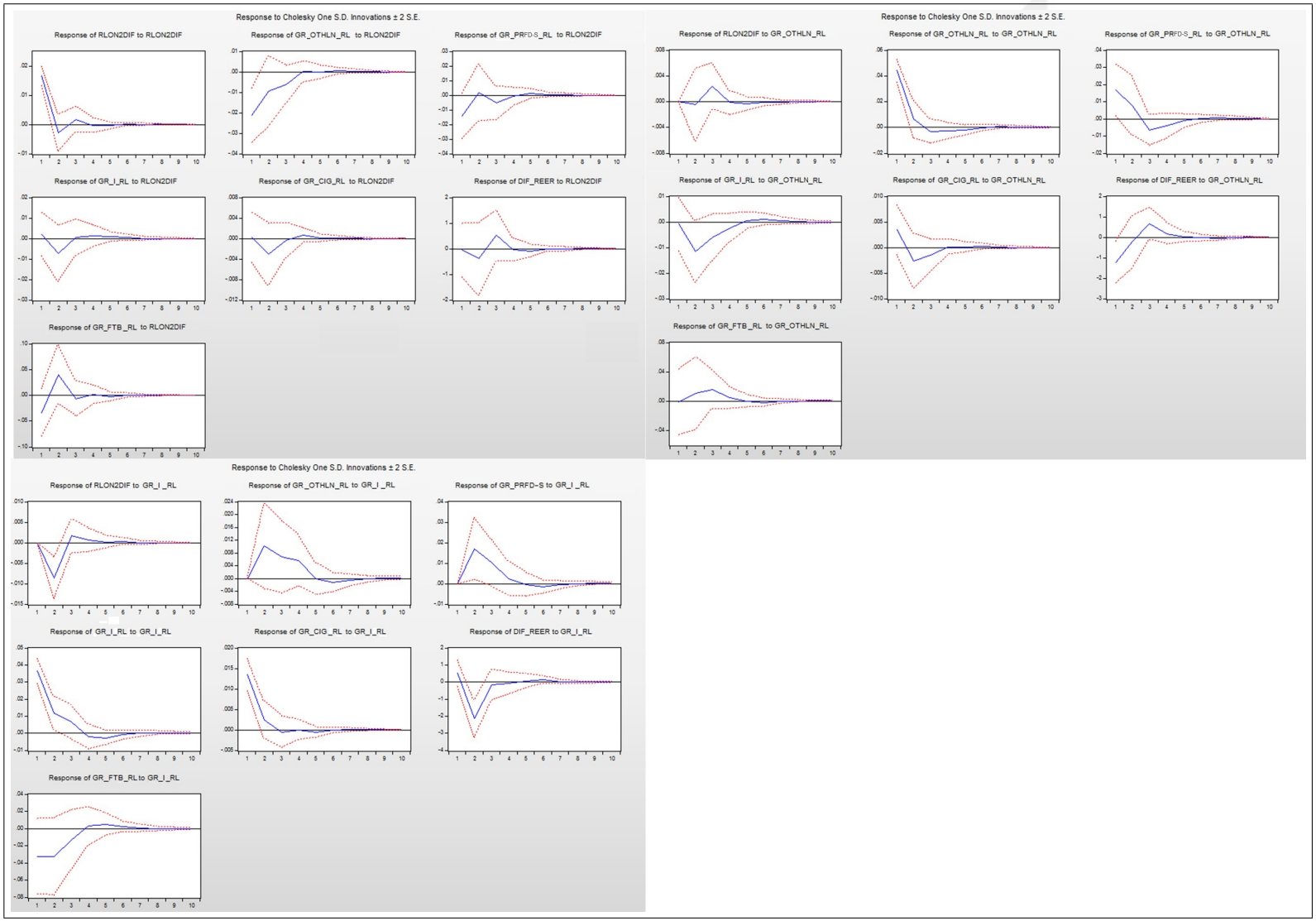

Figure 9.16: Impulse Response Graphics of Other (Business) Loans, Level Analysis

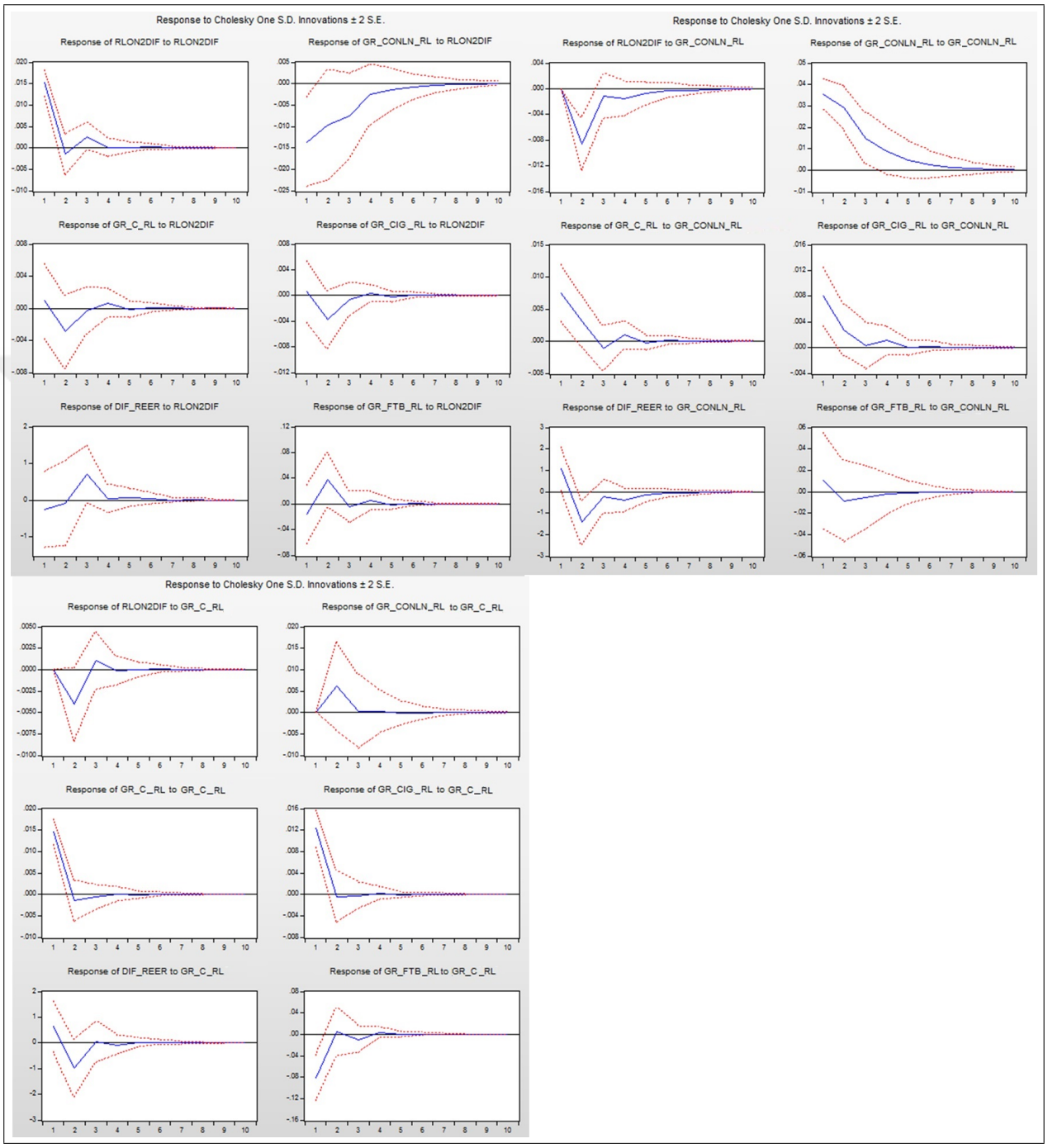

Figure 9.17: Impulse Response Graphics of Consumer Loans, Level Analysis

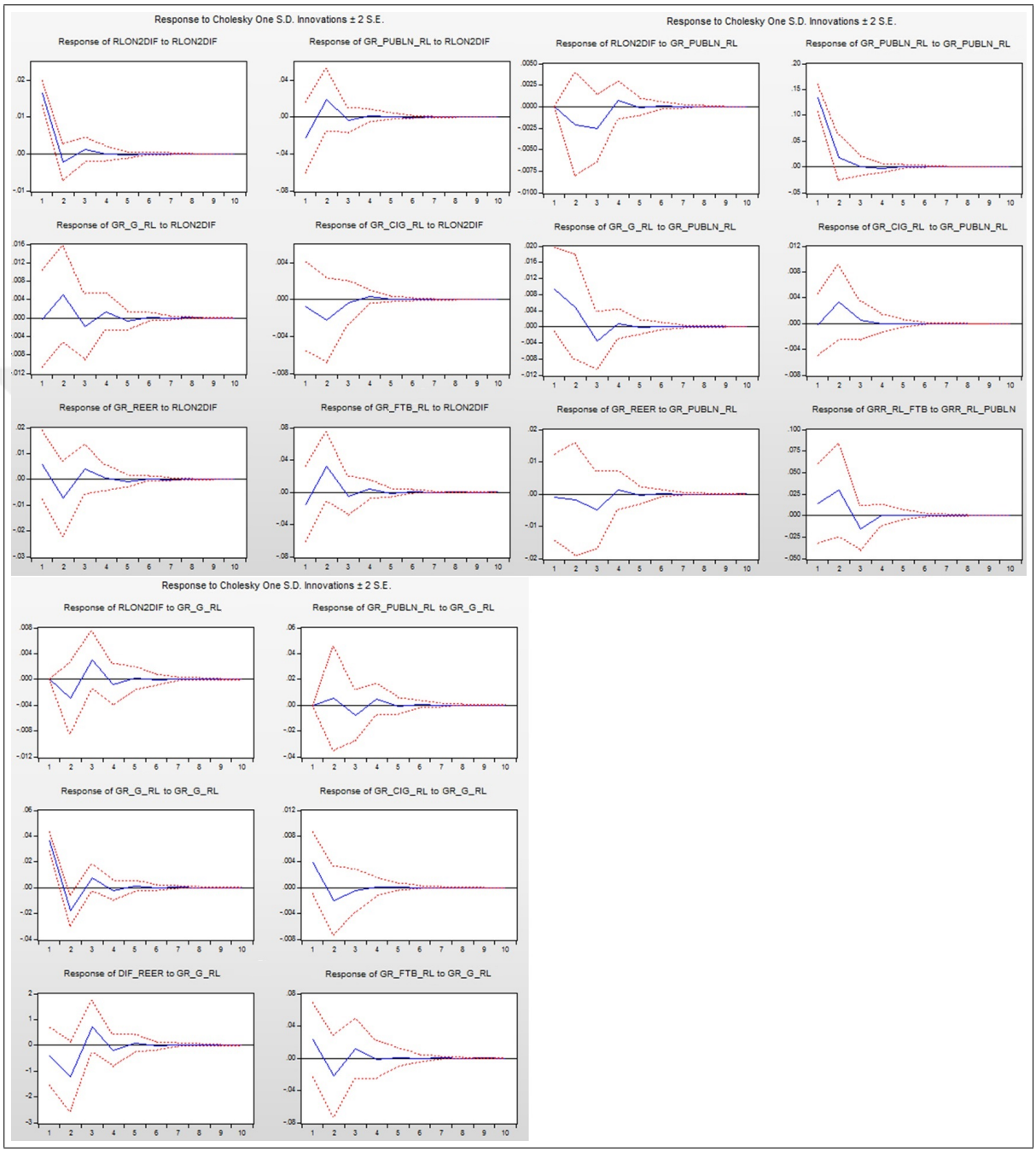

Figure 9.18: Impulse Response Graphics of Public Loans, Level Analysis

9.5 Impulse Response Tables of VAR Effects of Real Interest Rate on Loans

The graphs[102] are presented in the following order, where the upper graphs represent the ratio, the lower graphs also represent the level analyses:

Impulse Response Graphics of Total Loans
Impulse Response Graphics of Other (Business) Loans
Impulse Response Graphics of Consumer Loans
Impulse Response Graphics of Public Loans

[102]Response standard errors has been set up according to Monte Carlo method via 1000 repetitions

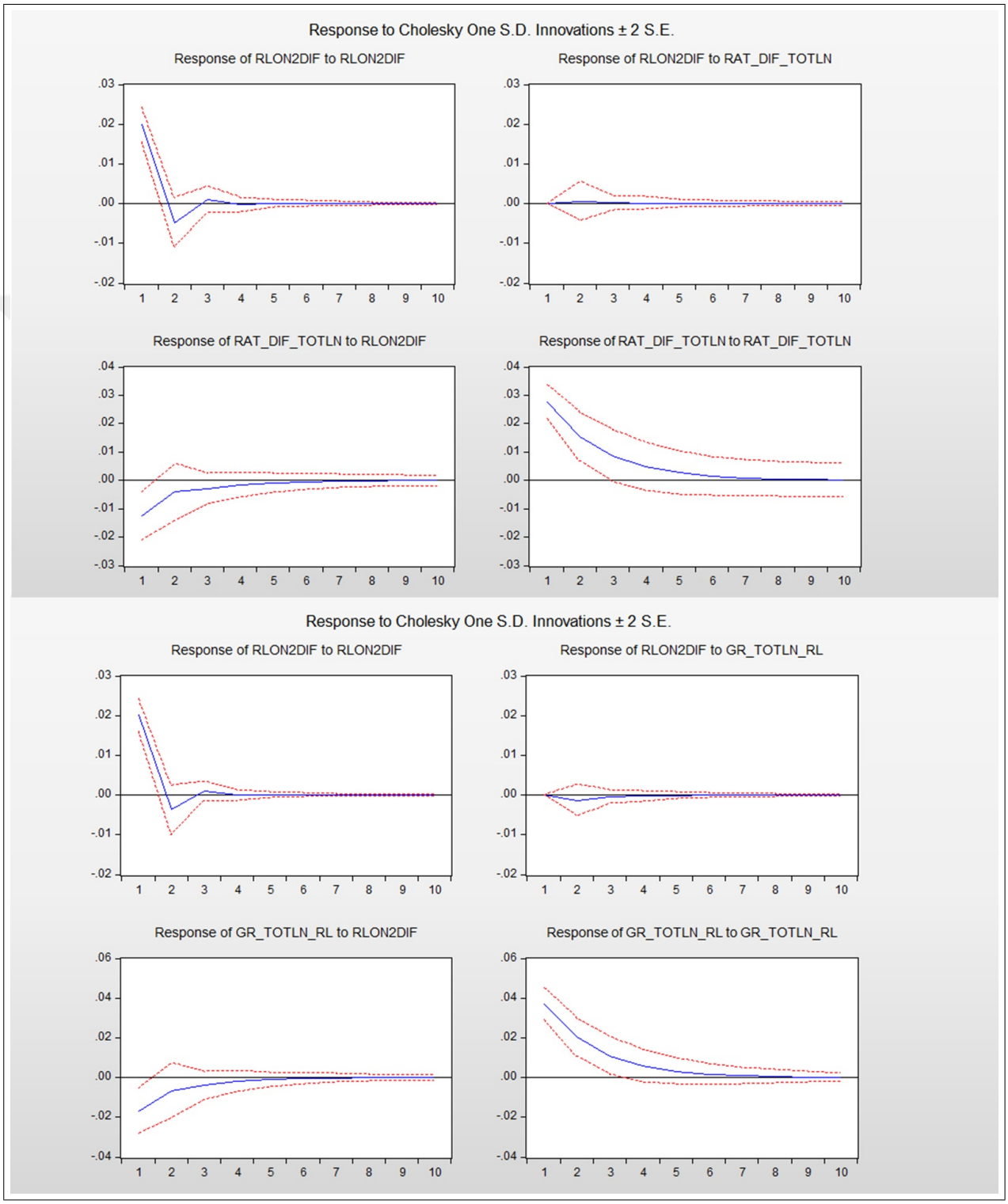

Figure 9.19: Impulse Response Graphics of Total Loans to Real Interest Rate

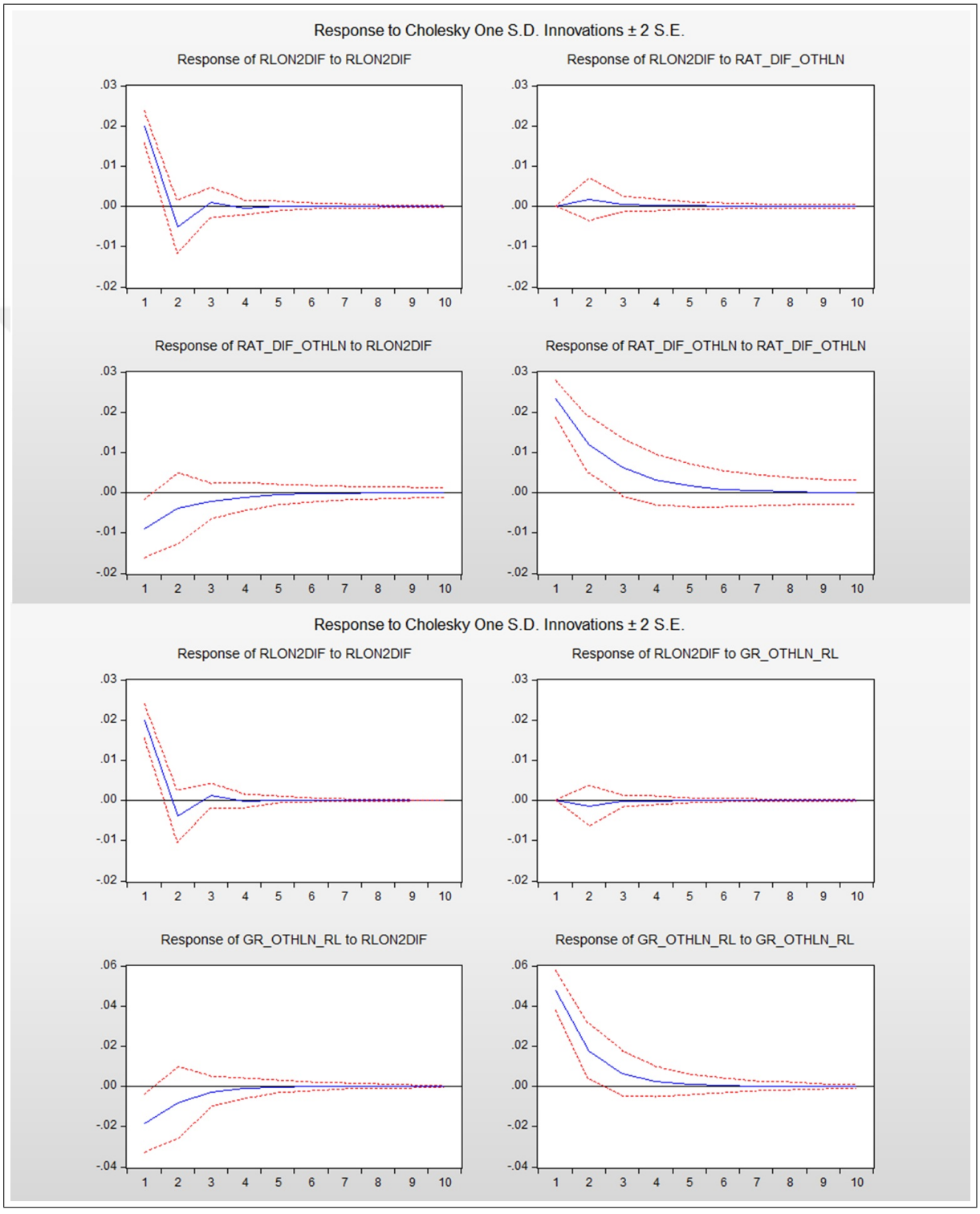

Figure 9.20: Impulse Response Graphics of Other (Business) Loans to Real Interest Rate

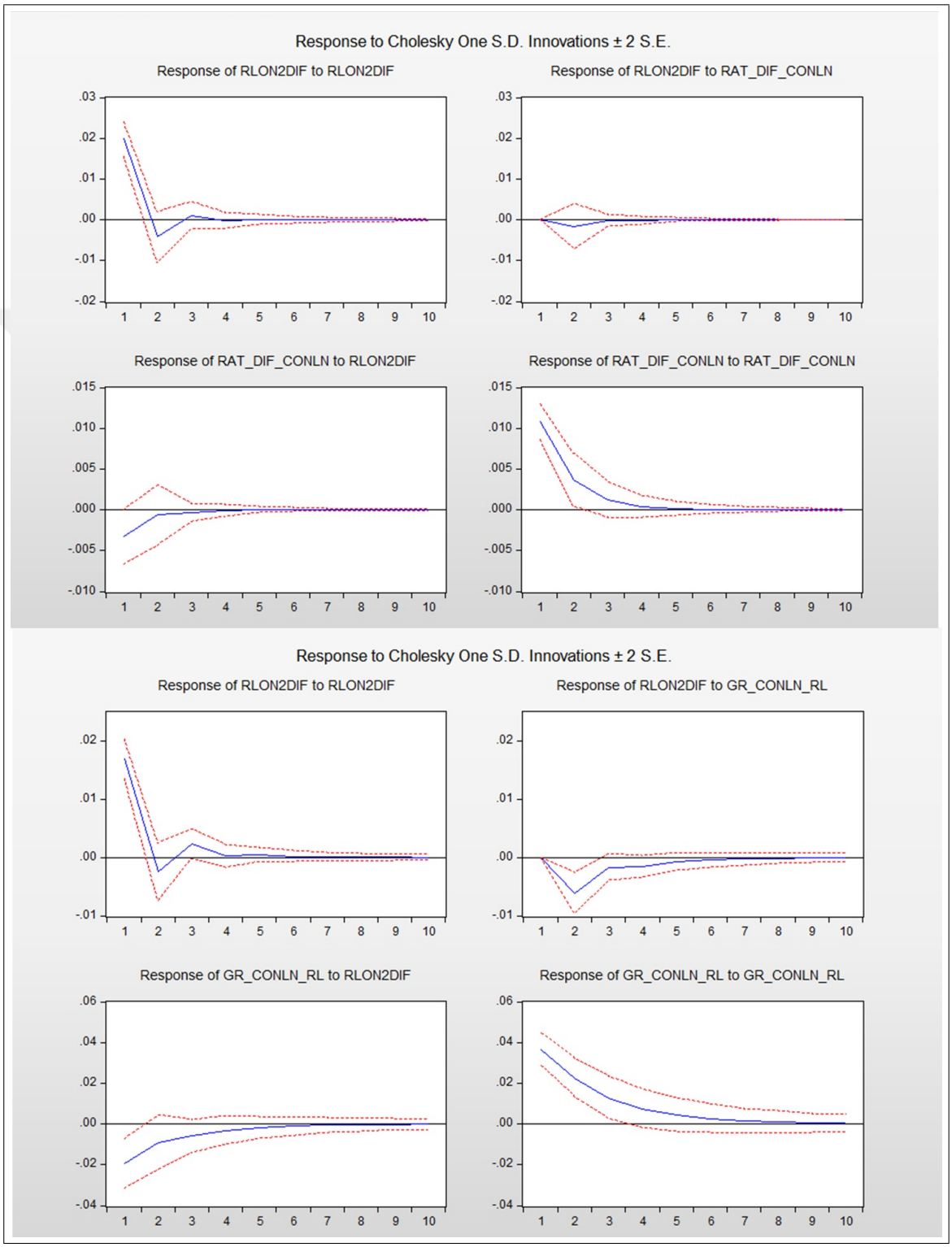

Figure 9.21: Impulse Response Graphics of Consumer Loans to Real Interest Rate

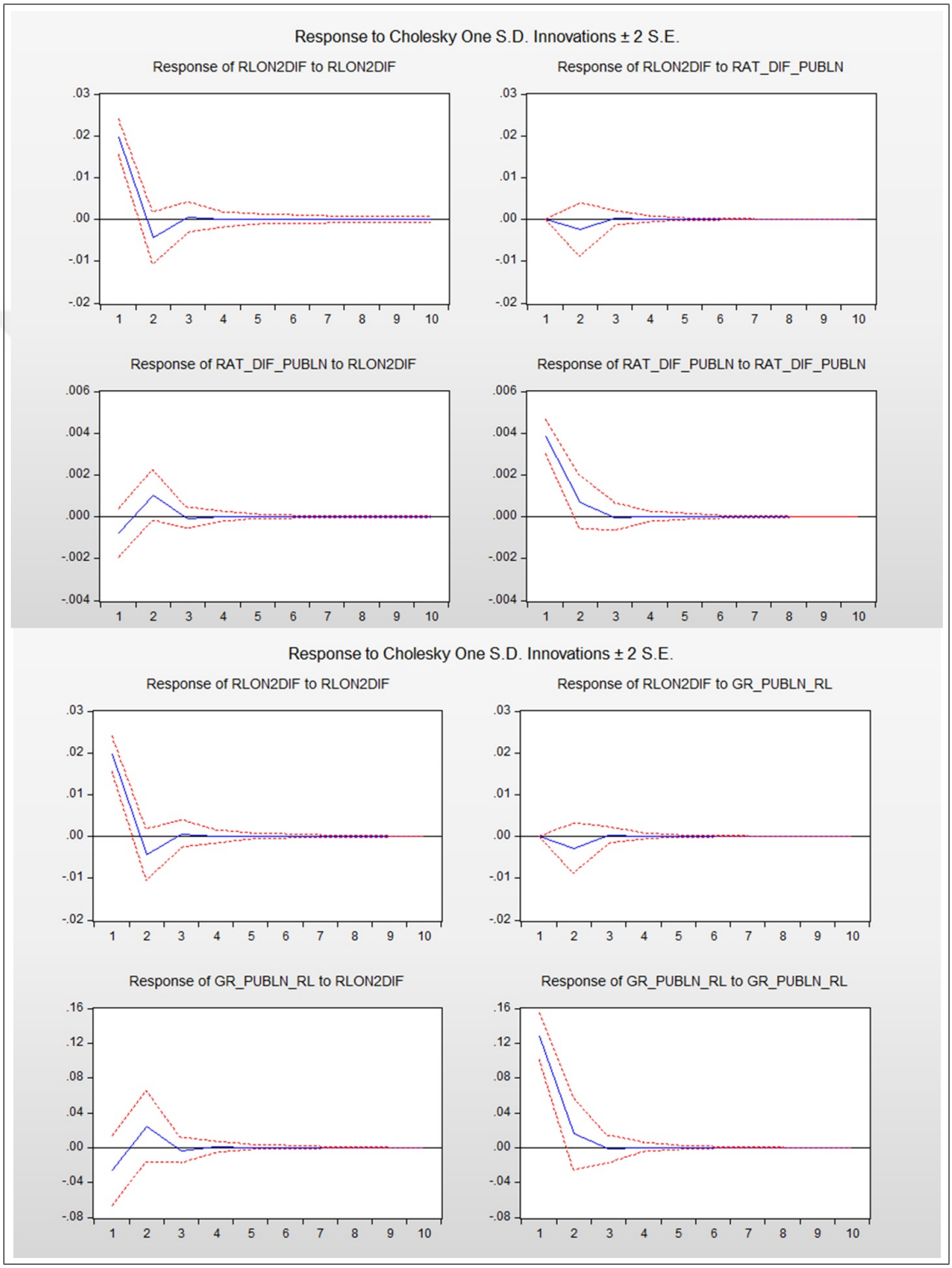

Figure 9.22: Impulse Response Graphics of Public Loans to Real Interest Rate