International Journal of Contemporary Economics and Administrative Sciences
ISSN:1925 – 4423
Volume: 5, Issue:1-2, Year:2015, pp.48-66

The Impact of Macro-Prudential Measures on Retail Loans: Evidence from Turkey

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Abstract

Following the global financial crisis, savings rate to GDP ratio in Turkey declined to severe levels. The Banking Regulation and Supervision Agency of Turkey took various macro-prudential measures to limit the retail loans in the banking sector to support the policies for increasing the savings rate. The aim of this paper is to analyze the effectiveness of these measures, thus the comparison of the growth rate of the loan types for the period of December 2010-September 2013 to October 2013-September 2015 with Welchs' t-tests. The results of the analysis points to the success of BRSA measures with significant declines in consumer loans, namely car loans, general purpose loans and credit cards with installments.

Keywords: *Banking, macro-prudential measures, loan growth.*
JEL Classification: *E44, G21, G28*

Introduction

The aftermath of the global financial crisis had been tough in all circumstances and it has been announced as the worst period after the Great Depression. IMF declared that the accumulated wealth has been lost in its most accelerated speed in the last forty years. Unemployment levels rocketed, the ratio of budget deficits to GNP and public debt stock to GNP levels increased, capital flows to emerging markets declined and the uncertainty in the financial sectors increased.

In order to rebuild trust to the financial system, G-20 countries and international institutions decided to act in coordination and new directions for economic policies have been set. Those directions contained the use of several macro-prudential policies as well as application of monetary and fiscal policies to generate injections to the financial system.

Despite the fact that Turkey did not suffer from the global crisis like the other countries do, but still the crisis had an affect on the economic developments.

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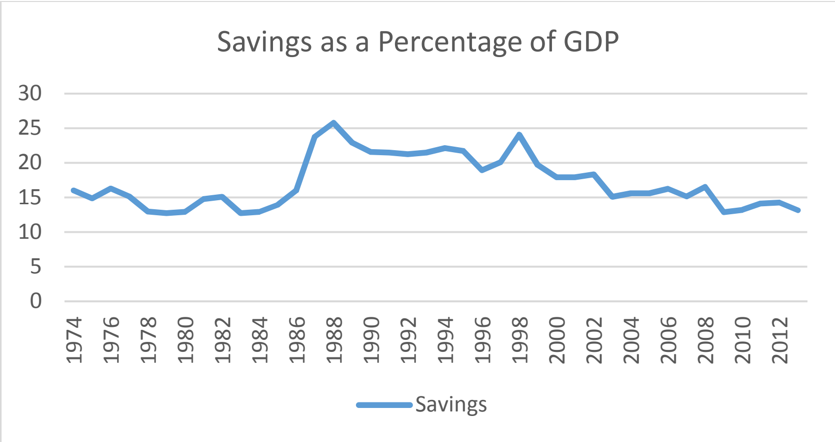
GDP, trade volume and capital inflows declined and unemployment, budget deficit levels increased. On the contrary inflation and interest rate levels declined to lowest levels in their history. The banking system kept their high profits as well as their high capital adequacy levels which is higher than most developed economies. But nevertheless, the low level of savings still continues to be a problem.

Figure 1. Gross Savings as a percentage of GDP in Turkey between 1974-2013



Source: World Bank World Development Indicators Data

Figure 1 shows the evolution of gross savings to GDP ratio of Turkey. It is clearly seen that the savings ratio entered into a decreasing trend after 1998. Recently the savings ratio is about 13 percent levels. In order to have a stable economic growth, the regulatory authorities should maintain an environment that channels savings to promote the growth. But the low level of savings create scarcity of funds both for the public and private sectors. Keeping these in mind, Banking Regulation and Supervision Agency of Turkey (BSRA hereafter) introduced new macro-prudential measures by making amendments in the regulations beginning from October 2013 to increase the level of savings and decrease the spending by consumer loans and credit cards and to direct the funds to the corporate sectors.

The motivation of this paper is to analyze the effectiveness of these macro-prudential measures and evaluate whether there is a significant decrease in the retail loans and credit cards usage and increase in corporate loans following the new measures and hence the pre and post October 2013 period will be compared. The second part of the paper will present a literature review, third part will give

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brief information on the macro-prudential measures in Turkish banking system, fourth part will analyze the development of loans in the banking sector, fifth part will present the methodology and provide the data and empirical results and finally last part will conclude.

Literature Review

IMF (2011) noted ten most frequently applied instruments to achieve the macro-prudential objectives. Credit related instruments consist of caps on the loan-to-value ratio, caps on the debt-to-income ratio, caps on foreign currency lending and ceilings on credit or credit growth; liquidity related instruments like limits on net open currency positions, limits on maturity/currency mismatch and reserve requirements; capital requirements like time-varying provisioning and restrictions on profit distribution.

There is a general opinion that the scope for monetary policy to lean against the build-up may be more constrained than in the past, which puts a premium on a strengthening of the macro-prudential orientation of prudential frameworks, designed to restrain the build-up of the imbalances and to make the financial system better able to withstand their unwinding (Borio and Shim, 2007). Dell'Ariccia et al. (2011) also note that restrictive macro-prudential measures, for instance, may be more effective against a backdrop of tighter monetary conditions.

The literature reports the effectiveness of macro-prudential tools on credit growth. For example, Vandenbussche et al. (2012) mentioned the effect of capital requirement and liquidity measures in Central Eastern and Southeastern Europe countries on the housing loans. Tovar et al. (2012) also note the moderate effect of average requirement and composite of dynamic provisioning and capital requirements on credit growth in five Latin American countries.

Aiyar et al. (2012) examine the regulation of bank capital as a means of smoothing the credit cycle in UK and find that regulated banks reduce lending in response to tighter capital requirements. Arregui et al. (2013) assess the cost and benefits of macro-prudential policies and propose a measure of net benefits in terms of parameters that can be estimated; the probability of crisis, the loss in output given crisis, policy effectiveness in bringing down both the probability and damage during crisis and the output-cost of a policy decision.

Igan and Kang (2011) evaluate the impact of measures such as loan to value and debt to income ratio on limiting the loans in Korean banking sector. Jimenez et al. (2012) analyze the impact of the countercyclical capital buffers held by banks on the supply of credit to firms and their subsequent performance and find that countercyclical capital buffers help smooth credit supply cycles and in bad times uphold firm credit availability and performance.

The literature notes a few papers on the outcomes of macro-prudential policies on Turkish banking sector. Lim et al. (2011) note that the impact of the global financial crisis manifested itself in Turkey through an FX liquidity squeeze. Banks acted in response to the liquidity squeeze by reducing their FX loans and holdings of Eurobonds. They also report the caps on loan to value (LTV) ratio as a result of the rapid increase in domestic demand, rapid credit growth, and increased foreign currency borrowing by banks following the recovery from the global crisis.

The Central Bank of Turkey (2014) analyze the impacts of macro-prudential policies towards the consumer credit expansion with a macro perspective and on the basis of a targeted credit type. The Central Bank of Turkey (2015) also analyze the effect of loan-to-value restriction on automobile loans using primary market car sales and find car sales in high price range category drooped significantly after the introduction of the measures. Tiryaki (2014) assess the effect of consumer credits and other credit indicators over gross domestic product and current account deficit and conclude that the total amount of consumer credits seems to have evident negative casual effect on current account deficit and in managing current account deficit which becomes a structural problem in Turkey, credit restrictions especially for consumer credits appear to be critically important.

Macro-prudential Measures on Retail Loans

The BRSA took various macro-prudential measures on banking sector in order to minimize the impacts of economic crisis in global financial markets. Macro-prudential measures were taken for limiting the retail loans, which increased sharply in the latest periods in order to decrease the current account deficit in the economy and decrease the indebtedness of household by increasing the savings rates. BRSA aimed to protect the financial stability and the soundness of banking sector by taking these macro-prudential measures.

Macro-prudential measures were taken basically in four areas; i) limitations towards consumer loans, ii) limitations brought to the usage of credit cards, iii) increasing ratios for loan loss provisioning, iv) increasing the risk weight ratios of loans on the calculation of capital adequacy ratio. Within this scope, macro-prudential measures taken by the BRSA for protecting the sound structure of banking sector are given below under these four areas.

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Measures on Consumer Loans

Macro-prudential measures taken towards consumer loans were the limitation of maturities of car loans and general purpose loans and the loan to value (LTV) ratio brought to mortgage and car loans. By limiting the maturities of consumer loans, it was aimed to reduce the growth rate of these loans. Besides, total amount of consumer loans was targeted to be reduced by increasing the amount of down payment made by consumers in mortgage and car loans by introducing the loan to value ratio.

With the amendments dated 31.12.2013 in the Regulation on Credit Operations of Banks, limitations were brought to the maturity of consumer loans granted by banks and the maximum maturity of consumer loans except mortgage loans shall not exceed 36 months and maximum maturity of car loans shall not exceed 48 months. With the amendment dated 25.11.2015 in the Regulation, maturity limitation for loans to be granted with aim of financing of education and training was removed.

With the BRSA Board Decision dated 16.12.2010 and the amendments dated 31.12.2013 in the Regulation on Credit Operations of Banks, it is decided that for loans extended to consumers for mortgage as well as consumer loans extended under mortgage collaterals, the amount of the loan shall be limited to 75 % of the value of the real estate subject to collateral and the valuation of real estates taken as collateral shall be made by valuation companies authorized by the Board or Capital Market Board.

With the amendment dated 31.12.2013 in the Regulation on Credit Operations of Banks, it is decided that for car loans to be extended; if the final billing value is TL 50,000 or below, the loan amount shall not exceed 70% of the billing value; if the final billing value is above TL 50,000, the loan amount shall not exceed 70% for the part of TL 50,000 of the billing value, and 50% for the part of above TL 50,000 of the billing value.

Measures on Credit Cards

Macro-prudential measures taken concerning credit cards were the limitation of credit card usage, increasing the minimum payment ratios, establishing link between credit card limits and consumer income and bringing installment limitation to expenditures made by credit cards. With these measures taken on credit cards, it was aimed to decrease the loan amount used by credit cards, ensuring consumers to borrow by credit cards in proportion with their income and preventing long-term household indebtedness in the economy.

The amendment dated 17.12.2010 in the Regulation on Bank Cards and Credit Cards regulated that limits of credit cards, whose payments are made up to 50 % of period debt three times at most within a calendar year, will not be increased until all of the debt due is paid and such cards will be closed for cash advances. The amendment dated 08.10.2013 in the Regulation regulated that credit cards, whose minimum payment amount is not paid three times totally within a calendar year, will be closed for cash advances; those whose minimum payment amount is not paid three times successively within a calendar year will be closed for cash advances and purchases of goods and services. The regulation decreed that these credit cards will be kept closed and their limits will not be increased until all of the debt due is paid.

With the amendment dated 17.12.2010 in the Regulation on Bank Cards and Credit Cards, within the three-year transition period, it was decided that minimum payment ratios which were 20 % for all limit amounts before the regulation; shall not be less than 25 % of period debt for the credit cards whose limits are up to TL 15,000; 30 % for the ones whose limits are between TL 15,000 and TL 20,000; 40 % for the ones whose limits are above TL 20,000 and 40 % for credit cards newly issued with a period of one year. With the amendment dated 08.10.2013 in the same Regulation, minimum payment ratios were increased to 30 % of period debt for the cards whose limits are up to TL 15,000; 35 % of period debt for the ones whose limits are between TL 15,000 and TL 20,000; 40 % of period debt for the ones whose limits are above TL 20,000.

With the amendment dated 08.10.2013 in the Regulation on Bank Cards and Credit Cards, banks were obliged to set a limit who want to get credit card by considering economic and social status, monthly or annual average income of the persons and credit card limits allocated to these persons by other banks. Credit card limits were limited with TL 1,000 for those having income amounting to TL 1,000 or lower as well as for those whose income level cannot be detected. Furthermore, it was stipulated that the total credit card limit of a person having credit card for the first time cannot exceed two times of the monthly average income for the first year and cannot exceed four times thereof for the second and following years, and when in the case it is determined that total credit card limit exceeds four times of the income, limits of those cards will not be increased.

With the amendment dated 31.12.2013 in the Regulation on Bank Cards and Credit Cards, the installment period cannot exceed 9 months for the purchase of goods and services and cash withdrawals by credit cards, and the installment for the expenditures of telecommunication, jewelry, food and fuel is not allowed. With the amendment dated 13.05.2014 in the same regulation, it was not allowed to make installment for the gift cards and cheques which is not used for purchasing of tangible goods and services and only the general installment restriction of 9 months is applied to corporate credit cards. With the amendment dated 22.10.2014 in the same regulation, the installment period for expenditures of jewellery was determined as 4 months and with the amendment dated 25.11.2015 in the same Regulation, the installment period for expenditures of domestic appliance and furniture as well as education and training was determined as 12 months.

Measures on Loan Loss Provisioning

Increasing the general provision ratios of loans granted by banks decrease the banks' profitability and thus reduce their own funds and Tier-I amounts. By taking the measures regarding the general provisions, it was aimed to increase the costs of loans granted by banks and to reduce the amount of loans in the banking sector.

With the amendment made dated 23.01.2009 in the Regulation on Procedures and Principles for Determination of Qualifications of Loans and Other Receivables by Banks and Provisions to be Set Aside, banks were provided to re-classify their non-performing loans until March 2010 according to the specified conditions, with the aim of protecting solvency of companies and households in the period of global crisis. With the amendment dated 06.03.2010 in the same Regulation, this period was lengthened for one more year until March 2011. Moreover, with this amendment, for banks having a capital adequacy ratio by 16 % and higher, the general provision ratio was made 0 % until March 2011 for new loans, except for credit cards, to be granted as of the mentioned date.

With the amendment dated 18.06.2011 in the Regulation on Procedures and Principles for Determination of Qualifications of Loans and Other Receivables by Banks and Provisions to Be Set Aside, it was decided that for the banks which of the ratio of consumer loans to total loans is greater than 20 % (amended as 25 % on 08.10.2013) and the ratio of non-performing consumer loans except mortgage and car loans to total consumer loans is greater than 8 %, the general provision ratio for the consumer loans except mortgage and car loans was increased from 1 %

to 4 % for the loans classified as Group One performing loans and from 2 % to 8 % for those classified as Group Two loans under close follow-up.

With the amendments dated 08.10.2013 in the Regulation on Procedures and Principles for Determination of Qualifications of Loans and Other Receivables by Banks and Provisions to Be Set Aside, loans granted via overdraft accounts dependent on saving accounts and loans granted via credit cards for goods and services purchases and in cash have been included within the scope of consumer loans. Besides, the exemption of car loans was removed and general provision ratios for consumer loans except mortgage loans was increased from 1 % to 4 % for the loans classified as Group One performing loans. Furthermore, within the scope of the mentioned Regulation, general provision ratios decreased from 1 % to 0 % for export loans and from 1 % to 0.5 % for SME loans.

Measures on Risk Weights of Loans

Risk weights of loans granted by banks are taken into consideration in determination of the amount subject to credit risk during the calculation of capital adequacy ratio of banks. Macro-prudential measures, which increases the risk weights of certain loans caused capital adequacy of banks to decrease and therefore costs of loans to increase and amount of loans to decrease.

With the amendments dated 18.06.2011 in the Regulation on Measurement and Assessment of Capital Adequacy of Banks, it was decided that risk weight method depending on the remaining maturity will also be implemented for consumer loans excluding car and mortgage loans, and within this scope for the calculation of capital adequacy of banks, risk weight for consumer loans excluding car and mortgage loans whose remaining maturity are between 1 to 2 years will be increased from 100 % to 150 % and risk weight will be increased from 100 % to 200 % for those having maturity more than 2 years.

With the amendments dated 08.10.2013 in the Regulation on Measurement and Assessment of Capital Adequacy of Banks, for the loans granted via credit card for goods and service purchases or cash, risk weight applied to; installment payments with 1-6 months remaining maturity increased from 75 % to 100 %, installment payments with 6-12 months remaining maturity increased from 150 % to 200 %, installment payments exceeding 12 months remaining maturity increased from 200 % to 250 % and loans granted in cash via credit cards were included within the mentioned scope. Furthermore, for the car loans; risk weight applied to those having 1 to 2 years remaining maturity increased from 75 % to 150 %, while

International Journal of Contemporary Economics and Administrative Sciences
ISSN:1925 – 4423
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risk weight for those having remaining maturity exceeding 2 years increased from 75 % to 200 %.

Development of Loans in Turkish Banking Sector and Preliminary Analysis of the Data

Following the period in which the BRSA took the macro-prudential measures concerning retail loans, the growth rate of retail loans were below the growth rates of corporate loans, SME loans and total loans. Therefore, it is important to examine comparatively the development of total amounts and annual increase rate of retail loans in banking sector with the developments in other loan types in the periods prior to and following to the October 2013 in which most of the macro-prudential measures for retail loans were taken.

Within this scope, first of all, it should be mentioned how loans and retail loans are classified in Turkish banking sector. Total loans of banking sector can be classified under 3 main groups, i) corporate loans: loans granted to companies operating in real sector, ii) SME loans: loans granted to small and medium-size enterprises; iii) retail loans: consumer loans and credit cards granted to natural persons.

Consumer loans granted to natural persons which is the first sub-group of retail loans are comprised of; i) mortgage loans, ii) car loans and iii) general purpose loans. Credit cards granted to natural persons excluding commercial credit cards is the second sub-group of retail loans and are comprised of; i) credit cards with installment and ii) credit cards without installment.

Total amounts and annual increase rates of loans in Turkish banking sector between December 2010 and September 2015 by quarterly periods are given in Table 1.

Table 1: Total Loans

Period	Total Loans	Corporate Loans	SME Loans	Retail Loans

	Amount (Milllion TL)	**Annual Change (%)**	**Amount (Milllion TL)**	**Annual Change (%)**	**Amount (Milllion TL)**	**Annual Change (%)**	**Amount (Milllion TL)**	**Annual Change (%)**
2015/9	1,481,590	24.8	717,587	37.0	383,423	21.1	380,580	9.7
2015/6	1,397,734	24.4	656,038	35.6	366,878	21.4	374,818	11.1
2015/3	1,322,679	22.1	609,830	30.6	347,870	22.1	364,979	10.3
2014/12	1,240,706	18.5	551,368	24.2	333,278	22.8	356,060	7.3
2014/9	1,187,284	19.9	523,912	25.9	316,523	24.5	346,850	8.4
2014/6	1,123,474	22.0	483,773	26.8	302,308	27.5	337,393	11.5
2014/3	1,082,854	29.9	466,980	39.1	284,858	30.8	331,016	18.2
2013/12	1,047,410	31.8	444,044	34.9	271,421	35.9	331,945	24.8
2013/9	990,441	31.1	416,266	26.0	254,171	47.6	320,004	26.5
2013/6	921,178	25.0	381,487	18.8	237,161	36.7	302,530	24.7
2013/3	833,557	19.2	335,657	10.9	217,748	30.7	280,153	21.8
2012/12	794,756	16.4	329,103	11.1	199,743	22.7	265,910	18.8
2012/9	755,640	14.3	330,482	14.1	172,214	10.2	252,943	17.4
2012/6	737,196	18.8	321,058	19.5	173,468	18.7	242,670	18.1
2012/3	699,107	23.9	302,606	24.3	166,559	22.7	229,942	24.2
2011/12	682,893	29.9	296,200	30.0	162,803	29.8	223,891	29.7
2011/9	661,282	39.1	289,592	38.7	156,226	44.3	215,464	36.1
2011/6	620,398	36.4	268,725	30.7	146,166	44.4	205,506	38.8
2011/3	564,303	35.4	243,490	27.7	135,692	51.4	185,121	35.6
2010/12	525,851	33.9	227,768	26.9	125,468	50.7	172,615	32.9

Total loans of the sector reached to TL 1,481,590 million as of September 2015 and increased by 24.8 % when compared to September 2014. In the same period, for the sub-groups of total loans, corporate loans comprising 48.5 % of total loans reached to TL 717,587 million by growing 37.0 %, while SME loans comprising 25.9 % of total loans grew by 21.1 % to TL 383,423 million and retail loans comprising 25.6 % of total loans grew by 9.7 % to TL 380,580 million. As of the mentioned date, retail loans with a total of TL 380,580 million are comprised of consumer loans with TL 303,245 million and 79.6 % share and credit cards with TL 77,335 million and 20.4 % share.

Annual growth rate of total loans fluctuated between December 2010 and September 2015 period. Turkish economy, which shrank by 4.8 % in 2009 due to global economic crisis achieved high growth rates in the following two years and grew by 9.2 % and 8.5 % in 2010 and 2011, respectively. The mentioned growth in Turkish economy also reflected on bank loans which is the most important source in financing of economic activities. Annual growth rate of total loans reached to 33.9 % and 39.1 % in December 2010 and September 2011, respectively. Following the mentioned period, as a result of macro-prudential measures taken by BRSA for provision and risk weight ratios of loans in June 2011, increasing growth rate of total loans entered into a slowing trend and realized as 16.4 % in December 2012. After that period, total loans of banking sector started to grow again and growth rate of total loans reached to 31.8 % in December 2013. By the impact of macro-prudential measures taken on the mentioned date, growth rate of total loans slowed down and decreased to 18.5 % in December 2014 and increased again to 24.8 % in September 2015 period.

When the growth rates realized in total loans and retail loans of banking sector are analyzed together before and after October 2013 period, the impact of sector-related macro-prudential measures on the growth rate of retail loans is seen clearly. Growth rates of retail loans from December 2010 to September 2013 period had a parallel motion with growth rates of total loans. However, macro-prudential measures showed their effects after that period and growth rate of retail loans realized under the growth rate of total loans. The growth rate of retail loans, which was 24.8 % in December 2013 started to decrease and reached its lowest level by 7.3 % in December 2014. In the same period, total loans grew by 18.5 %. Growth rate of retail loans increased slightly in the following three periods and stabilized around 10 % in 2015.

Within the framework of the explanations above, after October 2013 period during which macro-prudential measures were taken, measures such as maturity and installment limitations and the changes on loan loss provisioning and risk weights increased the costs of consumer loans and credit cards. As a result of these development, the customer demand for retail loans decreased and banking sector tended to provide corporate loans and SME loans instead of retail loans.

To understand the low growth rate of retail loans seen after October 2013, consumer loans and credit cards, which are sub-groups of retail loans shall also be analyzed closely. Total amounts and annual increase rates of consumer loans and its sub-groups between December 2010 and September 2015 by quarterly periods are presented in the Table 2.

Tablo 2: Consumer Loans

Period	Total Consumer Loans		Mortgage Loans		Car Loans		General Purpose Loans	
	Amount (Milllion TL)	Annual Change (%)	Amount (Milllion TL)	Annual Change (%)	Amount (Milllion TL)	Annual Change (%)	Amount (Milllion TL)	Annual Change (%)
2015/9	303,245	11.6	141,030	17.6	6,324	- 9.0	155,890	7.7
2015/6	299,906	15.0	138,336	20.4	6,393	- 13.9	155,177	12.0
2015/3	291,687	15.8	131,424	17.3	6,454	- 18.1	153,808	16.6
2014/12	281,934	13.6	125,750	14.0	6,832	- 19.9	149,351	15.5
2014/9	271,610	14.7	119,901	13.0	6,950	- 16.0	144,759	18.2
2014/6	260,854	16.7	114,895	14.5	7,423	- 8.5	138,536	20.4
2014/3	251,810	21.9	112,042	21.6	7,885	- 0.9	131,883	23.9
2013/12	248,138	27.7	110,286	28.2	8,532	6.1	129,321	29.0
2013/9	236,837	28.2	106,077	30.9	8,279	7.9	122,480	27.5
2013/6	223,553	24.9	100,338	28.0	8,109	7.7	115,106	23.6
2013/3	206,491	20.2	92,115	22.1	7,958	9.3	106,417	19.5
2012/12	194,318	15.4	86,042	15.4	8,043	9.2	100,233	15.9
2012/9	184,790	13.4	81,032	11.3	7,675	13.0	96,084	15.2
2012/6	179,014	14.6	78,381	10.7	7,528	14.6	93,105	18.1
2012/3	171,769	22.3	75,437	15.4	7,280	21.2	89,052	28.9
2011/12	168,402	30.5	74,588	22.7	7,366	30.0	86,448	38.2
2011/9	163,017	39.5	72,808	32.4	6,792	43.2	83,417	46.0
2011/6	156,244	44.0	70,836	36.3	6,567	49.1	78,840	51.2
2011/3	140,472	41.2	65,383	36.6	6,009	42.3	69,080	45.7
2010/12	129,033	38.3	60,793	35.5	5,666	28.1	62,574	42.1

Total consumer loans reached TL 303,245 million as of September 2015 and increased by 11.6 % annually. In this same period, for the sub-groups of consumer loans; mortgage loans comprising 46.5 % of consumer loans reached to TL 141,030 million by growing 17.6 %, while car loans comprising 2.1 % of consumer shrank by 9.0 % to TL 6,324 million and general purpose loans comprising 51.4 % of consumer loans reached to TL 155,890 million by growing 7.7 %.

Growth rate of total consumer loans, which grew annually by 38.3 % in December 2010 started to slowdown afterwards and realized as 27.7 % in December 2013 during which macro-prudential measures were begun to taken. Due to the impact of these measures, growth rate of total consumer loans realized as 13.6 % in December 2014 and 11.6 % in September 2015.

Growth rates of sub-groups of consumer loans fluctuated in this period. Following December 2013, the growth rate of general purpose loans realized higher than the growth rate of total consumer loans, except for the last two quarters. In this period, the growth rate of mortgage loans realized close to the growth rates of total consumer loans. Car loans were the sub-group of consumer loans, which affected the most negatively from macro-prudential measures. Car loans which showed increases close to consumer loans between December 2010 and December 2012 started to decrease because of the changes in taxes after this period and shown an annual growth by around 7 % until December 2013. Macro-prudential measures taken afterwards caused the growth rate of car loans to turn negative. Car loans decreased sharply after this period and shrank 19.9 % as of December 2014 and 9.0 % as of September 2015.

Total amounts and annual increase rates of credit cards and its sub-groups between December 2010 and September 2015 by quarterly periods are presented in the Table 3.

Tablo 3: Credit Cards

Period	Total Credit Cards		Credit Cards with Installement		Credit Cards without Installement	
	Amount (Milllion TL)	Annual Change (%)	Amount (Milllion TL)	Annual Change (%)	Amount (Milllion TL)	Annual Change (%)
2015/9	77,335	2.8	34,662	2.4	42,673	3.1
2015/6	74,912	- 2.1	32,992	- 7.6	41,920	2.6
2015/3	73,293	- 7.5	32,279	- 20.7	41,014	6.5
2014/12	74,126	- 11.6	33,546	- 29.3	40,580	11.7
2014/9	75,240	- 9.5	33,852	- 29.5	41,389	17.8
2014/6	76,539	- 3.1	35,687	- 19.1	40,582	17.2
2014/3	79,206	7.5	40,688	1.1	38,518	15.3
2013/12	83,806	17.1	47,479	23.7	36,328	9.4
2013/9	83,167	22.0	48,019	37.6	35,149	5.7

2013/6	78,977	24.1	44,109	41.8	34,868	7.1
2013/3	73,662	26.6	40,245	47.3	33,416	8.3
2012/12	71,593	29.0	38,386	46.9	33,207	13.1
2012/9	68,153	29.9	34,890	43.8	33,263	18.0
2012/6	63,656	29.2	31,101	41.2	32,555	19.6
2012/3	58,173	30.3	27,318	39.1	30,855	23.4
2011/12	55,489	27.3	26,124	34.9	29,365	21.3
2011/9	52,447	26.4	24,265	38.5	28,182	17.6
2011/6	49,263	24.7	22,032	37.4	27,230	16.0
2011/3	44,649	20.5	19,642	33.5	25,007	11.9
2010/12	43,582	19.2	19,372	30.4	24,210	11.5

Credit cards given to natural persons excluding the credit cards given to corporate companies, which compose of the second sub-group of retail loans decreased significantly due to the macro-prudential measures taken by BRSA. Total credit cards, which grew around by 25 % annually before October 2013 in which the measures started to be taken reduced sharply after this period. Total credit cards decreased by 11.6 % annually in December 2014 period; this trend started to slowdown in following periods and turned into a positive growth rate of 2.8 % as of September 2015.

Most important reason of this decrease occurred in total credit cards is the decrease realized in credit cards with installments as a result of the limitation of installments brought by macro-prudential measures. While the growth rate of credit cards without installment was approximately 20 % before December 2013, the growth rate of credit cards with installments was around 40 %. After this period, credit cards with installments decreased significantly and declined to negative 29.3 % as of December 2014. For credit cards without installments, the situation was the opposite and their growth rate increased to 11.7 % in December 2014 period.

In this respect, the limitations brought to the number of installments in credit card within the scope of macro-prudential measures affected the distribution of loans used by credit cards. As a result of these measures, while the amount of credit cards with installment decreased considerably, consumers tended to purchase goods and services with credit cards without installments.

Methodology, Data and Empirical Results

This part of the paper compares the important type of loans for the pre and post macro-prudential policies period. While performing the comparisons, Welch's t-test (1938) is used, instead of the classical t-test. The underlying reason for the selection of this test is the difference of the length of the compared periods and difference of the variance for the periods. In such circumstances, it is reported that this test statistic gives results that are more robust. Welch's t-statistics is calculated as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

$\bar{X}_1$, s_1^2 and N_1 represent the sample mean, variance and number of observations for the first sample; $\bar{X}_2$, s_2^2 and N_2 for the second sample. The degrees of freedom used for variance calculation is defined as:

$$v \approx \frac{\left(\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}\right)^2}{\frac{s_1^4}{N_1^2 v_1} + \frac{s_2^4}{N_2^2 v_2}}$$

$v_1 = N_1 - 1$ represent the degrees of freedom used for the first variance estimation and $v_2 = N_2 - 1$ represent the degrees of freedom used for the second variance estimation.

The data of this paper is collected from the Turkish Banking Sector Monthly Bulletin, which is prepared and presented by BRSA on its web site to the public. The monthly data of the total loans and its sub-groups for the December 2010-September 2015 period is extracted from the Bulletin and the changes of the loans from the previous month are calculated. Since most of the macro-prudential measures on retail loans were taken on October 2013, the analysis compares the period of December 2010-September 2013 to October 2013-September 2015.

The aim of the paper is to understand the effects of the macro-prudential measures on the growth of loans, thus the model is built on the growth rate of the loans. The growth of the loans is calculated based on their deviation from the prior month. The results of the Welch's t-test are presented in Table 4.

It is obvious that average growth of all types of loans decreased in the post measures period except for corporate loans. Hence, it is possible to conclude that the macro-prudential measures reached its main objective. Nevertheless, it is unlikely to confirm that all differences are statistically significant.

Table 4. The Difference of Growth Rate in Loans between the Pre and Post Measures Period

	Average Growth Following Measures	Average Growth Before Measures	Mean Difference	Welch t-statistics
1.Total Loans	1.6988	1.9438	-0.2449	-0.7682
1.1.Corporate Loans	2.3158	1.8669	0.4489	0.7815
1.2.SME Loans	1.7320	2.1851	-0.4531	-1.0479
1.3.Retail Loans	0.7266	1.8914	-1.1648***	-6.1767
1.3.1.Consumer Loans	1.0366	1.8617	-0.8251***	-4.1050
1.3.1.1.Mortgage Loans	1.1955	1.7052	-0.5096**	-2.5331
1.3.1.2.Car Loans	-1.1064	1.1657	-2.2721***	-5.9965
1.3.1.3.General Purpose Loans	1.0127	2.0623	-1.0497***	-4.1693
1.3.2.Credit Cards	-0.2927	1.9836	-2.2762***	-6.4838
1.3.2.1.Credit Cards with Installments	-1.3067	2.7989	-4.1056***	-6.3332
1.3.2.2.Credit Cards without Installments	0.8252	1.1503	-0.3251	-0.7132

*, ** and *** represent statistical significance at 10 %, 5 % and 1 %, respectively.

The retail loans declined by 1% in the post measures period due to significant decreases by its constituents, consumer loans by approximately 1% and credit cards by more than 2%. Mortgage loans also have a statistically significant decrease by about 0.5% and car loans have a huge decrease of 2.3%. Similarly, general-purpose loans had entered into a declining path by about 1%. The most significant decrease has been witnessed in credit cards without installments by more than 4%. In Turkey, different than most European countries, credit cards enable consumers to pay the purchases in installments up to several months, thus enabling people to purchase more. The measures led to limitations in these installments especially in electronics like mobile phones, computers etc. The measures led to a significant decline in the usage of credit cards with installments by 4.1% compared to the pre measurements period, and by 2.27% in credit cards in total.

Conclusion

The global economic crisis led to many precautions and new policies to be applied in the financial sector. Hence, supervisory agencies all around the world started the use of macro-prudential policies to enable soundness in the financial sector and to decrease the fragility. These policies included the use of credit related instruments, liquidity related instruments and various capital requirements.

Turkey witnessed decreases in its GDP levels as well as most countries in the post crisis periods, but also faced a huge decline in the savings to GDP ratio. After the crisis, many emerging countries witnessed capital outflows, which caused liquidity problems, and those countries faced serious issues finding funds both for corporate and government sectors.

In order to channel funds from consumer needs to corporate needs, the supervisory agencies issued new amendments in the regulations to limit the consumer consumption and channel those savings to more efficient credit lines in boosting economic growth, namely to corporate loans. This motive led to enact several amendments in the regulations of the banking sector by Banking Regulation and Supervision Agency of Turkey.

The amendments involved controlling the use of consumer loans and credit cards and increasing loan loss provisions and risk weight ratios of the certain types of loans. The measures on consumer loans included the limitation of maturities of car loans and general purpose loans. The main aim of these measures reduce the tendency to use these loans and decrease their growth rate. The measures taken towards credit cards included the increasing of the minimum payment ratio, establishing a link between credit card limits and consumer income and bringing limit to installments made by credit cards. The aim of the measures was to decrease the use of the credit cards, preventing people to consume more than they earn and reduce the percentage of non-performing loans in the banking sector. The measures on loan loss provisioning and risk weight ratios were also aimed at increasing the cost of loans granted by the banks and reduce the amount of loans.

Focusing on the macro-prudential measures taken by BRSA, the aim of this paper is to analyze the effectiveness of these measures and consider whether there is a decrease in the growth rate of consumer loans and increase in corporate loans. Thus, the paper focused on the period between December 2010 and September 2015 and regarded the October 2013 as the time when most of the measures were taken and divided the period into two period as pre-measures and post-measures period. The preliminary analysis of the data clearly shows that the nominal value of all types of loans increased, so the aim is to compare the growth rate of each type of loans in the pre and post-measures period. Obviously, the preliminary analysis also points to the decline in the growth rate of consumer loans in the post-measures period, still it is necessary to analyze if the difference is statistically significant. Since the length and the variance of the two periods are not similar, Welchs' t-tests are used to make a proper comparison.

According to the results of the t-tests, the total loans showed a statistically insignificant decrease in growth in the post measures period, despite the insignificant growth in corporate loans. On the other hand, the retail loans declined by a 1.16 % compared to the pre-measures period with a 1 % statistical significance. Among the consumer loans, car loans showed a 1.1 % decline in the post-measures period and decreased by -2.27 % compared to the prior period at 1% statistical significance. It is evident that the measures on consumer loans, especially limitations on car loans had been effective. The loan to value ratio limitations and limitations on the maturity of loans for cars ended up with success and with decreases in this type of loan. As a result of the measures, mortgage loans and general purpose loans ended up with a decline compared to the ex-ante period by 0.5 % and 1 % at 5 % and 1 % statistical significance, respectively. The results of the analysis points to the sharpest decline in credit cards with installments with a 4.1 % decline in the ex post period compared to the ex-ante period. Credit cards without installments showed an insignificant decline by 0.3 % and causing an overall decrease of 2.28 % at a 1 % significance.

The overall results show that the macro-prudential measures taken by BRSA had been effective causing significant decreases in retail loans and yet insignificant increases in corporate loans. It is possible that the analysis of the future periods will reveal that corporate loans will end up increasing significantly. If the channeled funds to corporate loans are used efficiently and effectively by the real sector, it is probable to boost economic growth in Turkey. Future studies should be performed in order to see a clear view on the effects of the measures on the economic growth.

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International Journal of Contemporary Economics and Administrative Sciences
ISSN:1925 – 4423
Volume: 5, Issue:1-2, Year:2015, pp.48-66

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