

Do Monetary Policy Stance and Participation Banking Influence the Real Economic Activity? Empirical Evidence from Turkey

Oguzhan Ozcelebi

Istanbul University, Faculty of Economics, Department of Economics

E-mail: ogozc@istanbul.edu.tr

Tel: 90 212 440 00 00 (11745)

Abstract

Participation banking has been evolving in Turkey especially over the last decade. Thus, it seems important to determine the effects of participation banking on the real economic activity as well as the effects of the macroeconomic policies on economic performance. On this account, a Structural Vector Autoregression (SVAR) model is employed for the period from January 2006 to March 2011. Empirical results from the impulse-response analysis of the SVAR model emphasized that Central Bank of Turkey (CBRT) and the fiscal policy authority should implement coordinated policies not only to maintain price stability but also to foster the development of participation banking for overcoming unemployment problem in Turkey.

Keywords: Islamic Banking, Conventional Banking, Real Economic Activity, SVAR Model.

JEL Classification Codes: E32, E51, E52, E43

1. Introduction

The Islamic rulings are codified in Islamic law or Sharia referring to the contained or derived from Qur'an and the Sunnah of the Prophet Muhammed. Sharia according to the Quran emphasizes the importance of establishing a society that bases on fairness and justice. Accordingly, Islamic rulings' intent is to build system across the society that includes financial and business elements. In Islam, profit-and-loss sharing is consented for the use of money, but predetermined return is forbidden. Thus, riba as such interest is banned. Islamic financing is linked with physical transactions or the real economic activity. Besides, financing is directed to useful products as it is related to ethical and moral values. While forbidding the rate of interest and permitting the rate of return, the main goal is to encourage trade and profit motive. Islamic financing produces factors of production, goods and services for which payment is determined. The real outcome of production process is shared between the financier and the entrepreneur. Profit is fairly distributed since a fixed parity is not predetermined like interest-based lending. In the wake of the financial integration process, as the flow of international investments and opportunities for productive projects has proved to be dominant in globally connected financial markets, Islamic banking appeared to promote financial integration and maintain economic stability using its own financing methods such as profit-and-loss sharing mechanisms, consumer finance, trade finance, working capital finance and project finance.

Islamic finance and banking system grew gradually following the establishment of the first Islamic bank which was founded in Egypt's Mit Gamr village in 1963. After Egypt's Social Bank of Nasir was founded in 1971, Islamic Bank of Dubai started to raise funds in 1975. These two banks were the two examples of this new system. Subsequently, implementation of Islamic banking expanded in the world. In this process, the need of an international Islamic Bank to foster the sustainable development of Islamic banking system was exposed at the Finance Ministers of Muslim countries 1973 conference that was held in Jeddah, whereupon Islamic Development Bank (IDB) was founded in 1975.

Turkey also became a member of the IDB that was founded in 1975. Turkey raised its capital in the IDB gradually. Thus, Turkey had the right of a permanent member in board of directors. Parallel to this phenomenon, Islamic banking system in Turkey or namely the participation banking was formed in 1983 with the Special Finance Houses decree. With this new system, contribution of funds to economy that had been stagnant for various reasons especially for religious reasons was targeted. Participation banking system in Turkey grew gradually, and therefore the number of employees and branches of these banks increased throughout years as shown in Table 1.

Table 1: Participation Banking System in Turkey by Employees and Branches

Years	No.of Employees	No.of Employees (%) Change	No.of Branches	No.of Branches (%) Change
1990	645	28	21	31
1991	813	26	25	19
1992	961	18	32	28
1993	1.213	26	42	31
1994	1.170	-4	43	2
1995	1.514	29	56	30
1996	1.967	30	75	34
1997	2431	24	114	52
1998	2.613	7	118	4
1999	2.672	2	117	-1
2000	2.182	-18	109	-7
2001	1.964	-10	115	6
2002	2.530	29	148	29
2003	3.504	38	188	27
2004	4.791	37	256	36
2005	5.749	20	290	13
2006	7.114	24	355	22
2007	9.215	30	422	19
2008	11.032	20	530	26
2009	11.802	7	558	6
2010	12.703	8	607	8

Source: The Participation Bank Association of Turkey (TKBB)

Participation banks' number of employees and branches tended to increase between 1990 and 2010 in Turkey indicating the growth of participation banking. However, economic crises in Turkey also affected the participation banking system negatively. As a result of the economic crises in 1994, employees of these banks decreased. Besides, the two economic crises in 1999 and in 2001 led contraction in the sector. Especially, the 2001 economic crises affected the sector seriously and caused Ihlas Bank to go bankrupt. Therefore, new regulations were made in the participation system. With the new banking law in 2005, Savings Deposit Insurance Fund (SDIF) was founded and participation funds in the domestic branches of these banks were insured up to an amount of 50.000 Turkish Lira (TRY). Related to the new regulations, the participation banking system grew rapidly between 2005 and 2010 despite the Gross Domestic Product (GDP) of Turkey decreased in the ratio of 4,7% in 2009 according to Turkish Statistical Institute (TÜİK). Thus, the number of employees and branches increased in the ratio of 100% approximately from 2005 to 2010.

Growth of the participation banking system can also be detected as some indicators related to the system are carefully investigated. Table 2 shows the evaluation of the system on both asset and liabilities side between 2005 and 2010 by providing some financial measures. According to Table 2, funds raised by the participation banks and participation banks loans increased rapidly in this period¹. On the other hand, from 2005 to 2009, the share of loans in assets was around 70%, whereas participation banks loans were approximately 75% on average in proportion to the total value of raised funds and shareholder's equity. These measures expose the increased integration of participation banks with Turkey's economy. Furthermore, the share of net past-due loans in participation banks loans was approximately 1,5% on average between this period. This ratio indicates the efficient performance of participation banks' financing methods, implying that participation banks avoided from financing risky projects in Turkey. Nonetheless, the share of loans received and miscellaneous payables in assets and shareholder's equity grew gradually between 2005 and 2007 and reached their maximum values in 2007 as 6,1% and 50% according to Table 3. But, after the year 2007, these two ratios fell because of the rapid growth of participation banks' assets and shareholder's equity in relation to these banks' debt. In this process, the participation banks' profitably also grew. Between these years, while the share of profit in shareholder's equity was around 20%, profit was around 2,5% in proportion to assets. These measures also show that the participation banks performed well from 2005 to 2010. But, profit and total volume of loans of these banks can be interpreted as insufficient considering the development potential of the participation banking system in Turkey since most of Turkey's citizens are Muslims. Table 2 indicates that in 2010, assets of participation banks amounted to 4,3% of the sector total, whereas 5,8% of the total banking sector loans were extended by participation banks.

Table 2: Evaluation of Participation Banking System by Financial Measures

	Years					
	2005	2006	2007	2008	2009	2010
Funds Raised	8.478	11.223	14.762	18.890	26.595	33.477
Loans	6.455	9.242	13.828	17.442	23.616	31.079
Working Capital Loans (Million TRY)	2.557	3.338	5.490	6.958	13.826	19.689
Consumer Loans (Million TRY)	980	1.588	1.758	1.804	2.504	3.713
Profit (Million TRY)	244	399	526	646	707	758
Loans / Assets	64,8%	67,6%	71,8%	68%	70%	71,8%
Loans /(Funds Raised + Shareholder's Equity)	68,5%	72,2%	80,7%	77,1%	76,1%	79,8%
Net Past-Due Loans / Loans	1,8%	1,3%	1,6%	2,1%	1,6%	1%
(Loans Received+ Miscellaneous Payables)/Assets	2,6%	3,6%	6,1%	5,7%	2,3%	4,4%
(Loans Received+ Miscellaneous Payables)/ Profit/Shareholder's Equity	27,8%	32,1%	50%	39,2%	17,9%	35,4%
Profit/Assets	2,4%	2,9%	2,7%	2,5%	2%	1,7%
Assets / Banking Sector Total Assets	2,4%	2,7%	3,3%	3,5%	4%	4,3%
Loans/ Banking Sector Total Loans	4,2%	4,2%	4,9%	4,8%	6%	5,8%

Source: CBRT and BDDK

Measures related to the participation banking system in Table 1 and 2 imply that participation banking system and its financing has been developing in Turkey. Therefore, in addition to macroeconomic policy implementations, influence of the participation banking system on the real economic activity may be expected to rise in future periods. Therefore, participation banks loans may be considered as an important factor for overcoming the unemployment problem in Turkey since

¹ Participation banks support real sector by allocating their raised funds through several channels. Thus, the term "loan" may be replaced with "allocated funds". However, Central Bank of Turkey (CBRT) and Banking Regulation and Supervision Agency (BDDK) use the term "loan" instead of "allocated funds" in their statistic database. Accordingly, the term loan is preferred and used in this study.

financing of participation banks is linked with the real economic activity. This study which investigates the effects of monetary policy implementation and participation banks on the real economic activity of Turkey in open economy framework fills the gap in the literature in that short-run restrictions attributable to economic theory are imposed within the methodology of Structural Vector Autoregression (SVAR) model developed by Blanchard and Watson (1986), Bernanke (1986) and Sims (1986). Thereby, it is aimed to expose whether monetary policy stance of the Central Bank of Turkey (CBRT), participation banks loans, and real effective exchange rate have impact on labor force, and therefore lead to the labor force participation rate to increase/decrease in the following periods via SVAR model impulse response analysis.

In accordance with this aim, SVAR model considering short-run relations among variables is estimated for the period from January 2006 to March 2010 since labor force market data by the new population projections for Turkey is available from 2006. In the empirical analysis, the consequences of CBRT's monetary policy stance is reflected by the 1-month interest rate on deposit that is a major determinative of conventional banks' loan interest rates because of the lack of monthly data for conventional banks' loan interest rates. Labor force participation rate measured by the percentage of working-age population (the ages of 15 to 64, according to TÜİK) in an economy who are employed and unemployed but looking for a job is used in this study for analyzing the effects of changes in monetary implementation and participation banks loans on labor force. Furthermore, real exchange rate movements are included into the model for considering the role of real exchange rate fluctuations on the other variables of the model. Thus, producer price index (PPI) based real effective exchange rate index of CBRT computed in relation to the year 2005 is used in the empirical analysis². In this study, all series are sourced from CBRT and while participation banks loans and real effective exchange rate index series are specified in natural logarithms, 1-month interest rate on deposit and labor force participation rate series are in percentage terms.

The plan of the paper is as follows. Section 2 reviews some theoretical considerations and previous studies. In Section 3 the data and empirical methodology of the study are introduced. Section 4 discusses empirical results and findings of the paper. Finally, Section 5 contains concluding remarks and points out some issues for further research.

2. Theoretical Considerations and Previous Research

Both conventional and Islamic banks are actors in money markets as financial intermediates. They take funds and channel these funds for economic transactions and activities. On the other hand, central banks increase or decrease the liquidity in money markets by determining the policy interest rate as the authority of monetary policy. Changes in interest rate policy of central banks affect various types of interest rates with different term structure and the amount of available credit. Accordingly, the macroeconomic variables are influenced by the central banks with credit channel mechanism (Cook and Hahn, 1989; Kuttner, 2001; Cochrane and Piazzesi, 2002; Rigobon and Sack, 2004; Driscoll, 2004; Kashyap and Stein, 2000; Kishan and Opiela, 2006; Ashcraft, 2006). Besides, monetary of policy stance of central banks leads to changes in international market interest rates. Within this context, Valente (2005) examined the effect of US monetary policy announcements on the term structure of US interest rate differentials between Hong Kong and Singapore employing Ordinary Least Squares (OLS) model with daily data generally between 1994 and 2004. The findings exposed that US monetary policy announcements influenced the behavior of the term structure of interest rates in US and in the two Asian countries. When evaluating the degree and speed of policy rate pass-through expectations relating to the macroeconomic variables should also be considered. Kleimeier and Sander (2004)

² In CBRT's real effective exchange rate index computation, methodologies followed by the European Central Bank (ECB) and the Bank for International Settlements (BIS) are adopted. CBRT uses 31 and 20 countries' trade weights in forming the PPI based real effective exchange rate index. An increase in the index indicates appreciation, whereas a decrease denotes depreciation of the TRY.

investigated the role of interest rate expectations in determining retail banking product pricing in the Eurozone by cointegration techniques on the basis of monthly data from January 1999 to May 2003. The results exposed that interest rate pass-through would be faster when monetary policy changes were correctly anticipated especially in loan markets. In addition to macroeconomic expectations, the impact of ownership on the reaction of banks to monetary policy is another factor determining the efficiency of policy rate pass-through. Bhaumik et al. (2010) explored whether the effectiveness of monetary policy through a lending channel differs across banks with different ownerships in India using approximately over 300 bank-year observations from 2000 to 2007. It was suggested that bank lending channel was likely to function much better if banks had arms length relationship with borrowers according to the regression estimates.

Wind of globalization phenomenon has led to financial integration and deregulation process all over the world. Thus, financial development has increased, whereupon the total volume of available credits has grown. At this point, financial development has become a major factor for sustaining economic development and economic stability. Most empirical studies in the literature concluded that development of the financial sector is a factor promoting economic growth (Berglöf and Roland, 1995; Levine, 1997; Wachtel, 2001; Berglöf and Bolton, 2002). Nonetheless, Koivu (2002) analyzed the relationship between financial sector and economic growth using a fixed-effects panel model with unbalanced panel data from 25 transition countries during the period 1993-2000. It was revealed that growth of credit was not always a factor for sustaining economic development alone, besides efficiency in banking sector was important. For analyzing the effects of financial development on the real economic activity, econometric models allowing for theoretical considerations to be incorporated into the estimation process may also be used. Within this context, Rahman (2004) investigated the long-run impact of financial development on capital formation and per capital income in Bangladesh. Blanchard and Quah's (1989) technique of SVAR was employed with annually data from 1976 to 2005. The study indicated that financial development stimulated investment activities and had impact on per capital income.

As a result of financial integration process, financial development may also lead to an increase in the volume of non-return credits. Accordingly, growing non-return credits may become an important risk factor for economic agents since they may cause credit crunch, financial fragility, and therefore financial crises. At this point, currency mismatch in portfolios of firms and financial sector should also be considered when analyzing the possible effects of financial crisis as suggested by Gertler et al. (2003), Cespedes (2004), Choi and Cook (2004) and Cook (2004). In an effort to investigate the consequences of the financial crisis, Bougheas et al. (2007) studied the impact of the Asian crisis on exporting and non-exporting firms in Thailand, Indonesia, Malaysia and Korea. For the empirical analysis, a differenced Generalized Method of Moments (GMM) model was carried using a large panel of balance sheet data of the firms' for the period 1996-2004. It was revealed that smaller and less profitable firms were indeed less likely to obtain credit than larger, export-oriented firms in the wake of economic crises. Possible effects of credit crunch on financial intermediates should also be analyzed since they are major determinative in financial markets. Dahduli (2009) investigated the difference between Islamic and conventional banks in the Gulf Co-operation Council (GCC) market for the data from 2000 and 2008 on the basis of the effects of credit crunch. Two-sample *t*-test with unequal variances and nine ratios for 76 banks were employed to compare measures of liquidity, credit risk and profitability in the study. It was pointed that Islamic banks generally performed better than conventional banks in the wake of credit crunch and they were less exposed to credit risk with superior credit performance in relation to conventional banks. On the other hand, risk structure of credit stock is an important factor that should be considered when monetary policy is being conducted. Cappiello et al. (2010) investigated the credit channel of monetary policy transmission in Euro-area. They estimated OLS regressions and OLS panel regressions with quarterly data over the period 1999-2008. The findings emphasized the importance of monitoring credit developments in monetary policy implementation since the supply of credit influenced real economic activity.

Efficiency of banking system is also critically important for the success of the monetary policy implementation since banks are major financial intermediates in money markets. Accordingly, efficiency of Islamic banks as a financial intermediate should also be maintained in search of macroeconomic stability. However, there are not many studies in the literature investigating the efficiency of the Islamic banking system and the consequences of Islamic banks' performance. Samad (1999) explored the efficiency of Islamic banks in Malaysia for the period 1992-1996 and revealed that there is no major difference in performance between Islamic and conventional banks with respect to profitability and liquidity. Hassan and Bashir (2003) also analyzed the performance of Islamic banks during 1994-2001 to predict profitability and efficiency using Generalized Least Squares (GLS) estimation by pooling bank level data across 21 countries. Empirical findings of the study revealed that high capital and loan-to-asset ratios led to higher profitability. In another effort examining the efficiency of Islamic banks, Yudistira (2004) evaluated the performance of 18 Islamic banks in the world between 1997 and 2000 by Data Envelopment Analysis (DEA). It was concluded that inefficiency across 18 Islamic banks was relatively small compared to conventional banks. In addition to the studies by Samad (1999), Hassan and Bashir (2003) and Yudistira (2004), El-Gamal and Inanoglu (2005) explored the efficiencies of 53 Turkish banks using likelihood-based stochastic frontier analysis for the period 1990-2000 using a panel data set of 49 conventional banks and 4 special finance houses. It was revealed that Islamic banks were more efficient than conventional banks and also Islamic financing would help mobilize funds, and therefore play a valuable role in economies of countries with large Muslim populations. More recently, Čihák and Hesse (2010) used Z-scores as a measure of financial stability and conduct a comparative analysis coupled with a regression that controlled for bank specific, economic independent variables based on evidence covering individual Islamic and commercial banks in 18 banking systems. Results of the study stressed that small Islamic banks outperformed better than their larger Islamic rivals and conventional peers.

3. Data and Set-Up of Svar Model

3.1. Data

Stationary among the variables is to be tested to specify the appropriate form of econometric model before the estimation procedure. Unit root tests determine whether series are stationary or not. The most widely used is the Augmented Dickey-Fuller (ADF) test Makridakis et al. (1998:329). In this study, series were differenced a maximum number of times necessary for inducing stationary. This strategy is namely the Pantula principle that was proposed by Pantula (1989). In this procedure, if a linear trend term is needed in the test for y_t , then only a constant term should be used in the test for Δy . Similarly, if just a constant is necessary in the test for y_t , the test for Δy is to be carried with no deterministic term. The ADF test bases on the estimation of the three regression models below;

$$\Delta y_t = \mu + t + \varphi \Delta y_{t-1} + b_1 \Delta y_{t-1} + b_2 \Delta y_{t-2} + \dots + b_p \Delta y_{t-p} \quad (1)$$

$$\Delta y_t = \mu + \varphi \Delta y_{t-1} + b_1 \Delta y_{t-1} + b_2 \Delta y_{t-2} + \dots + b_p \Delta y_{t-p} \quad (2)$$

$$\Delta y_t = \varphi \Delta y_{t-1} + b_1 \Delta y_{t-1} + b_2 \Delta y_{t-2} + \dots + b_p \Delta y_{t-p} \quad (3)$$

In the regression models above, Δy denotes differenced series $y_t - y_{t-1}$. p is the number of lagged differences, φ and $b_1 \dots b_p$ are the parameter coefficients. Finally, while μ is the intercept, t is the trend term. The pair of hypothesis $H_0 : \varphi = 0$ versus $H_0 : \varphi < 0$ that bases on φ 's t-statistic from an OLS estimation of the equations above, is tested. If the null hypothesis is rejected, y_t is nonstationary, whereas if the null hypothesis is accepted, y_t has a unit root and is stationary. The number of lagged

differences in the regressions that allows a maximum lag length (p) of 10 is set by the Schwarz Criterion (SC)³.

Table 3: ADF Test Results

Variables	ADF Test Statistic	Deterministic Terms	No. of Lagged Differences
<i>LPR</i>	-0,09	Constant	6
ΔLPR	-7,16	None	5
<i>INT</i>	-0,09	Constant	1
ΔINT	-5,85	None	0
<i>LOAN</i>	-0,54	Constant, trend	0
$\Delta LOAN$	-7,77	Constant	0
<i>RER</i>	-2,32	Constant	4
ΔRER	-5,46	None	3

Notes: For the ADF test with constant and trend term, constant term and with no deterministic term; 5% critical values are 3,41, -2,86 and -1,96 respectively, whereas 10% critical values are -3,13, -2,56 and -1,62 for each of the regression model that ADF bases. Critical values are from Davidson and McKinnon Estimation and Inference in Econometrics, p.708 Table: 20.1.

All series used in this study have a nonzero mean and don't have a linear trend component except participation banks loans. Therefore, while the ADF test is applied to participation banks loans series with linear trend, other series' ADF test is carried without linear trend. As shown from Table 3, all series are $I(1)$. Some authors like Sims (1980), Cooley and Leroy (1985), Sims et.al (1990), Enders (1995) and Doan (2004) recommend against differencing time series, as differencing throws away the possibility of cointegrating relations between the variables. Besides, the residuals will be stationary because of the inclusion of the lagged levels of variables in VARs even with $I(1)$ variables. The possibility of spurious relationships between the $I(1)$ variables may still exist. Furthermore, a SVAR in differences would lead to losing information on the comovement among the variables according to Brooks (2002). In consequence, a SVAR model in levels form is estimated even all variables in the model are $I(1)$ since the primary goal of the study is to study the interrelationships between the variables not to determine efficient parameter estimates as Sims (1980) recommended.

3.2. SVAR Model Methodology

The point of departure is a K -dimensional stable VAR(p) process;

$$y_t = v + A_1 y_{t-1} + \dots + A_p y_{t-p} + u_t \quad (4)$$

where $y_t = (y_{1t}, \dots, y_{kt})'$ is a vector of K observable endogenous variables. The A_i are fixed ($K \times K$) coefficient matrices, $v = (v_1, \dots, v_k)$ is a fixed ($K \times 1$) vector of intercept terms allowing the possibility of a nonzero mean $E(y_t)$. Finally, $u_t = (u_{1t}, \dots, u_{kt})'$ is a K -dimensional unobservable zero-mean white noise or innovation process that is $E(u_t) = 0$ and has covariance matrix $E(u_t u_t') = \Sigma_u$ Lütkepohl (2005:13).

Impulse response functions are estimated to explore the interactions between the endogenous variables of a VAR model. In impulse response analysis, exogenous and deterministic variables (a constant, a linear trend and dummies) are dropped from the system. When intercept term is excluded for simplicity, stable VAR(p) process can be expressed as;

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + u_t \quad (5)$$

³ Schwarz Criterion can be specified as; $SC = T \ln(\text{residual sum of squares}) + n \ln(T)$, where n is the number of parameters estimated and T is the number of usable observations.

The stationary y_t process (5) has a Wold moving average (MA) representation below;

$$y_t = \Phi_0 u_t + \Phi_1 u_{t-1} + \Phi_2 u_{t-2} + \dots, \quad (6)$$

where I_K is an $(K \times K)$ identity matrix, $\Phi_0 = I_K$ and the Φ_s can be computed recursively as;

$$\Phi_s = \sum_{j=1}^s \Phi_{s-j} A_j, \quad s=1,2,\dots, \quad (7)$$

where $A_j = 0$ for $j > p$. The coefficients of this representation are the responses to impulses hitting the system or the point estimates for impulse response function. The $(i, j)^{th}$ elements of the matrices Φ_s that trace out the expected response of $y_{i,t+s}$ to a unit change in y_{jt} holding constant all past values of y_t , are a function of s . Thereby, the elements of Φ_s represent the impulse responses of the components of y_t with respect to the u_t innovations. These impulse responses are called as forecast error impulse responses. On the other hand, the accumulated effects of the impulses are easily obtained by adding up the Φ_s matrices Breitung et.al (2007:166). The total long-run effects are given by;

$$\Phi = \sum_{s=0}^{\infty} \Phi_s = (I_K - A_1 - \dots - A_p)^{-1} \quad (8)$$

For nonstationary processes the Φ_s impulse response matrices can also be computed in the same way like stationary processes. Thus, forecast error impulse responses are available despite some variables are not $I(0)$. Besides, impulses hitting a nonstationary system may have permanent effects. Forecast error impulse responses may not reflect the relations between the variables since the components of u_t may be instantaneously correlated. Thus, Σ_u may not be diagonal matrix. At this point, the innovations of VARs are orthogonalized using a Cholesky decomposition of the covariance matrix Σ_u . Denoting by B a lower triangular matrix such that $\Sigma_u = BB'$, the orthogonalized shocks that based on a one standard deviation shock, are given by $\varepsilon_t = B^{-1}u_t$ JMulti Help System (2008). In stationary case the form below is expressed;

$$y_t = \Psi_0 \varepsilon_t + \Psi_1 \varepsilon_{t-1} + \dots, \quad (9)$$

where $\Psi_i = \Phi_i B$ ($i=0,1,2,\dots$). $\Psi_0 = B$ is lower triangular. While, an ε or one standard deviation shock in the first variable may have an instantaneous effect on all the variables, a shock in the second variable cannot have an instantaneous impact on y_{1t} but only on the other variables of the VAR model. As a different ordering of the variables in the vector y_t may produce different impulse responses, SVAR model has been developed JMulti Help System (2008).

SVAR model is used to identify the shocks in an impulse response analysis. Therefore, restrictions are imposed on the matrices A and B in the model form.

$$A y_t = A_1^* y_{t-1} + \dots + A_p^* y_{t-p} + B \varepsilon_t \quad (10)$$

where A_i^* , s ($i=1,\dots,p$) are $(K \times K)$ coefficient matrices. $B \varepsilon_t$ represents the residuals and ε_t is a $(K \times 1)$ vector of structural shocks with covariance matrix $E(\varepsilon_t \varepsilon_t') = \Sigma_t$ which is specified to be an identity matrix. For identifying the structural form parameters, the matrix A exposing the contemporaneous relations between the variables is set to I_K identity matrix. In the AB -model, the relation to the

reduced form residuals is given by $Au_t = B\varepsilon_t$. Thus, a SVAR model's impulse responses can be obtained from process (10) with $\Psi_j = \Phi_j A^{-1}B$ Breitung et.al (2007:162-167).

3.3. Identification of the SVAR Model

In the empirical analysis, a SVAR model based on VAR framework in process (4) is employed for considering the influence of monetary policy stance of CBRT, participation banks loans and real exchange rate on labor participation rate in Turkey. Within this context, the vector of time series variables is $y_t = (LPR_t, INT_t, LOAN_t, RER_t)'$ and the vector of the errors are denoted by; $u_t = (u_t^{LPR}, u_t^{INT}, u_t^{LOAN}, u_t^{RER})'$. The constructed SVAR model can be identified as;

$$u_t^{LPR} = a_{12}u_t^{INT} + a_{13}u_t^{LOAN} + b_{11}\varepsilon_t^{LPR} \quad (11)$$

$$u_t^{INT} = b_{22}\varepsilon_t^{INT} \quad (12)$$

$$u_t^{LOAN} = a_{31}u_t^{LPR} + b_{33}\varepsilon_t^{LOAN} \quad (13)$$

$$u_t^{RER} = a_{41}u_t^{LPR} + a_{42}u_t^{INT} + a_{43}u_t^{LOAN} + b_{44}\varepsilon_t^{RER} \quad (14)$$

Structural shocks in the SVAR model are identified by placing some restrictions on contemporaneous relationships. In this study, the methodology of Amisano and Gianini (1997), known as the namely the AB-model that can be written as $Au_t = B\varepsilon_t$, is followed. Thereby, orthogonalized impulse-response functions basing on a one standard deviation shock ($\varepsilon_t = B^{-1}u_t$) are applied. The restrictions placed on the contemporaneous relationships among the variables are characterised by;

$$\begin{bmatrix} 1 & * & * & 0 \\ 0 & 1 & 0 & 0 \\ 0 & * & 1 & 0 \\ * & * & * & 1 \end{bmatrix} u_t = \begin{bmatrix} * & 0 & 0 & 0 \\ 0 & * & 0 & 0 \\ 0 & 0 & * & 0 \\ 0 & 0 & 0 & * \end{bmatrix} \varepsilon_t \quad (15)$$

In AB-model, there are $K(K+1)/2$ equations. The two matrices A and B have K^2 elements each. Thus, at least $2K^2 - K(K+1)/2$ restrictions are need to be imposed to identify all $2K^2$ elements of A and B Lütkepohl (2005:364). As number of variables K is 4 in this study, 22 restrictions on A and B matrix should be placed. There are 10 restrictions for A matrix (4 ones and 6 zeros), whereas 12 zero restrictions for B matrix. Above, the unrestricted elements of the A and B matrices are indicated by asterisks. The following interpretations depending on the expression (15) can be made:

- Labor force participation rate is affected by the 1-month interest rate on deposit contemporaneously. Rises/falls in the deposit interest rate can lead to contemporaneous changes in consumption and investment total expenditures affecting labor force since the structure of Turkey's industry is labor-intensive. It is also assumed that participation banks loans will be spent as soon as they are obtained leading to changes in labor force participation rate. Thus, participation banks loans cause contemporaneous reactions in the labor force participation rate.
- It is assumed that 1-month interest rate on deposit does not respond to labor force participation rate contemporaneously. Because, CBRT does not make contemporaneous changes in the policy interest rate, and therefore in the deposit interest rate considering the labor force participation rate since its main goal is to maintain price stability. Besides, conventional banks determine their deposit interest rates according to the macroeconomic conditions. However, direct information on the labor participation rate is not available within the month. CBRT announces the labor participation rate data in the following periods. Therefore, conventional banks do not change the deposit interest rate contemporaneously. Expression (15) also indicates

that the deposit interest rate does not react to participation banks loans since there is no contemporaneous effect of participation banks loans on the deposit interest rate. However, the deposit interest rate may respond to participation bank loans in the long-run. But, this situation can not be explored with the use of the SVAR AB -model.

- Participation banks also change the volume of their available loans by considering the variables relating to the macroeconomic situation. However, participation banks loans do not react to labor force participation rate contemporaneously because of the information lags of labor participation rate. On the other hand, when determining the market interest rate, possible rate of return in the economy is considered. Thus, participation banks loans are not insensitive to this rate of return. Thereby, it is assumed that 1-month interest rate on deposit has contemporaneous effects on participation banks loans.
- Real effective exchange rate does not lead to contemporaneous reactions in the other variables of the model since it is supposed that real effective exchange rate is not a major determinative of the macroeconomic conditions in the short-run. However, it is assumed that real effective exchange rate responds to all variables in the model contemporaneously, as is common in SVAR studies.

4. Empirical Results

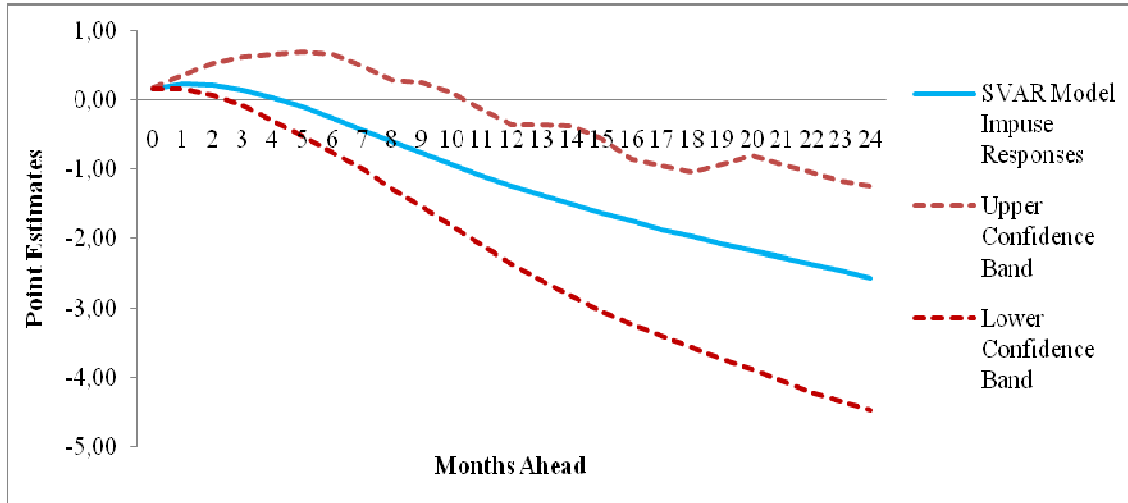
In this study, a 4-variable SVAR model is estimated depending on a VAR model with constant terms. For determining the optimal lag length of the VAR model, SC is employed and a lag length of 1 is suggested by the SC ⁴. Thus, applied SVAR model depends on VAR(1) model. Within this framework, SVAR model accumulated impulse response functions are used to especially show how labor force participation rate reacts to a positive one standard deviation shock in other variables for the next 24 months considering the dynamic behavior of the system. In the impulse-response analysis, confidence intervals are implemented for reflecting the estimation variability of estimated impulse responses. Thereby, 90% Hall's Percentage Intervals are used based on 100 bootstrap replications⁵. Impulse-response analysis results of the SVAR model are shown in Figures 1-3.

Figure 1 shows that as a result of a one standard deviation shock in the deposit interest rate, real economic activity tends to decline. From the 5th month negative effects begin to be persistent for labor demand and supply, and therefore labor force participation rate falls. It beckons that as the interest rate increases, real economic activity is deteriorated, whereupon labor demand and supply decreases in Turkey. Thus, in long-run employment rate may not rise but fall. This finding exposes the importance of keeping interest rates low for overcoming the unemployment problem in Turkey.

⁴ For determining the appropriate lag length of VAR model, Schwarz Criterion in the form; $SC = T \log |\Sigma_u| + N \log(T)$ is used, where $|\Sigma_u|$ denotes the determinant of the variance/covariance matrix of the residuals and N is the total number of parameters estimated in all equations.

⁵ See Hall (1992).

Figure 1: Response of Labor Force Participation Rate to a Positive Shock in Deposit Interest Rate



As can be shown in figure 2, impulse response analysis implies that a positive one standard deviation shock in participation banks loans leads to a jump in real economic activity for the following periods. Thus, labor demand and supply increase and labor force participation rate rises. According to this finding, growth of the volume of participation banks loans should be sustained for increasing employment in Turkey. Within this context, policies promoting the participation banking system should seriously be implemented.

Figure 2: Response of Labor Force Participation Rate to a Positive Shock in Participation Banks Loans

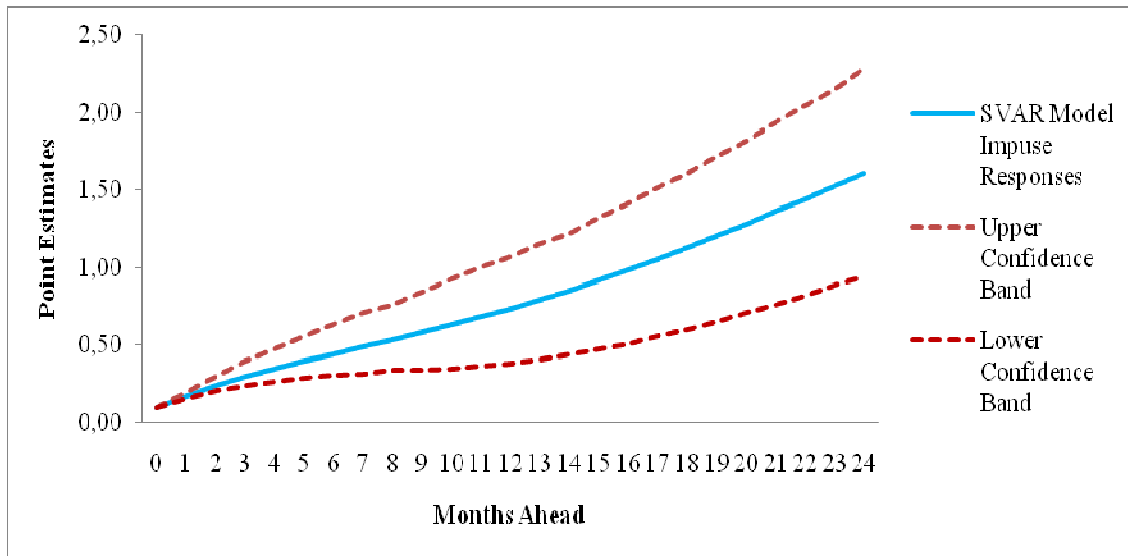
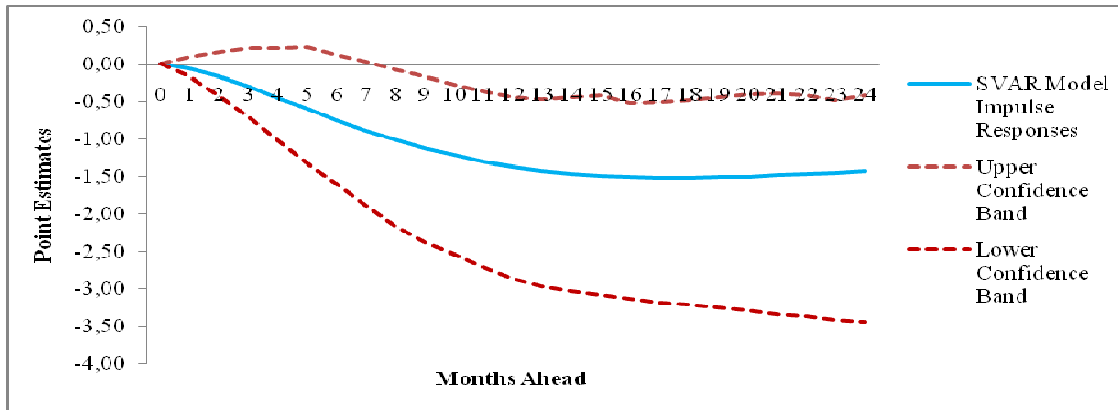


Figure 3 reveals that a positive one standard deviation shock in real effective exchange rate indicating the appreciation of TRY according to the real exchange rate index computation of CBRT engenders a contraction trend in real economic activity for the following periods significantly. It is revealed that the real effective exchange rate is a major determinative of the real economic activity. On the other hand, real exchange rate misalignment should not occur for maintaining macroeconomic stability. Accordingly, CBRT should consider the macroeconomic situation both in Turkey and in the world and implement an exchange rate policy in accordance with the monetary policy for increasing the labor participation rate.

Figure 3: Response of Labor Force Participation Rate to a Positive Shock in Real Effective Exchange Rate

5. Conclusion

According to impulse-response analysis, a positive one standard deviation shock in the 1-month interest rate on deposit engenders a decline in labor force participation rate. This phenomenon arises from a decrease in consumption and investment expenditures. Accordingly, real economic activity is deteriorated, and economic development is hindered in the long-run. At this point, macroeconomic policy coordination should be maintained to achieve price stability target, whereupon to keep interest rates low. Within this context, interactions between monetary and fiscal policy should be analyzed in open economy framework. Thereby, optimal macroeconomic policy should be formulated and implemented.

Impulse-response analysis also shows that a positive one standard deviation shock in participation banks loans leads the real economic activity to grow, and therefore an up-trend in labor force participation rate for the following periods. This finding stresses the importance of channelling funds between surplus and deficit agents for overcoming the unemployment problem in Turkey permanently. At this point, sustaining the development of participation banking system has become critically important. Accordingly, economic policies both on micro and macro basis should be implemented for increasing the total volume of participation banks loans. On the other hand, risky projects should not be financed by the participation banks and excess credit supply and demand should not occur in participation banking system. Within this context, implementation of credit rationing by participation banks that influences tenure choice may be used. Besides, financing of the banks should not only be screened by participation banks themselves but also by the Banking Regulation and Supervision Agency (BDDK) in Turkey. Thus, the role of the BDDK should be increased in participation banking system as a regulator.

In addition to rise in the deposit interest rate, appreciation of TRY is proven to be another factor of the contractions in the real economic activity in Turkey according to the empirical findings. As a result of a positive one standard deviation shock in real effective exchange rate causes labor demand and supply to decrease leading to a fall in labor participation rate. Therefore, real exchange rate misalignment by the appreciation of TRY should not occur not to raise unemployment rate in Turkey. Within this context, while implementing monetary and fiscal policy to attain the determined inflation target, nominal exchange rate of TRY should also be considered not to lead TRY's appreciation. CBRT should use its policy instruments not only to maintain price stability but also to hinder sharp rises/falls of nominal exchange rate of TRY in currency market.

The empirical findings of the study emphasize that for analyzing the changes labor force participation rate, shocks in other variables of the SVAR model should seriously be considered. Thereby, it is concluded that labor force that is also important to the notion of production capabilities and the total volume of participation banks loans should be increased for maintaining macroeconomic

stability. Accordingly, CBRT and government should implement coordinated economic policies that will foster the growth of participation banking in Turkey.

References

- [1] **Ashcraft, A. (2006)** "New Evidence on the Lending Channel." *Journal of Money Credit and Banking* 38(3): 751-76.
- [2] **Amisano, G. and Giannini, C. (1997)** *Topics In Structural Var Econometrics Second Edition*. New York: Springer Verlag.
- [3] **Bernanke, B. (1986)** "Alternative Explanations of the Money-Income Correlation." *Carnegie-Rochester Series on Public Policy*, 25(1): 49-99.
- [4] **Berglöf, E. and Roland, G. (1995)** "Bank Restructuring and Soft Budget Constraints in Financial Transition." *Journal of the Japanese and International Economies*, 9(4): 354-375.
- [5] **Berglöf, E. and Bolton, P. (2002)** "The Great Divide and Beyond – Financial Architecture in Transition." *Journal of Economic Perspectives* 16(1): 77-100.
- [6] **Bhaumik, S.K., Dang, V. and Kutan, A. M. (2010)** "Implications of Bank Ownership For The Credit Channel Of Monetary Policy Transmission: Evidence From India." *William Davidson Institute Working Paper* 988: 1-33.
- [7] **Blanchard, O.J. and Watson, M.W. (1986)** "Are Business Cycles All Alike?" In R.J. Gordon (Ed), *The American Business Cycle: Continuity and Change*, pp. 123-56, Chicago, University of Chicago Press.
- [8] **Blanchard, O.J. and Quah, D. (1989)** "The Dynamic Effects Of Aggregate Demand And Supply Disturbances." *American Economic Review* 79(4): 655-673.
- [9] **Bougheas, S., Mizen, P. and Yalcin, C. (2007)** "An Open Economy Model of Credit Channel Applied To Four Asian Economies." *HKIMR Working Paper* 8: 1-34.
- [10] **Breitung, J., Brüggemann, R. and Lütkepohl, H. (2007)** "Structural Vector Autoregressive Modeling And Impulse Responses" In H. Lütkepohl and M. Kratzig (Ed), *Applied Time Series Econometrics*, pp.159-195, New York: Cambridge University Press.
- [11] **Brooks, C. (2002)** *Introductory Econometrics for Finance*. Cambridge: Cambridge University Press.
- [12] **Cappiello, L., Kadareja, A., Sørensen, C.K. and Protopapa, M. (2010)** "Do Bank Loans and Credit Standards Have An Effect On Output?." *ECB Working Paper* 1150: 1-33.
- [13] **Céspedes, L. (2004)** "Credit Constraints and Macroeconomic Instability in a Small Open Economy." *Econometric Society 2004 Latin American Meetings* 264: 1-33.
- [14] **Choi, W-G. and Cook, D. (2004)** "Liability Dollarization and the Bank Channel." *Journal of International Economics* 64(2): 247-275.
- [15] **Čihák Martin and Heiko H. (2010)** "Islamic Banks and Financial Stability: An Empirical Analysis." *Journal of Financial Services Research* 38(2): 95-113.
- [16] **Cochrane, J. and Piazzesi, M. (2002)** "The Fed and Interest Rates - A High Frequency Identification." *American Economic Review Papers and Proceedings* 92: 90-5.
- [17] **Cook, T. and Hahn, T. (1989)** "The Effect of Changes in the Federal Funds Rate Target on Market Interest Rates in the 1970s." *Journal of Monetary Economics* 24: 331-51.
- [18] **Cook, D. (2004)** "Monetary Policy in Emerging Markets: Can Liability Dollarization Explain Contractionary Devaluations?," *Journal of Monetary Economics* 51: 1155-1181.
- [19] **Cooley, T.F. and Leroy, S. F. (1985)** "A theoreticalmacroeconometrics: A critique." *Journal of Monetary Economics* 16(3): 283-308.
- [20] **Dahduli, M.S. (2009)**, "Islamic Banking and the Credit Crunch." http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1570613, (accessed September 30, 2010).
- [21] **Doan, T.A. (2004)** *RATS User's Guide Version and RATS Reference Manual, Version 6.0. Estima*, Evanston.

- [22] **Driscoll, J.C. (2004)** "Does Bank Lending Affect Output? Evidence from the US States." *Journal of Monetary Economics* 51: 451-71.
- [23] **El-Gamal, M.A. and Inanoglu, H. (2005)** "Efficiency and Unobserved Heterogeneity in Turkish Banking." *Journal of Applied Econometrics* 20(5): 641-664.
- [24] **Enders, W. (1995)** *Applied Econometric Time Series*. USA: John Wiley&Sons.
- [25] **Gertler, M., Gilchrist, S. and Natalucci, F. (2003)** "External Constraints on Monetary Policy and the Financial Accelerator." *NBER Working Paper* 10128: 1-50.
- [26] **Hall, P. (1992)** *The Bootstrap and Edgeworth Expansion*. New York: Springer.
- [27] **Hassan, M. K. and Bashir, A-H.M. (2003)** "Determinants of Islamic Banking Profitability." http://www.philadelphia.edu.jo/courses/accountancy/Files/Accountancy/Kabir_Bashir.pdf, (accessed September 30, 2010).
- [28] **JMulTi (Time Series Analysis with Java) Econometric Software Help System, Version.4.23.**
- [29] **Kashyap, A.N. and Stein, J. (2000)** "What Do a Million Observations Say About the Transmission of Monetary Policy?" *American Economic Review* 90(3): 407-28.
- [30] **Kishan, R.P. and Opiela, T.P. (2006)** "Bank Capital and Loan Asymmetry in the Transmission of Monetary Policy." *Journal of Banking and Finance* 30: 259-85.
- [31] **Kleimeier, S. and Sander, H. (2009)** "Convergence in Eurozone Retail Banking? What Interest Rate Pass-Through Tells Us About Monetary Policy Transmission, Competition and Integration." *LIFE Working Paper* 03-009: 1-77.
- [32] **Koivu, T. (2002)** "Does Financial Sector Growth Affect Economic Growth in Transition Countries." *BOFIT Seminar Paper* 14: 1-17.
- [33] **Kuttner, K.N. (2001)** "Monetary Policy Surprises and Interest Rates: Evidence from the Fed Funds Futures Market." *Journal of Monetary Economics* 47: 523-44.
- [34] **Levine, R. (1997)** "Financial Development and Economic Growth: Views and Agenda." *Journal of Economic Literature* 35(2): 688-726.
- [35] **Lütkepohl, H. (2005)** *New Introduction to Multiple Time Series Analysis*. Berlin: Springer.
- [36] **Makridakis, S., Wheelwright, S.C. and Hyndman, R.J. (1998)** *Forecasting Methods and Applications*. USA: John Wiley & Sons.
- [37] **Pantula, S. (1989)** "Testing For Unit Roots In Time Series Data." *Econometric Theory* 5: 256-271.
- [38] **Rahman, H. (2004)** "Financial Development-Economic Growth Nexus: A Case Study of Bangladesh." *Bangladesh Development Studies* 30(3&4): 113-128.
- [39] **Rigobon, R. and Sack, B. (2004)** "The Impact of Monetary Policy on Asset Prices." *Journal of Monetary Economics* 51: 1553-75.
- [40] **Samad, A. (2004)** "Performance of Interest-Free Islamic Banks VIS-A-VIS Interest-Based Conventional Banks of Bahrain." *IJUM Journal of Economics and Management* 12(2): 2-15.
- [41] **Sims, C.A. (1980)** "Macroeconomics and Reality." *Econometrica* 48: 1-48.
- [42] **Sims, C.A. (1986)** "Are Forecasting Models Usable for Policy Analysis?" *Quarterly Review of the Federal Reserve Bank of Minneapolis* 10: 2-16.
- [43] **Sims, C.A., Stock J.H. and Watson, M.W. (1990)** "Inference in Linear Time Series Models with Some Unit Roots." *Econometrica* 58: 113-144.
- [44] **Valente, G. (2005)** "US Monetary Policy Announcements and the Term Structure of Interest Rate Differentials: Evidence from Hong-Kong and Singapore." *HKIMR Working Paper* 9: 1-25.
- [45] **Wachtel, P. (2001)** "Growth and finance – What Do We Know and How Do We Know It?" *International Finance* 4(3): 335-362.
- [46] **Yudistira, D. (2004)** "Efficiency of Islamic Banks: An Empirical Analysis of 18 Banks." *Islamic Economic Studies* 12(1): 1-19.