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IS THERE A RISK TAKING CHANNEL OF MONETARY POLICY IN TURKEY?

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Abstract

This paper uses data of the Turkish banking sector to investigate whether the stance of monetary policy has an impact on the level of risk of individual bank loans. Using bank level quarterly data over the period 2003q1-2012q3 a dynamic panel data model is estimated. There is a positive relationship between the changes in short-term interest rates and banks risk taking. This result reflects that a decrease in short term interest rates has a positive impact on the loan portfolio via outstanding loans. However, negative relationship was found between the interest rate falling below benchmark rate and the risk taking by banks. The magnitude of this effect decreases in the large scale and high liquidity level of the banks. According to these results, it was concluded that low interest rates in Turkish banking system affects risk taking of the banks in the period of 2003q1-2012q3. These results are important for developing and conducting monetary policy. This study adds to the literature on risk-taking channel by providing evidence from an emerging market. Moreover, benchmark rate obtained by estimating Taylor rule for the above-mentioned period.

Keywords: *Monetary Policy, Non-Performing Loans, Risk Taking Channel.*

JEL Classification: *E22.*

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TÜRKİYE'DE PARA POLİTİKASININ RİSK ALMA KANALLARI VAR MI?

Özet

Bu çalışma, Türkiye'deki bankacılık verilerini kullanarak, para politikası duruşunun bankaların bireysel kredi verme risk düzeyleri üzerinde etkisi olup olmadığını araştırmaktadır. Bankaların 2003q1-2012q3 çeyrek yıllık dönemi verileri kullanılarak dinamik panel veri modeli tahmin edilmiştir. Buna göre kısa vadeli faiz oranlarındaki değişim ile bankaların risk yüklemimleri arasında pozitif bir ilişki vardır. Bu sonuçlar kısa vadeli faiz oranlarında bir düşüş olduğunda bankaların geri dönmeyen portföyleri üzerinde olumlu etkisi olduğunu ortaya koymaktadır. Ancak, gösterge oranının altına düşen faizler ve bankaların risk yüklenimleri arasında negatif ilişki bulunmuştur. Bu etkinin büyüklüğü, büyük ölçekli ve likidite seviyesi yüksek bankalarda düşüktür. Bu sonuçlara göre, 2003q1-2012q3 döneminde Türk bankacılık sisteminde düşük faiz oranları bankaların risk yüklenimlerini etkilediği sonucuna varılmıştır. Bu sonuçlar, para politikası geliştirilmesi ve yürütülmesi için önemlidir. Bu çalışma, risk yüklenim kanalı üzerine gelişmekte olan bir piyasa çerçevesinde ele almaktadır. Ayrıca çalışmada ilgili dönem için gösterge faiz oranı Taylor kuralı çerçevesinde tahmin edilmiştir.

Anahtar Kelimeler: *Para Politikası, Geri Dönmeyen Krediler, Risk Yüklemin Kanalı.*

JEL Sınıflaması: *E22.*

1. Introduction

In the studies prior to the global financial crisis, it was emphasized that financial market conditions have insignificant effects on macroeconomic variables or monetary policy transmission mechanisms. According to this, the central banks directed to control inflation rate can also resolve financial instability at the same time. Global financial crisis cause changes in this orthodoxy. It was emerged that Greenspan policies implemented at the first half of 2000's may increase the instability in financial markets by promoting risk taking behaviour of economic units. Some arguments are built to see the fundamental factors behind the global financial crisis.[1]

2. Theoretical Background of the Risk-Taking Channel

Role of the banks has been examined mainly within the framework of "bank lending" in the traditional monetary policy transmission channel literature.[2]

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1 In some of the studies, while it was emphasized that expansionary monetary policies are the main reason of global financial crisis and excessive loan expansion (Taylor, 2009), on the other hand, in some of the studies, it was asserted that the monetary policies implemented did not have effect of the financial crisis. (Bernanke 2010; Dokko et al., 2011; Svensson 2010).

2 Two conditions should be satisfied for functioning bank lending. First one is that the expenditure of the borrowers depends on loan supply of the banks. Second one is that loan

In the bank lending channel, expansionary monetary policies affect loan supply of the banks by increasing bank reserves and bank deposits. However, recently financial restrictions cause transmission channels working in a different ways by affecting transmission mechanisms functioning. Whereas, expansionary monetary policies do not only bring about an increase in loan supply as it is emphasized in traditional approach, it also increases the risk undertaken by the banks. Within this framework, in the transmission of monetary policies, banks have undertaken a new function through risk taking[3].

The designation of the risk taking channel of monetary policy first appeared in Borio and Zhu (2012. p. 242); who pointed out explicitly this transmission mechanism defined as "the impact of changes in policy rates on either risk perceptions or risk-tolerance and hence on the degree of risk in the portfolios, on the pricing of assets, and on the price and non-price terms of the extension of funding." In this respect, the risk taking channel generated by a greater appetite for risk by financial institutions will be exist.

Recently, various authors like Borio and Zhu (2012)**,** Rajan (2005), De Nicolo et al (2010), Adrian and Shin (2010), identify and find evidence of the existence of a new monetary policy transmission channel denominated the risk-taking channel. These authors have identified some mechanisms through which this channel operates.

One of these mechanisms is the impact of interest rates on valuations and asset prices. According to Borio and Zhu (2012), due to low interest rates the increase in valuations and in the asset prices, increases the net worth of economic units. This increase in net worth may have two effects. One of them is that borrower's net worth increases, change risk estimations of banks'. When monetary policy is put into effect expansively banks might engage in lending relations with borrowers perceived as risky in the past. According to Gaggl and Valderarma (2010, p. 36), "if the risk taking channel exists, it will potentially reinforce or amplify monetary policy decisions. Thus, an expansive monetary policy, for instance, will become even more expansive due to changes in the risk attitude of lenders". Another effect is that increases occurring in net worth, reduces the borrowers' probability of default by increasing collateral value.

The other way through which the risk taking channel operates is through the "search for yield", which occurs mainly through the asset side of financial institutions' balance sheet. A decrease in interest rates decreases their portfolio income and then may lead to a search-for-yield by financial intermediaries (Rajan, 2005).

According to Rajan (2005), expansionary monetary policies decreases returns obtained from short term assets by considering long term commitments of financial institutions like insurance companies and pension funds. In case returns obtained from

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supply of the banks is affected by the reserve changes emerged as a result of monetary policy changes (Bernanke and Blinder 1988).

[3] Risk taking channel is consistent with the point of view having "extensive" definition including financial stability in the responsibility area of central banks. This new transmission channel is the improved version of theoric framework – financial stability hypothesis - asserted by Minsky (1986).

investment instruments composed of risk free assets remain at low levels for a long time, continuation of such investments cause nonfulfilment of long term liabilities of financial institutions. Tendency towards risky and high yield financial assets increases the probability to have higher returns for financial institutions. In this process called *risk shifting*, financial institutions incline to realize their return expectations by disregarding the risk of loss. During the period which the interest rates are low, the pursuit of risk of financial institutions increases, and when the interest rates increase, financial institutions become more conservative.

Another way through which the risk taking channel operates is through the effect of communication policies and the reaction function of the central bank (Borio and Zhu 2012). In this process, capability of central banks for managing short term inflation expectations and inflation rate is especially important. In this context, transparency and predictability of monetary policies decrease both the uncertainty related to the variation in inflation and short and long term interest rates and accordingly in financial market prices.

In the countries having low interest rates for quite a long time, another factor affecting risk taking of the banks is the moral risk. However, under the influence of moral risk, banks incline to finance the projects having negative net present value by lending most of the liquidity (Maddaloni and Peydró, 2011). Essential factor causing moral risk effect is the expectations about strong reaction to be shown by the central banks against negative shocks. This expectation became more important in the recent period and reflected in the literature as "Greenspan effect – put-". When banks expose to a shock threatened the stability of the financial system, and they expect from central bank to lower the interest rate aggresively, they will incline to undertake higher risk. Accordingly, essential reason of the formation of moral risk is the commitment stating interest rates will be implicitly kept low instead of having low interest rates (De Nicolo et al, 2010).

Another way through which the risk taking channel operates is the excessive expansion of banks' balance sheets through leverage. Adrian and Shin (2010) suggest that banks actively manage their leverage in response to changes in asset values. According to this study, depending on the increase in asset prices banks expand their balance sheets through collateralized borrowing during periods of expansive monetary policies.

Concurrent with these theoretical developments, in the following part, empirical literature will be presented.

3. Survey of the Empirical Literature

The academic literature on the risk taking channel examines whether banks extend relatively larger loans to riskier borrowers during periods of low interest rates. Most of these empirical studies have found evidence that banks increase lending to riskier borrowers when interest rates are low. There are two broad types of studies: those using macro data that try to capture the link between monetary policy and risk

behavior.[4] The list of papers that use micro data to study bank behavior has been increasing rapidly in the recent past. These studies focus mainly on providing micro-level panel evidence for the effect of changes in policy rates on individual banks' lending behavior. The remaining part of this section we summarise these studies.

The first empirical investigations of the impact of monetary policy on bank risk behaviour belonged to Jiménez et al. (2008). This paper uses data of the Spanish banks over the period 1984–2006. Using a variety of duration models and time to default as a measure of risk, their empirical results reveals that lower interest rates raise the probability of default on new loans but reduce that on outstanding loans. According to Jiménez et al. (2008), risk taking is higher in banks with small sized and higher liquidity levels.

Iannidou et al. (2009), studied the impact of the federal funds rate on the riskiness and pricing of new bank loans in Bolivia between 1999 and 2003. They found evidence that a decrease in the US federal funds rate prior to loan origination raises the default on new bank loans. Their analysis reveals that expansionary monetary policy increases the risk-taking appetite of banks. Moreover, larger banks, with less capital and more liquid assets take on more risk when the federal funds rate decrease.

Altunbaş et al (2010) use an interest rate gap in order to measure the effect of monetary policy stance on banks risk taking, using balance sheet data for a sample of banks from EU-15 and the U.S. between 1998 and 2008.They provide empirical evidence that a period of short-term interest rates below a benchmark level, increases financial fragility. They use Expected Default Frequency (EDF) as a measure of risk variable. They found positive relation between size and risk-taking. However, liquid and well-capitalized banks are found to be less risky. Those results differ from Jiménez et al (2008) and Ioannidou et al (2009).

Using a database of listed banks from the European Union and United States developed by Altunbaş et al. (2010), Gambacorta (2009) states that when interest rates are low for an extended period banks' EDFs tend to increase. The results confirm the existence of a risk-taking channel. All other things being equal, liquid and well capitalised banks are less risky.

Using data from commercial banks operating in Brazil over the period from 2003 to 2009, Tabak et al. (2010) conclude that lower interest rates lead to an increase in banks' credit risk taking. They found that size and liquidity have a positive relation with risk. Large and liquid banks present a higher credit risk exposure. On the other hand, they found that well-capitalized banks have a lower risk exposure.

Lopez et al. (2010) employs a dataset from the Credit Register from Colombia over the period 2000-2008. This paper finds a statistically significant link between interest rates and banks' risk taking. Lower interest rates increase the probability of default on new loans and reduce that on outstanding loans. They find that small and highly leveraged banks are more willing to take risks.

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4 Angeloni et al. (2010); Eickmeier and Hoffman (2010) Bekaert et al. (2010). Another group of studies utilize both macro and micro level data in their analysis. For instance De Graeve et al. (2008); De Nicolo et al. (2010).

The first empirical study in Turkey about risk taking channel was carried out by Özsuca and Akbostancı (2012). Using 53 quarterly bank level data over the period 2002-2012, Özsuca and Akbostancı find evidence that low levels of interest rates have a positive impact on banks' risk-taking behavior. Specifically, low short term interest rates reduce the risk of outstanding loans; however short term interest rates below a benchmark level increase risk-taking of banks. Regarding bank characteristics, they find that large, liquid and well-capitalized banks are less vulnerable to risk-taking.

According to these above mentioned empirical papers, periods of low interest rates would favor a risk taking channel of monetary policy whereby bank risk appetite and risk taking behaviour would be stronger after.

4. Model and Methodology

In the study, dynamic panel data analysis was applied to determine the effect of changes of monetary policies on the risk taking of banks. Three ranges of models are going to be used in order to state whether risk taking channel works or not in Turkish banking system. To identify the model ranges, studies of Tabak et al. (2010), Özsuca and Akbostancı (2012), were selected as a base.

In our study, in the framework of Model I, the effects of bank-specific characteristics on attitudes of banks risk-takings are going to be stated. We also also investigate whether monetary policy has a differential impact for banks of size (SIZE), liquidity(LIQ) and capital strength (CAP).(Kashyap and Stein, 1995; Kishan and Opiela, 2000).

According to this context, Model I has been identified as following:

$$\Delta NPL_{it} = \alpha + \beta \Delta NPL_{it-1} + \lambda SIZE_{it-1} + \eta LIQ_{it-1} + \phi CAP_{it-1} + \varepsilon_{it} \quad (1)$$

In first equality, with $i = 1,2,3,..., N$ where N is the number of banks; t has shown, $t = 1,2,3,..., T$ for quarter period. Model I will be used with purpose to determine effects of particular bank characteristics on non-performing loans. The variables used in Model I are as follows: ΔNPL_{it} is the variation of bank's non-performing loans divided by total loans of bank i at time t. This rate is a basic indicator which is used to state fragility level of banks[5]. $SIZE_{it-1}$ is the log of the total assets of banks; LIQ_{it-1} represents liquidity and is measured by proportioning of liquid assets to total assets; CAP_{it-1} stands for capitalization, measured by the equity ratio over assets.

Different results have been approached when studies on effects of bank size, liquidity and capitalization level on risk taking are examined. Therefore, indicators of parameters that contain particular bank characteristics are uncertain.

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5 See; Buch et al, (2010); Tabak et al, (2010); Delis and Kouretas, (2011); Özsuca and Akbostancı, (2012).

According to Altunbaş et al. (2010), the main problem of measuring the impact of low interest rates on bank risk taking is to separate the effects of changes in monetary policy rates on the risk of outstanding loans and, bank's incentive to take on new risk. Reduction in interest rates affects lending portfolios positively by reducing possibility of default on economic units. On the other hand, a reduction of the interest rate below the benchmark rate causes a negative effect. To overcome of this identification problem, change in the monetary policy rate and the deviation of the interest rate from a benchmark level should be added to the model.

According to this context, Model II has been identified as following:

$$\Delta NPL_{it} = \alpha + \beta \Delta NPL_{it-1} + \lambda SIZE_{it-1} + \eta LIQ_{it-1} + \phi CAP_{it-1} + \gamma \Delta MP_t + \delta TGAP_t + \theta \Delta GDP_t + \varepsilon_{it} \quad (2)$$

In equation (2), ΔNPL_{it} has shown changes in the monetary policy indicator. Interbank money market rates have been used as a measure of monetary policy stance[6]. $TGAP_t$ has shown the difference between the actual nominal short-term interest rate and that generated by a standard "Taylor rule". Finally, in order to determine effects of macroeconomic conditions on risk taking of the banks, variation in gross domestic income (ΔGDP_t) has been taken into consideration as control variable.

Due to the fact that decrease in interest rates is expected to decrease non-performing loan volume, sign of γ parameter has been predicted to be positive. In model, deviation from benchmark value of interests (TGAP) has been given place to take account of effect of tendency to risky new credits of banks on non-performing loan volume. When interest rates fall below benchmark rate, there will be increase in non-performing loans of bank. Therefore, the sign of δ is expected to be negative.

Effect of ΔGDP_t variable on non performing loans is not explicit. For example, better economic conditions may cause decrease in credit risk of the bank. Therefore, the sign of θ is expected to be negative. However, in some circumstances, when increase in GDP_t is directed to the risky loans of banks, θ parameter may have positive value.

Interaction variables that represent relationship between monetary policy and particular bank characteristics reflect distributional effects according to subjected characteristics of monetary policies. Model III will be used where interaction variables are included to analyse whether risk taking of banks change or not according to bank characteristics within this scope.

According to this context, Model III has been identified as following:

6 Tabak et al, (2010); Delis and Kouretas, (2011); Özsuca and Akbostancı, (2012), Wimanda and Turner (2012).

$$\Delta NPL_{it} = \alpha + \beta\Delta NPL_{it-1} + \gamma\Delta MP_t + \delta TGAP_t + \theta\Delta GDP_t + \zeta(SIZE_{it-1} * TGAP_t) + \psi(LIQ_{it-1} * TGAP_t) + \kappa(CAP_{it-1} * TGAP_t) + \varepsilon_{it} \quad (3)$$

Risk taking is expected to be rather low against monetary policy changes banks which are great-scale, have high liquidity level and well capitalized. Therefore, interaction parameters are expected to be positive since banks which are great-scale and have high liquidity level and well capitalized can avoid itself from effect of monetary policy shocks, presumably.

5. Data and Emprical Results

Unbalanced panel data approach that covers 2003q1-2012q3 period is used to set forth monetary policies effect on risk taking of banks in Turkey at our study. Quarterly data were used to determine short-term effects of monetary policies on risk takings of banks. Financial statements like liquidity, total loan, non-performing loans and liquid assets of banks were taken from the Banks Associations Union of Turkey (TBB). Interbank money market interest rates and gross domestic product data that used in this study were obtained from International Financial Statistics (IFS). Sample volume covers 32 banks.

Moreover, all variables that are used to estimate Taylor rule were obtained from International Financial Statistics (IFS). The targets for the inflation rate, 2002 (35%), 2003 (20%), 2004 (12%), 2005 (8%), 2006 (5%), 2007: (4%), 2008: (4%), 2009: (7.5%), 2010: (6.5%), 2011: (5.5%) and 2012: (5%) were obtained from Central Bank of the Republic of Turkey (CBRT) website[7]. The seasonally adjusted industrial production series (IPS) was used for the measure of output gap. The definition of the output gap is a detrended IPS by Hodrick–Prescott (HP) filtering. These data are available from the CBRT. Taylor rule estimation results are presented in Table 1:

Table 1: The Estimation Results of Taylor Rule for Turkey

	α	β	γ
Coefficients	13.2790	1.3053	0.1864
Std. Errors	(0.0574)	(0.0064)	(0.0035)
Probability	[0.0000]	[0.0000]	[0.0000]
J-statistic	0.1859		

Note: The instruments variables are four lagged values of the related variables.

7 Yazgan and Yılmazkuday (2007) method was adopted at transformation of subjected data.

Table 2 indicates estimation results of equation (1)-(3) with Arellano-Bond (1991). Three different models have taken account into whilst given results in Table 2 are examined. Model I reports our baseline regression results contains particular bank characteristics' effects on non-performing loans. In Model 2, the effects of changes in interbank money market rates, TGAP and GDP on non-performing loans have been revealed. Model III presents the results obtained from the estimation of equation (3) and shows the distributional effects of interest rates on bank risk-taking due to individual bank characteristics.

Table 2: Estimation results of Eq. (1)-(3)

Depended Variable: ΔNPL_{it}	**Model I**	**Model II**	**Model III**
ΔNPL_{it}	-0.2269 [a] (0.0790)	-0.2393[a] (0.0778)	-0.2390[a] (0.0779)
ΔMP_t	-	2.9381 [a] (0.5795)	2.6444 [a] (0.7636)
$TGAP_t$	-	-0.7491 [b] (0.3368)	-0.6115 [c] (0.3368)
ΔGDP_t	-	-0.0107 [a] (0.0029)	-0.0097 [a] (0.0033)
$SIZE_{it-1}$	-0.0264 [b] (0.0104)	-0.0467 [a] (0.0101)	-
CAP_{it-1}	-0.0197 [a] (0.0024)	-0.0219 [a] (0.0024)	-
LIQ_{it-1}	-0.0057 [b] (0.0029)	-0.0063 [a] (0.0029)	-
$SIZE_{it-1} * TGAP_t$	-	-	0.0060 [a] (0.0015)
$CAP_{it-1} * TGAP_t$	-	-	0.0010 [a] (0.0003)
$SIZE_{it-1} * TGAP_t$	-	-	-0.0003 (0.0003)
Sargan Test (p-value)	0.3705	0.3238	0.3757
AR(1) (p-value) AR(2) (p-value)	0.0000 0.2278	0.0000 0.1284	0.0000 0.8498

Note: [a] Significant at the 1 % level, [b] Significant at the 5 % level, [c] Significant at the 10 % level. Standard errors are shown in parentheses.

Two tests have been used to determine validity of estimated models before commenting on estimation results at Table 2. Sargan and AB tests indicate convenience of all three estimated models. Moreover, time effect is considered to have under control of non-observed temporal shocks which affects risk taking of banks at all three estimated models.

The effects of changes in short-term interest rates' (ΔMP_t) on dependent variable is seen to be positively and statistically significant at both models (Model II,

Model III) when results of estimated models at Table 2 were examined. This means that a decrease in short term interest rates has a positive impact on the loan portfolio quality of banks. In other words, when interest rates are decreased, a decrease at non-performing loans of banks set forth since economic units will easily pay outstanding loans. Therefore, risk taking of banks will be decreased. This obtained parameter is convenient to expectations and literature (Jiménez et al. 2008; Altunbaş et al. 2010; Özsuca and Akbostancı 2012).

The Taylor gap (TGAP), has a negative and significant coefficient. This result implies that when short-term interest rates are below a benchmark level, banks increase their risk-taking. This finding is consistent with Altunbaş et al. (2010) and Özsuca and Akbostancı (2012).

A negative relationship is observed between changes in GDP and non-performing loans of banks at models (Model II, Model III). Indication of related parameter is significantly negative. Accordingly, increased income is creating a reverse effect on non-performing loan of banks. Economic units that are in debt to bank will pay their loans easily when economic conditions of country are improved. Thus, risk taking of banks will decrease since non-performing loans that banks are after decrease.

Banks' specific characteristics ($SIZE_{it-1}$, LIQ_{it-1}, CAP_{it-1}) are important determinants of banks' risk taking. In Table 2 reports that the three bank-specific characteristics are significantly negative. The negative coefficient of the size variable implies that larger banks take on lower levels of non-performing loans. In other words, portfolio structure of larger banks is more qualified according to smaller banks. This result differs from Tabak et al. (2010) and Altunbaş et al. (2010). They found positive relationship between bank size and risk. Our result is in line with, Jiménez et al. (2008), Lopez et al. (2010), Delis and Kouretas (2011) and Özsuca and Akbostancı (2012).

The coefficient of liquid assets to total assets is negative and significant. This parameter shows that non-performing loans of banks that have high liquidity are low. So, these types of banks invest on more safe instruments at market and when they come across with unexpected situation, they convert their assets to cash immediately. Accordingly, banks at Turkey are doing their activities at non-risky fields as much as possible. This result differs from Jiménez et al. (2008) and Iannidou et al. (2009), who find positive relationship between bank liquidity and risk, whereas it is in line with Gambacorta (2009) and Altunbaş et al. (2010) and Özsuca and Akbostancı (2012).

Third of specific characteristics of banks is capitalization level. Capitalization parameter is significant and negative like other two characteristics. This result reveals that in the Turkish banking system, well-capitalized banks are considered less risky by the market. Furthermore, when analyzing the results, the coefficient of size variable is larger than that of capital and liquidity variables. This means bank size is the determining indicator in related period in Turkey in terms of banks risk taking behaviour. This result is in line with Özsuca and Akbostancı (2012).

Finally, in order to indicate the distributional effects of changes in monetary policy stance on bank risk due to individual bank characteristics interaction terms

are included. When analyzing estimation results, the coefficients of the interactions between the Taylor rule gap and bank characteristics ($SIZE_{it-1}$ *$TGAP_t$ and CAP_{it-1} *$TGAP_t$) are positive significantly. However, the coefficient of the interaction between the Taylor rule gap and liquidity (LIQ_{it-1} *$TGAP_t$) was found statistically insignificant.

Accordingly, when the interest rates deviate from benchmark rate, affecting degree of the banks risk taking differentiates according to their size and capitalization level. When the interest rates decrease below the benchmark rate, large banks decrease their risk taking. As this is not the case for smaller banks, their risk appetite increases when interest rates are below the benchmark rate. Interaction term of capitalization with the Taylor rule gap shows that more capitalized banks decrease their risk taking when interest rates are below the benchmark rate. In other words, the impact of low interest rates on risk-taking would be weak for banks with strong capitalized.

6. Conclusions

Risk taking channel causes extension of effects of monetary policy decisions. When considered in this context, expansionary monetary policies have wide effects due to the amendment in risk perceptions of the banks. Risk taking channel adds a new dimension to the connection between financial stability and monetary policy. According to recent literature, periods of low interest rates would favor a risk taking channel of monetary policy whereby bank risk appetite and risk taking behaviour would be stronger after.

In our study, it was concluded that low interest rates in Turkish banking system affects risk taking of the banks in the period of 2003q1-2012q3. Accordingly, when short term interest rates decrease, the risk of outstanding loans reduces. In other words, when interest rates are decreased, a decrease at non-performing loans of banks set forth since economic units will easily pay outstanding loans. Therefore, risk taking of banks will be decreased. However, when the interest rates decrease below benchmark rate, risk taking of the banks increases due to the tendency towards new risky loans. When handling the issue within the framework of bank characteristics used in order to determine distributional effects of monetary policies, size and capitalization variables are considered as significant.

A negative relationship is observed between changes in GDP and non-performing loans of banks at models. Accordingly, increased income is creating a reverse effect on non-performing loan of banks. Economic units that are in debt to bank will pay their loans easily when economic conditions of country are improved. Thus, risk taking of banks will decrease since non-performing loans that banks are after decrease.

Hereunder, when interest rates deviate from benchmark rate, the reaction differentiates according to the size of the bank and capitalization level. In other words, the impact of monetary policy on risk-taking is not equal for all banks. Small sized and low liguidity level banks take on more extra risk than other banks when interest rates are low. These results are important for developing and conducting monetary policy.

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