

## **Eighth ECB Statistics Conference**

### **Central Bank Statistics: moving beyond the aggregates**

**Frankfurt, 6 July 2016**

#### **Session 2**

#### **The benefits of micro data for macroprudential policy making**

#### **The Use of Microdata in Central Bank Policies: The Turkish Experience**

##### **I. Introduction**

The financial crisis of 2008 demonstrated that the regulations prescribed to protect the financial system were not enough to deal with the diversity of risks that are posed by different types of assets and markets. With an aim to prevent financial crises from occurring, macroprudential policies are designed and employed as a broader approach to financial regulation. In an effort to increase the robustness of the financial system, maintaining price stability is no longer perceived as the most important goal of the monetary policy. It has been widely accepted that central banks should not overlook the importance of financial stability in order to provide macroeconomic stability and price stability in the medium to long run (Başçı and Kara, 2011).

While price stability is a clearly defined area in which central banks are legally and operationally equipped enough to make decisions in order to follow a specified monetary policy framework, financial stability is a rather less obviously outlined task to achieve in the sense that it requires continuous monitoring of the processes occurring at the macro and micro level of the financial system. The availability of comprehensive, timely, and reliable statistics has always been significantly important in order to conduct and support economic and monetary analysis. However, the aim of maintaining financial stability carried the urgent need for data one step further by maximizing the demand for micro data in order to better serve policy needs and assess interconnections within economies. In this context, access to micro data has become significantly important in the sense that it can provide sufficient basis for the analysis of new macroprudential tools.

The need for restructuring macroeconomic policy framework incorporating new macroprudential measures has also been recognized by Turkey after the global financial crisis of 2008. Having realized the associated macro-financial risks, the Central Bank of Turkey (CBRT) started to pursue a new approach to monetary policy that employed a redesigned macroprudential toolkit. The new policy mix incorporated financial stability context into the revisited inflation targeting framework.

In this paper, the first section summarizes the macroprudential tools employed in Turkey in the context of the redesign of macroeconomic policies after the global financial crisis. The following sections highlight the importance of micro data for designing macroprudential policies and provide details of two data projects that combine micro and macro perspectives at the Central Bank of the Republic of Turkey.

## **II. Macroprudential Measures in Turkey**

*There was an urgent need to integrate financial stability context into monetary policy framework.*

As an emerging economy, Turkey has experienced accelerated capital inflows -mostly composed of short term investments- contributing to the widening of the imbalance between domestic and external demand through easier access to credit and appreciation of the Turkish lira. In order to maintain financial stability along with price stability and prevent financial turmoils, the CBRT needed to design a more flexible monetary policy that is capable of influencing both the credit channel and the exchange rate channel while restraining macrofinancial risks. However, it is impossible for a central bank to target more than one variable with one instrument. As a solution to this conflict, the CBRT designed a new policy framework by incorporating complementary policy instruments mostly from the macroprudential tool kit.

*There was a co-ordinated action with the BRSA. While the macroprudential tools employed by the BRSA aimed to contain credit growth...*

The macroprudential policies employed in Turkey can be broadly divided into two categories according to the targeted channel. While some of the macroprudential policies are designed to affect the credit channel, others are intended to deal with the current account balance and financing quality. In order to promote financial stability and increase sustained growth prospects, it is essential to smooth credit cycle and control household borrowing. The primary objective of macroprudential policies applied to consumer loans in Turkey is to increase savings by slowing down the rapid growth in consumer loans and to direct savings into productive investments (Financial Stability Report, November 2014). In Turkey, a number of borrower-based macro-prudential measures have been put in place by BRSA since the end of 2010 in order to limit the volume of credit cards and consumer loans. The loan-to-value (LTV) ceilings for purchases of housing and passenger cars, maturity limit on consumer loans, the credit card limits and limits to installments and credit card cash advances are the macro-prudential measures put in place with an aim to limit the consumer loan growth rate directly by affecting either credit demand or supply. These measures aim to ensure that leverage of the households is in line with their income level and hence to decrease default risk. In addition to

these measures, BRSA took other measures such as high risk weights for consumer and consumer car loans and increased provisions for consumer loans that indirectly affect the credit growth rate through lowering the banks' willingness to lend or tightening of the credit standards as a result of higher funding costs. To support these measures applied by BRSA, the CBRT included the liabilities of financing companies in the reserve requirement system starting from 2013, which is accepted as the only measurement applied by the CBRT which targets consumer loans directly.

*...policies implemented by the CBRT rather focused on the current account deficit and the quality of its financing.*

After the global financial crisis, emerging economies became the receivers of capital flows as a result of the low interest rates and quantitative easing policies of advanced economies. Increased capital inflows mostly composed of portfolio and short term flows have deteriorated the financing quality and posed the risk of a sudden stop. In order to improve the quality of external financing and bank liabilities, the CBRT mainly used reserve requirement policy as a macroprudential tool by adjusting reserve requirement ratio and remuneration rates to favor core liabilities over non-core liabilities, long term over short term and TL over FX.

A second macroprudential tool that is put into action by the CBRT is addressed to the foreign exchange (FX) reserves. The Bank is able to create direct FX liquidity provision facilities for banks to strengthen their resilience against external finance shocks using reserve option mechanism (ROM) and FX deposit facility. ROM is a market friendly tool that acts as an automatic stabilizer which contains possible distortionary effects of excessive volatility in capital flows on the domestic business cycles (Aysan, Fendođlu and Kiliń, 2014). The mechanism allows banks to voluntarily reserve some amount of their domestic currency required reserves in FX or gold. In other words, banks have the option to hold extra FX flows at the central bank when there is excess FX liquidity in the market. Therefore, in cases of outflow and liquidity shortage, the banks can utilize their funds via ROM in order meet their FX financing needs. Since the volatility of capital flows adversely influences the banks' debt payment capacity and balance sheets, storage and use of reserves at optimal levels according to the nature of the capital flows increases the efficiency of the system.

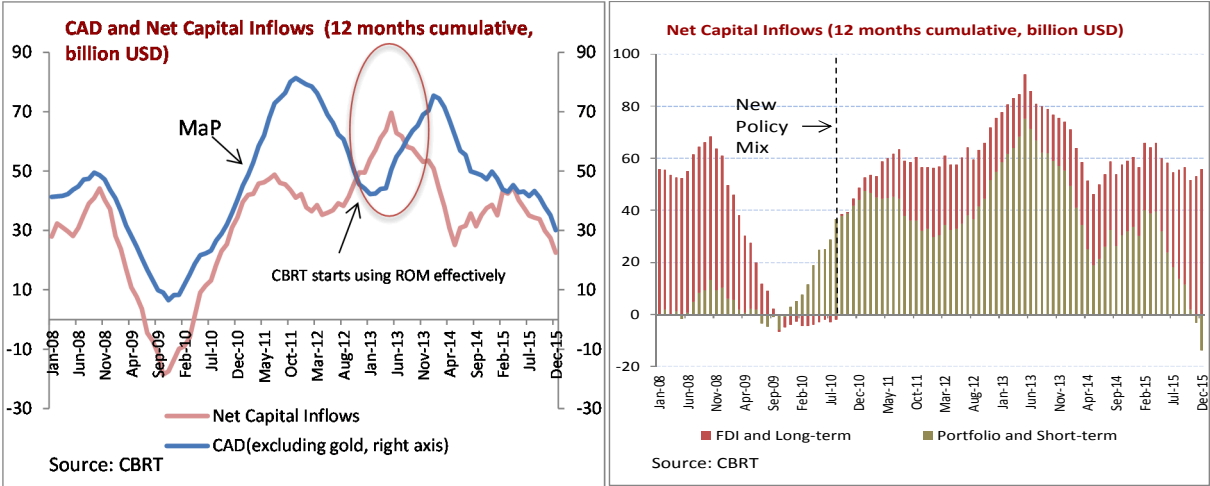
Wide interest rate corridor has been implemented as the third macroprudential tool to dampen the financial amplification mechanisms triggered by cross border flows. While ROM helps to build reserves with low sterilization costs and reduce sensitivity of credit and exchange rates to capital inflows, wide interest rate corridor provides a more flexible interest rate policy against sudden shifts in capital flows. A wider corridor means higher uncertainty about short term yields thus discourages short term portfolio inflows. Following the FED's QE2, the CBRT has reduced the lower bound to

dampen short term capital flows and increased the upper bound in late 2011 and 2012 when the Euro debt crisis was deepened.

*Well-targeted countercyclical macroprudential policies provided successful cushioning from volatile cross-border capital flows.*

As a result of the aforementioned macroprudential policies, the interaction between capital flows, exchange rate and bank loans have been decreased. Current account deficit has started to move in a decreasing trend and the share of FDI and long term capital inflows have increased. Moreover, GDP growth stayed relatively stable following the implementation of macroprudential policies.

Figure 1. Current Account Deficit and Main Financing Items



**III. Importance of Micro Data for Macro Prudential Policy**

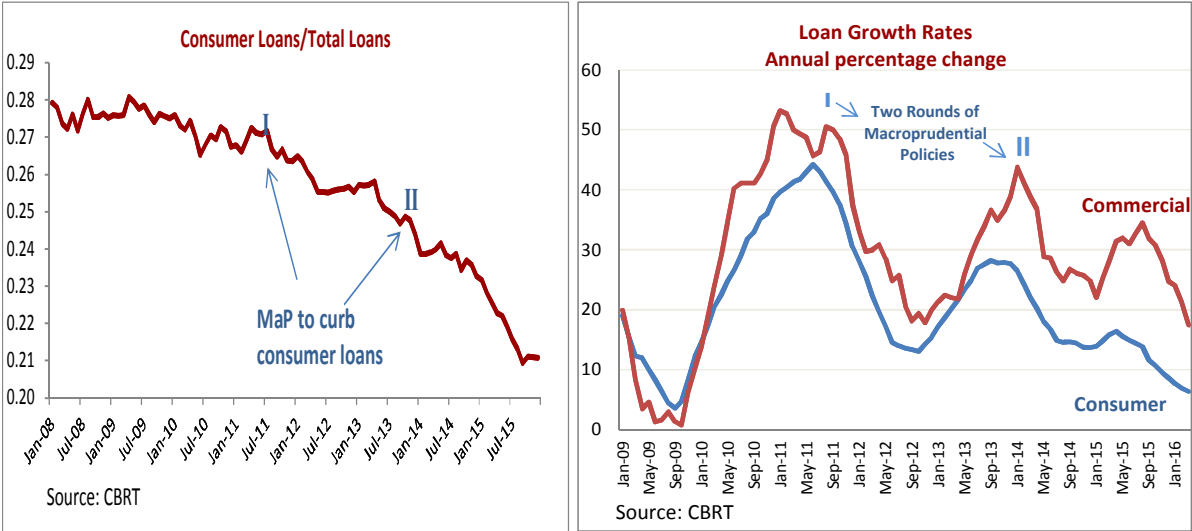
In uncertain times, it is a general theme for users to require additional data to help answer a wider range of questions and micro level data investigation becomes inevitable to maintain financial stability (Korhonen, IFC Bulletin No 37, BoE). Additional data needs can vary according to the macroprudential policy tool that is selected depending on the riskiness of the exposure in question. In this regard, it is important to gather data that can be broken down by various dimensions. Data on subsectors might be needed in order to determine a particular subsector that is financially distressed. When a specific type of intra-financial system activity threatens the whole system, a more detailed data breakdown by instrument might be required in order to have a better analysis and timely recognition of the symptom. This way, micro-data based analysis enables policy makers to adapt to the rapidly changing economic conditions. Another advantage of using micro data would be the suitability check for the impact of a new policy. A new adjustment could be tried in a chosen

subsector in order to decide whether the correct target is selected. Moreover, the development of new statistical frameworks would close the information gaps and create sufficiently granular data to further analyze the connections among financial institutions.

*Macro-data based impact analyses will be a partial approach...*

Indicators measuring loan growth rate and changes in current account deficits as well as the asset quality and risk-taking ability of domestic sectors are tracked in assessing the effectiveness of the macroprudential measures that have been in place in Turkey. Based on the macro data, it has been observed that the consumer loans growth, which is accepted as the one of the central indicators for financial stability, slowed down in Turkey following the implementation of the measures. The share of consumer loans in total loans has declined considerably since 2011. As a second indicator for the effectiveness of the measures, current account deficit has improved in recent years, despite the volatile course of capital flows, supporting the implementation of policy measures.

Figure 2. Consumer and Commercial Loans in Turkey



*...there is a need of comprehensive data sets integrating granular data into a macro perspective...*

In this regard, it can be concluded that the macro data are able to show that the policies implemented affected the targeted macro variables. Though, financial stability analysis requires a deeper identification of the sectoral risks as well as the vulnerabilities across sub-sectors, institutions and instruments for which the macro data do not suffice. Therefore, there is a need for additional information sets which complement the financial data for the financial stability analysis. In this respect, a micro-level data set with a comprehensive coverage of assets and liabilities of non-financial sector and households could give important insights to the policy makers to assess the

relative effectiveness of different policy instruments, but institutional-level data are often not available and/or accessible due to confidentiality concern. Even further, financial stability analysis needs a wider range of macroeconomic, monetary and financial statistics than the micro-prudential approaches based on granular data. To this end, comprehensive data sets which integrate granular data into a macro perspective should be developed.

*...and “financial accounts” is one of the key areas.*

Financial accounts provide consistent statistics on transactions and financial assets and liabilities for the economy as a whole and for each institutional sectors: financial, non-financial, government, household and rest of the world sectors broadly. Financial accounts statistics capture all transactions in financial assets and liabilities at each instrument level which reveals the portfolio allocations of the agents between money and non-monetary financial assets. Since the instrument and sector level data production requires a security-by-security data base as well as micro data set for non-financial sector, financial accounts can be categorized as a macro data set which is enriched with micro data. Net worth for each sector, which is defined as the difference between stocks of assets and liabilities, can be calculated from financial accounts. Instrument-level data enables to identify how the net borrowing sectors (sectors with a negative net worth) obtain resources and how net lending sectors (sectors with a positive net worth) allocate surpluses. Thus, financial accounts identify who finances whom as well as the instruments used for financing. CBRT started to disseminate the financial accounts statistics in 2015 for all sectors, in stocks and flows with quarterly periodicity.

*FX exposure of non-financial corporations is an external vulnerability indicator...*

Especially for emerging market economies, the macro-prudential toolkit could also include measures to limit system-wide currency mismatches, which aim at stemming the domestic financial consequences of capital inflows (Galati and Moessner, 2011). As a result of the structural shift in the financial intermediation from domestic banking sector to global financial markets, cross-border exposures of non-financial corporations is needed to be monitored in the macro-prudential framework applied by the CBRT.

*...CBRT utilizes a dual approach based micro and macro datasets in monitoring.*

This task of monitoring currency mismatches of non-financial corporations requires a comprehensive micro and macro data integrated statistical framework. In that framework, macro data measures the foreign exchange assets and liabilities of the domestic corporate sector on an aggregated level and reveal the potential currency mismatch risk. Company Accounts publication of the CBRT, on the other hand, forms the basis for the micro component of the framework and provides the balance sheets

and income statements of the real sector with the information on composition of assets and liabilities in both sector and sub-sector levels. An integrated framework generated by combining the Company Accounts data base with the data base of the Risk Center at Banks' Association of Turkey enables a deeper study on the degree of foreign currency exposure with an emphasis on company specifics.

A study by the CBRT based on this integrated framework has proved to be instrumental in understanding the transmission of institution-level fragilities to macro financial stability risks. According to the macro level data, the FX indebtedness of the non-financial sector in Turkey is increased significantly since 2010 resulting in a net FX open position about 28 percent of GDP by December 2015. The high net open FX position suggests that a depreciation of Turkish lira could damage the balance sheet of the sector and increase the indirect credit risk for the banking sector. However, the study carried out with the integrated framework for more than nine thousand non-financial firms which hold 58.2 percent of the total sales based on data of 2011, showed that most firms do not borrow in FX and a significant portion of the FX borrowers are naturally hedged. More specifically, the study showed that FX debt is higher among firms which have higher export ratios while it is lower among the firms with lower export ratios. The firms with high FX debt but without or limited export revenues, on the other hand, obtain a higher average net FX profits than other firms. Additionally, most of the sectors with relatively higher debt dollarization ratios seem to have activities not classified as exports but generating revenues through FX-linked pricing in the domestic market. Therefore, the study revealed that foreign currency risk of non-financial firms in Turkey might be lower than what the macro aggregates have implied, justifying the advantage of micro level data investigation (Hülagü and Yalçın, 2013).

*“Households” is still a missing sector and requires further statistical micro-data work in Turkey.*

Constraining the consumer loan growth is an important element of the macro-prudential toolkit. Aggregate financial data are able to reveal the trend in consumer indebtedness and hence show whether the toolkit is effective or not. However, when it comes to assessing the relative effectiveness of the each policy measures such as LTV ceilings and high risk provisions, the aggregate data are not sufficient. This type of an analysis requires a deep knowledge regarding the structure of the households' balance sheets with the factors affecting the changes in assets and liabilities of the households which is beyond the regulatory data. Moreover, risk-taking ability of the households, which is also crucial in a macro-prudential framework for not only household sector's soundness but also for the soundness of the financial system, could not be measured properly with the regulatory data since it fails to capture detailed information on the debt and wealth of households. Therefore, a

high quality micro-macro framework is essential for assessing the risk-taking ability of households and the relative effectiveness of the borrower-based policy instruments. To this end, CBRT is investing in generating a nationally-representative micro-level data set by conducting a survey on households' balance sheets, pensions, income, and demographic characteristics.

#### **IV. Conclusion**

Following the last financial crisis, macroprudential policies became increasingly important as a broader approach to increase the robustness of the financial system. Achieving financial stability requires continuous monitoring of the processes occurring at the macro and micro level of the financial system maximizing the demand for micro data in order to better serve policy needs and assess interconnections within economies. With this in mind, use of micro data has become remarkably important for enabling the necessary requirements to employ the macroprudential tools. Having realized this trend, Turkey employed a new macro approach following rapid credit growth and sharp widening in its current account deficit. The CBRT played an important role in redesigning the macroprudential toolkit to respond to macro financial risks. Reserve requirements and interest rates were used jointly for macroprudential purposes as well as achieving monetary policy goals.

Utilizing micro databases have been central in designing and monitoring the new macroeconomic policies. In that respect, the CBRT recently established Financial Accounts as one of the key statistics that integrates granular data into macro perspective. On the other hand, firm-level data base is used to enable a deeper study in understanding the transmission of institution-level fragilities to macro financial stability risks.



## Annex I. Recent Macroprudential Measures

Measure	Description	Implementation Date
Loan-to-value (LTV) ceilings	Implements loan-to-value ceilings on housing loans to consumer (at 75 percent) and on purchases of commercial real estate (at 50 percent).	December 2010
Implicit Nominal Credit Growth Target	The authorities provided guidance to banks that credit growth (adjusted for FX movements) in 2011 should not exceed 25 percent	Spring 2011
High risk weights for consumer loans	Higher risk weights introduced for fast growing consumer loans. For new general purpose loans with maturities below two years, the risk-weighting increased to 150 percent (from 100 percent). For new general purpose loans with maturity greater than two years, the risk-weight increased to 200 percent (from 100 percent).	June 2011
Increased provisions for consumer loans	For new (performing) general purpose loans, general provisions were increased from 1 percent to 4 percent. General provisions for (pre-nonperforming) loans increased from 2 percent to 8 percent. The higher provisioning requirements are conditional on banks having a consumer loan portfolio exceeding 20 percent of total loans or having a general purpose loan NPL greater than 8 percent.	June 2011
Limits to credit card payments	If three or more monthly payments within a calendar year are less than half of the outstanding balance for the period, the individual credit card limits cannot be increased and cash advances for such credit cards cannot be permitted, unless the outstanding balance for the period is fully covered.	June 2011
Interest Rate Risk	Announced by the Banking Regulation and Supervision Agency (BRSA) to contain interest rate risk through capital charges on large maturity mismatches, discouraging duration gaps. Effective from 2012.	August 2011
Changes to minimum Capital Adequacy Requirements	Amended by the BRSA in September 2011 to apply to banks with foreign strategic shareholders as of January 2012. The minimum ratio would depend on various factors such as the CDS spread of the parent and its sovereign, EBA stress test results and the public debt ratio in the country of origin.	September 2011 Abolished February 2013
Changes to deposit insurance premiums	The deposit insurance fund introduced a premium surcharge for large banks and a new factor to calculate the banks' score for the deposit premium determination.	September 2011
Abolition of loan to value ratios for commercial real estate loans	Loan to value ratios for loans financing commercial real estate were abolished.	April 2013
Credit card limits introduced	Consumer credit card limits were tied to incomes. Minimum payment limits and risk weights were increased. Limit increases were linked to prior income tests.	October 2013
Changes to provisioning rate	Increased general provisioning rates for uncollateralized consumer loans to 4 percent from 1 percent; Decreased general provisioning rates on export and SME loans to 0 percent and 0.5 percent respectively from previous 1 percent.	October 2013
Increase in risk weights for consumer car loans	Risk weights of those consumer car loans were increased for loans with a remaining maturity longer than a year.	October 2013
Maturity limit on consumer loans	Maturity of consumer loans is capped at 36 months for consumer loans excluding housing loans and other real estate related loans, and at 48 months for car loans.	December 2013
Limits to installments and credit card cash advances	As a general requirement, maximum number of installments is capped at 9 months. In addition to that, installments are banned for telecommunication device, jewelry, dining, groceries and fuel products.	February 2014
Loan to value requirements for car loans	Consumer loans for the purchases of passenger cars (including purchases through financial leasing) shall be subject to an LTV ratio of 70 percent for those cars worth up to TRY 50,000 and 50 percent for the incremental car value in excess of TRY 50,000.	February 2014
Remuneration of TRL required reserves	The CBRT starts paying an interest rate on banks and financing companies' required reserves (RR) in TRL. The interest rate on RR will be the weighted average cost of the CBRT's funding rate minus 700bps for all banks for 2014. Starting with 2015, the interest rate on RR will be the weighted average cost of the CBRT's funding rate minus 500bps for banks and financing companies that have a core funding (i.e., (deposit + shareholder's equity)/credit) ratio higher than the sector average and that maintain or increase their own core funding ratios with regard to the reference period, and minus 700bps for the remaining banks and financing companies.	November 2014
Reserve Requirement Ratio	The CBRT raised the reserve requirement ratios (RRR) of foreign exchange (FX) denominated liabilities of banks and financing companies as a way to encourage the extension of maturities of non-core FX liabilities.	January 2015

Reserve Requirement Ratio	The CBRT raised the reserve requirement ratios (RRR) of foreign exchange (FX) denominated liabilities of banks and financing companies as a way to increase the marginal cost of FX liabilities and therefore defend the currency from its slide from TL/USD 2.35 to TL/USD 2.60 in January–February 2015.	March 2015
Reserve Option Coefficients	The CBRT changed the reserve option coefficients (ROC) of foreign exchange (FX) RRR for TL denominated liabilities of banks and financing companies as a way to increase the marginal cost of FX liabilities and therefore defend the currency from its slide from TL/USD 2.35 to TL/USD 2.60 in January–February 2015.	March 2015
Reserve Requirement Ratio	The CBRT raised the reserve requirement ratios (RRR) of foreign exchange (FX) denominated liabilities of banks and financing companies as a way to encourage the extension of maturities of non-core FX liabilities. <i>Unlike previous changes, the higher RRR will apply to new borrowing while old RRR will apply to existing stock till maturity.</i> New reserve requirement ratios will be applied to the liabilities after 28 August 2015, as of the maintenance period dated 23 October 2015. The current ratios will continue to be applied to stock of liabilities on 28 August 2015 until the end of their original maturities. The full impact will start to reflect starting from 2018 and is estimated at around 1 percent of annual NI of the banking sector, assuming average cost of FX funding at 3 percent and no drastic change in the current balance sheet mix.	August 2015
Remuneration of TL Required Reserves	The remuneration rate for the required reserves maintained in Turkish liras will be raised by 150 basis points in total within the frame of following timeline:  <ul style="list-style-type: none"> <li>- 50 basis points as of 1 September 2015</li> <li>- 50 basis points as of 1 October 2015</li> <li>- 50 basis points as of 1 December 2015</li> </ul> By December 2015, the Bank will start paying 300bps lower than the CBT's average funding rate to a Bank with above sector's average core liability ratio (CLR) and 500bps lower for those below sector's average.	August 2015
Marginal Loosening of Maturity Limits on Household Credit	The BRSA eased maturity limits on credit card installment plans from 9 to 12 months for purchases of furniture, white goods and education services. At the same time, it exempted retail loans extended for the purchase of education services from the 36 month installment cap in effect for other personal loans.	November 2015

Source: IMF

## References

- Aysan, Fendođlu and Kiliñ (2014), “Macroprudential Policies As Buffer Against Volatile Cross-Border Capital Flows”, CBRT working paper, February 2014, available at [www.tcmb.gov.tr](http://www.tcmb.gov.tr).
- Başçı and Kara (2011), “Financial Stability and Monetary Policy”, CBRT working paper, May 2011, available at [www.tcmb.gov.tr](http://www.tcmb.gov.tr).
- Galati, Gabriele and Moessner, Richhild (2011), “Macroprudential policy – a literature review”, working paper, February 2011, available at [www.bis.org](http://www.bis.org).
- Gross, Marco and García, Francisco Javier Población (2016), “Assessing the efficacy of borrower-based macroprudential policy using an integrated micro-macro model for European households”, working paper, February 2016, available at [www.ecb.europa.eu](http://www.ecb.europa.eu).
- Hülagü, Timur and Yalçın, Cihan (2014), “Micro Level Evidence on Foreign Exchange Liability and the Exchange Rate Risk in Turkish Corporate Sector”, CBRT research notes in economics, August 2014, available at [www.tcmb.gov.tr](http://www.tcmb.gov.tr).
- Irving Fisher Committee (2015), Workshop –Programme, Warsaw, 14–15 December 2015, available at [www.bis.org](http://www.bis.org).
- Kara (2015), “Turkey’s Experience with Macroprudential Policy”, CBRT-IMF-BIS Joint Conference, 26-27 October 2015, available at [www.tcmb.gov.tr](http://www.tcmb.gov.tr).
- Korhonen (2014), “Do macroprudential tools require micro-data?”, IFC Bulletin No 37, January 2014, available at [www.bis.org](http://www.bis.org).
- The Central Bank of Turkey (2014), Financial Stability Report, November 2014, available at [www.tcmb.gov.tr](http://www.tcmb.gov.tr).