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BANK OF ALBANIA

DISENTANGLING DEMAND AND SUPPLY SHOCKS IN ALBANIAN CREDIT MARKET USING A SURVEY APPROACH: WHICH OF THEM AFFECTS MORE BANK LENDING TO FIRMS (AND HOUSEHOLDS)?

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Gerti Shijaku
Bank of Albania, Research Department (PhD in Banking and Finance).
E-mail: gshijaku@bankofalbania.org

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ABSTRACT

This paper aims to analyse a conventional wisdom on a key question to understand whether and to what extent bank lending in Albania is a result of demand-side or/and supply-side factors. The idea is to investigate the extent to which bank lending flows are effected by demand-side factors that influence the ability and desire of borrowers to demand more, or instead, it is a result of supply-side factors and other balance sheet issues that determine the extent to which by tightening their lending standards and conditions banks are likely to impair the supply of bank lending. For this, we use content information from a bank lending survey data to identify these shocks. This responses provide a perfect methodological approach that allows us to disengage and identify any shock effects among those caused by demand-side factors form those determined by supply-side factors. Shocks related to demand-side are identified by looking at those factors that are assumed to affect the desire of borrowers and their creditworthiness to demand more loans. Shocks related to supply-side are identified by looking at those factors that determine the decision of banks to change their lending conditions and standards, which would influence them to supply less loans to their borrowers. In addition, these shocks are analysed, then, with respect to bank lending to firms (and households). The estimation approach includes a vector autoregressive approach with sign restrictions. The sample includes quarterly data for the period 2007 Q4 – 2018 Q4. It combines macroeconomic and bank-specific variables with information from bank lending survey.

JEL Codes: **C12, E44, G21**

Keywords: **credit supply, credit demand, bank lending survey, SVAR.**

1. INTRODUCTION

The ability of banks operating in Albania to provide qualitative bank lending flows and to transfer risk out of their balance sheets was severely disrupted after the global financial crisis (henceforth GFC) that erupted in mid-2007. Evidences (See Figure 1) point out that this episode was due to a combination of factors. On the one hand, this situation is seen as a reaction driven by the overall upturn of macroeconomic risks in Albania. This is related, among other things, to the lower economic growth and higher public debt. On the other hand, to some extent it is assumed to be directly related also to problems that some banks had in particular with capital adequacy ratios and with problems trigger by increasing non-performing loans (henceforth NPL) reaching as high as 25 percent of total loan. These phenomena, however, added further pressure on banks to squeeze and consolidate properly their balance sheets. This pressure could not be extinguished despite the easing policies pursued by Bank of Albania (i.e. either by cutting interest rates or by implementing macro-prudential policy aimed at writing off non-performing loans from banks' balance sheets) to support at least bank lending in domestic currency. This ultimately led, among lower levels of growth rate and inflation rate, to a significant reduction in credit allocation to non-financial private sector, namely firms (and households). This phenomena was much clearer in particular after the Greek Sovereignty Debt crisis that emerged in early 2012. As a result, bank lending reached at about 33[1] percent of GDP in early 2019 from almost 43 percent it that was by the end of 2011.

These distorting episodes highlight two interrelated dimensions. Firstly, as advocated previously by Bassett, *et al.* (2011) and Ciccarelli, *et al.* (2015), these developments endorse the predominant role that banking sector has with regards to business cycle fluctuations in Albania. Secondly, they prove the spreading

[1] *Note that this figure represents the ratio with regards to regular outstanding loans level, which if it is corrected for the ratio of Write-offs than the outstanding loan ration goes at nearly 43 percentage. Still, in annual growth rate, loan to private sector has increased on average by 3.4% after 2008 Q4 and by nearly 0.2% after 2012 Q1, from 41.8% it was before the financial crisis.*

mechanism and the severe implications that shocks on credit market and lack of efficient credit allocation have as potential crucial source of macroeconomic instability, which as accepted previously by Mirzaei and Moore (2014) are almost certain to be transmitted throughout to the rest of the economy.

For these reasons, therefore, there is nowadays an ongoing lively discussion on a conventional wisdom that is copiously related to a key question. This question is similar to the discussions addressed by Calani, *et al.* (2010). It focuses on the main factors that explain properly credit market developments in the case of Albania, in particular during the period 2012 - 2018. The main idea is to analyse empirically the extent to which these patterns are determined the effects related to demand-side factors, or instead, they are forced by those related to supply-side or bank balance-sheet problems. In other words, the idea is to analyse whether bank lending is driven by the ability of firms (and households) to borrow more, or instead, by the ability of banks to supply less as imposed by tightening of their credit standards and conditions.

Addressing these questions empirically again over time is of central importance for policymakers trying to understand better credit market developments in Albania. The reason is threefold. First, bank lending is a key source of external finance for the Albanian economy and therefore, following the Bernanke and Blender (1992) argument, this channel is often viewed as an enhancement channel that amplifies the interest rate channel of Bank of Albania. Second, as Altavilla, *et al.* (2018) reveal, understanding the transmission of shocks to the real economy as transmitted by the banking sector is of utmost importance as an optimal policy response on case to cases depends on whether credit developments are driven by changes in banks willingness to lend or by the propensity of borrowers to invest or consume. This has become even more crucial in the aftermath of financial crisis. Third, it is related to a general greater issue, which although it is the object of a large body of research, remains far from settled also in the case of Albania. For example, in answering these questions, researchers have identified, either through an equilibrium or through a non-equilibrium model, a large number of plausible explanatory factors of bank lending.

These factors are related either to demand-side or/and to supply-side. For this reason, some authors try to distinguish them into two separated equations. Other authors, however, place both of these type of factors in the same equation.

In this sense, answers to these questions remain, therefore, far incomplete as it is still not clear how to adopt a suitable approach that can disentangle properly them among those that are related implicitly with demand-side factors and those that are related to supply-side. The former category, as Del Giovane, *et al.* (2010) put forward, mirrors always a combination of both driving forces. Similar, as Everaert, *et al.* (2015) advocate, disentangling the role of credit demand and supply is an inherently difficult task. On the one hand, this problems is because those real factors belongs truly to each category are unobservable. Only the actual level of credit outcomes can be observed. Similar, literature does not offer yet an empirical approach that identifies properly each of these categories. This means that an econometric identification approach that would serve to identify properly demand-side factors against supply-side factors is not straightforward.

Progress in this area, however, has been recently achieved. There is a large body of literature, known as the bank lending channel approach, which uses qualitative data to address these questions and challenges. The information content from these data are retained from a bank lending survey (henceforth BLS) approach. This approach is conducted nowadays by many central banks in advanced economies to analyse determinants of credit growth developments, e.g. US economy and Eurozone. It is conducted regularly also by Bank of Albania since late 2007. It aims to collect qualitative data on the main drives on lending activity in Albania. This set of factors and the information gathered by them is categorised into two groups. One group of data reports implicitly information on each individual component related to demand-side factors. Similar, the other group reports data on each individual component related to supply-side factors. However, in both cases, data are reported also as aggregated ratio reflecting the overall effect of each category. This is used to measure the overall effect of each category. This means that this approach complements

hard data on credit market with qualitative specific information reports on how, and why, conditions on demand and supply of loans change. This approach, as Altavilla, *et al.* (2018) advocate, provides a clean insight identification approach, without the need for assumptions on demand. This is done by complementing the quantitative data information that would serve, similar to what Faruqui, *et al.* (2008) do, as a useful tool for in-depth analysis of financial markets. This includes current and future developments in credit growth and economic activity.

Against this background, this paper analyses the extent to which shocks, caused either by demand-side or supply-side factors, effect overall bank lending in the case of a small open economy, namely Albania. For this reason, we follow a three step approach. In the first step, we construct two distinguished new instruments. These instruments are retained from the BLS dataset conducted by Bank of Albania. One instrument represents aggregated data on all demand-side factors that affect the ability of firms (and households) to borrow more. Any change caused by this indicator, that is also considered as a possible component that affects demand for bank lending is identified, therefore, as a demand-side shock. The other instrument represents an aggregated component with information on credit conditions and standards that banks apply each time they provide additional new loans. This means that it reflects an aggregation ratio of the effect of all supply-side factors that determine the ability and the desire of banks to supply more new loans. This means that any change caused by this component is identified, similarly, as a supply-side shock. These two indicators are adopted respectively to address empirically the extent to which demand-side and supply-side factors determine bank lending to firms (and households). This means that we have constructed four different variables, which as Bassett, *et al.* (2014) suggest, are uncorrelated with each-other. They are uncorrelated also with other explanatory variables that can simultaneously affect the demand and supply of additional new loans.

In the second step, we adopted an equilibrium model approach. This model expresses bank lending, to firms (and household) as a functions of macroeconomic and monetary as well as other

bank-specific variables. This model specification includes also an additional explanatory variable related specifically with information from BLS data. This variable represents specifically either a demand-side or a supply-side shock component. This means that the identification of any shock effects, either belonging to demand-side or to supply-side, is analysed in a non-simultaneous equation framework that, similar to what Sóvágó (2011) suggests, assumes that credit market is in equilibrium since bank lending is market clearing due to adjustments of the real lending rate. This means that we treat each of these components as endogenous variables. The aim is to twofold. On the one side, it is our intention to split and distinguish between shocks coming from demand-side factors and those coming from supply-side factors. On the other side, it is the objective of this paper to understand the extent to which bank lending to firms (and households) is effected respectively by each of these shocks. This is assumed to be an appropriate approach to understand whether and how these shocks are meaningful in an economic sense in the case of firms (and households), in particular in the case of Albania.

The model is estimated, then, through means of a structural vector autoregressive model with quarterly data for the period 2007 – 2018. This means that we use a recursive identification scheme in a model that analyses the responses to either a demand-side or a supply-side shock innovation. These innovations, as in the case of Shijaku (2018a), are identified by means of sign restrictions approach. This approach is suitable in this case for three reason. First, it does not drop any contemporaneous effects (the variance – covariance is full). Second, it achieves identification by restricting the signs of the structural responses and eliminates any kind of possible puzzle by construction coming due to limitation caused by small data sample as it is our case. Finally, results are analysed through means of impulse response functions (henceforth IRFs). This approach fits well into the objective of this paper for at least for three reason. First, it shows exactly the response of how a demand and supply shock innovation effects bank lending to firms (and households) over a given time horizon. This horizon includes a period of time with 10 lags. Second, it reports when the maximum impact is experienced and how long the effects lasts. Finally, since

all the impulse responses are produced using the same candidate decomposition, it facilitates a comparison approach across all variables. These are all important pieces of information about the relationships between time series.

To the best of our knowledge there are two essential issues that have to be noted at least in the case of Albania. On the one hand, this is the first time that the pass-through effects of shocks on bank lending, related to either demand-side or supply-side, are identified using responses from the BLS at the country level. This means that this paper solves the problem of shock identification by providing a methodological approach that generates an exact decomposition of aggregated effect of demand-side and supply-side factors. These transmission channels are identified by looking in particular at those factors that are supposed to affect the creditworthiness of firms (and households) and their desire to borrow more and at the same time by looking also at those other factors that by affecting the decision of banks to change lending conditions and standards for their borrowers determine them to supply less. On the other hand, it takes crucial steps to address also an identification challenges by making particular reference to what can be considered as a unique features of this study that is linked on the ability to separate shocks related to demand-side from those related to supply-side factors, in particular those effecting bank lending to firms (and households). For this reason, it distinguishes between them by relying heavily on content qualitative information from BLS responses. This approach, as Ciccarelli, *et al*. (2013) advocate, represents an invaluable source of information on credit market developments for several reasons. First, understanding the transmission mechanism of such shocks and identifying their individual effects is among those key issues for the central bank to conduct monetary policy effectively. This is crucial in particular for a small and open economy, namely Albania. Second, it supplements existing statistics with appropriate crucial qualitative information. This information refers to a set of responses related to questions on demand-side and supply-side factors, which are assumed that effect bank lending to firms (and households) from a demand and a supply point of view. This means that it does not suffer from any problems related to selection biasness. On the one hand, this is due to the fact that it distinguishes between firms

(and households). On the other hand, it is because it separates among those factors that affect the decision of banks to grant additional loans to all potential borrowers and those that effect the decision of firms (and households) to borrow more. The distribution of BLS questions, whether related to the demand or supply loans, is related to the same category of potential borrowers, both for the analysis of the factors that might influence the tightening / easing of credit conditions and standards and those that might influence the demand by borrowers. This is another aspect that avoids the biasness in choosing the right indicator for measuring properly the effect of a shock caused by demand and / or another one caused by supply related to the amount of loans granted effectively. Finally, the so-called "bank lending channel" literature is devoted mainly to identifying shocks in credit market, either caused by demand-side or by other supply-side factors, at an aggregated level. This paper assesses, by contrast, the validity of the main hypothesis by disentangling the role of a possible shock, either related to demand-side or supply-side factors, with a particular focus to the firms (and households). This means that this paper assumes that in the case of firms (and households) are not homogenous.

The results from this analysis generate several insights. First, they indicate that credit market in Albania react to shock innovations, caused either by demand-side or/and supply-side factors, consistently with the theory expectations. They prove that positive shocks, tracked by a positive "shift" on demand for loan or as an "easing" on credit standards and conditions that would stimulus bank lending supply, is expected to surge the flows of new loans to firms (and households) in a positive and statistically significant way. Results clarify that a supply-side shock, rather than demand-side shock, would have a relatively bigger effect on bank lending. It is new flows of lending to firms rather than to households that is relatively more effected by shock innovations related to both demand-side and supply-side factors. Other results imply that it is not only the stability condition and prudential behaviour of the banks, but also their desire and willingness to provide more flow of new loans that determine credit market developments for a supply point of view. Similar, results point out that it is the non-price-related factors that would have a stronger effect on bank lending patterns.

This is found to be stronger in the case of bank lending to firms.

The remaining of the paper is as follows. Section 2 provides the theoretical and empirical literature review. Section 3 presents the methodology, describes the data, the model specification and discusses identification issues. Results are discussed in section 4 and finally Section 5 concludes and discusses possible policy implications.

2. LITERATURE REVIEW

There is a vast literature on assessing the main factors that drives bank lending. This literature can be analysed from a theoretical and empirical point of view. From a theoretical point of view, as Fase (1995) shows, there exist two distinguished major doctrines. One of them is referred as the neo-Keynesian approach. The other doctrine refers to the neo-Fisherian approach. A third approach emerges from research on portfolio behaviour of banks. The first two approaches focus mostly on demand-side factors effecting credit patterns. The neo-Keynesian approach considers the corporate balance sheet of the firms as the main component that drives demand for bank lending. In this case, bank lending is assumed to serve as an external source to finance the asset side of the firm's balance sheet. The neo-Fisherian approach, which is based on the Irving Fisher's model of bank lending behaviour, considers the households rather than the firm as the basic unit to generate the functional specification of the demand for loans[2]. The portfolio approach, which is an important approach for the determination of money supply, focuses on the supply side. This approach sees banking sector behaviour as the main drivers of patterns in credit market. It assumes, as Al-Tarawneh and Khataybeh (2015) reveals, that the main objective of banks is to maximise profits' level from their asset holdings. If the asset distribution is not as desired, then banks will attempt to adjust their portfolio composition by increasing some of their asset holding components and decreasing others. For this, as Andersen and Burger (1969) put forward, they depend on the opportunity cost of doing so. This means, as these authors assume,

[2] *See for more details Melitz and Pardue (1973).*

it is the banks, therefore, that drive the cost and the new flows of bank lending to specific sectors of the economy rather than vice versa. This is, however, different to the assumption of Cuthbertson (1985) who takes a different approach. This author believes that it is the banks themselves that set the interest rates and meet all the requirements of the borrowers. This means that at the ongoing interest rate, new flows of bank lending are driven by demand, no matter how interest rate is determined, set either by market forces or fixed by the banks.

The empirical literature offers, on the other side, a mix support of all these theoretical approaches. This support comes from several prominent studies focusing mostly at aggregated data on country level. These studies see bank lending as a function of a set of factors related either to demand-side and/or to supply-side. Some authors, therefore, place both type of them into the same equation. Other authors, by contrast, try to distinguish among them by using two different separated equations.

The starting point of this approach is a study by Melitz and Pardue (1973). These authors assume that credit market is always in equilibrium. This means that demand for bank lending equals supply at each period of time. For this reason, using an equilibrium approach, they specify an all-inclusive single equation that includes all together demand-side and supply-side factors. This study comprises quarterly data for the period 1951 – 1969. It provides the foundation of later work by other authors[3]. These authors, by contrast, advocate that credit market is in disequilibrium. This assumption has become, nowadays, popular in the "credit crunch" literature. Authors supporting this approach[4], however, focus mostly on advanced economies[5]. Their work expresses credit market

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[3] *See among others Madala and Nelson (1974); Laffont and Garcia (1977); Martin (1990); and Pazarbasioglu (1996). These authors use the maximum likelihood method as an appropriate method to estimate a disequilibrium model.*

[4] *See among others the work by Gosh and Gosh (1999); Borensztein and Lee (2002); Nehls and Schmidt (2003); Agénor, et al. (2004); Baek (2005); Kanoh and Pumpaisanchai (2006); Allain and Oulidi (2009); Čeh, et al. (2011); Rottmann and Wollmershäuser (2013); Everaert, et al. (2015).*

[5] *They use a wide set of estimation techniques. These techniques varying from descriptive or survey analyses to more simple time-series regression analysis. They includes also other approaches such as panel regression models and logistic regression.*

disequilibrium as a function of demand-side and supply-side factors. These factors, however, are modelled into two different equations. This means that the main drivers of bank lending, or of episodes of excess demand or supply of loans, are identified through a set of separated equations that includes independently in one equation all demand-side factors from those related to supply-side, and vice versa. This means that one equation includes all demand-side factors and the other equation includes all supply-side factors. On the demand-side, these factors related mostly to macroeconomic and financial condition. For these reason, the list of these variables is dominated mostly by indicators related to economic performance and output gap, interest rates, inflation, exchange rate. On the supply-side, explanatory variables relate mainly to financial variables on the banking sectors. These set of variables includes indicators related to the minimum reserve requirements, capital and liquidity ratio, return on asset, corporate net worth, stock market prices, risk premium, and banks' lending capacity. The list of indicators in this case extends also to other macroeconomic variables. This includes by contrast, industrial and energy production index or real GDP growth rate, output gap, interest rates spreads, exchange rate deviations, etc.

Most of the empirical studies, however, have succeed to identify the main drivers by using linear equilibrium approach. These studies distinguish from previous work for two reasons. First, the list of variables these authors use, either related to demand-side or supply side factors, can be categorised into two groups. One group includes those variables considered to be related to internal factors. These factors represent developments related to mainly balance sheets. This means that they provide information on the financial situation of lenders and borrowers. The other group relates to external factors. This set of indicators refer to the situation related to macroeconomic and financial conditions of a given country. Secondly, and most importantly, most of the authors use a classical approach. This approach includes a simultaneous econometric model with two different specified equation. One equation is related to demand-side factors. The other equation includes supply-side factors. Both of them, however, share the same identity. This identity is based on market clearing condition. This approach is

most commonly identified by the work of Sóvágó (2011). This study uses a panel approach with six banks and covers the period 2003 Q1 – 2010 Q4. The dependant variable, proxy as the annual growth rate of the outstanding level of corporate loan, is expressed as a function of demand-side factors. Similarly, it is expressed also as a function of supply-side factors. The former equation includes variables related to real interest rate on new loans to selected branches of the manufacturing sector and the gross fixed capital formation. It includes also an extra variable with information from the BLS approach. This is an aggregated variable. It reports the overall impact, as perceived by loan officers in charge of filling out the BLS, demand-side factors have all-together on bank lending. On the other hand, the second equation includes variables related to real interest rate on new loans, corporate bankruptcy rate, and annual growth of banks foreign liabilities. Among these variables, it includes also two extra variables with information from BLS approach. One of these variables provides data related to changes in lending standards applied by banks while supplying new flow of loans. The other variable exhibit information related to changes in banks willingness to lend. These indicators are also a perception of loan officers responding to the BLS approach.

However, as Everaert, *et al.* (2015) puts forward, one of the problem with most of the existing studies is the inherently difficult task to disentangle the role to which bank lending is determined by demand-side or/and by supply-side factors. The idea is how to disentangle demand-side effect from those related to supply-side. This conditional difficulty pitfall stems from two main factors. First, there is no published and/or approved instruments that quantifies or shows the exacted amount of new flow of loans that borrowers are willing to demand compare to what banks in return are willing to supply at a given period of time. These components, yet so far, are unobservable as accepted by most authors. Existing data provide information only on actual levels. This means that it does not offer a concrete information on the exact volume demanded and/supplied. For this reason, it assumed that demand and supply are in equilibrium. Second, researchers use a wide range of variables to explain credit market developments. There is, however, yet so far no agreement among them on the effect that each of these variables

represent when used in such analysis. There are authors who agree that some factors drive generally demand for loans. There are also other authors that accept that some variables drive mostly supply of loans. Most of them, however, agree that there are some among these variables that drive both demand and supply of new loans.

The identification process in this case is, hence, not straightforward. Progress in this area has been recently achieved through the use of information retained from credit register managed by central banks. This approach is adopted in an equilibrium model by Jimenez, *et al*. (2012). These authors use loan application and bank-firm level data from a unique features of the Credit Register of Spain to distinguish between the extend of bank lending demand by borrowers compared to the extent supplied by banks. The authors search empirical answers to questions on how the actual level of loan supplied by banks is determined specifically by a set of macroeconomic and bank-specific factors. The macroeconomic variables related to short-term interest rate, annual inflation rate and annual change in output. The other set of variables represent mostly patterns related to bank' balance sheet condition. This includes data on capital and liquidity position of banks proxy, both as a ratio of total assets. It includes also other data on return on assets and annual change of assets.

In addition, there is also a large body of literature, known as the 'bank lending channel', which identifies and disentangles shocks on bank lending among those caused by factors representing demand-side and those representing supply-side. This approach uses, however, qualitative data to address these challenges. These data are retained from a BLS responses approach. They complement hard data with qualitative information that reports specifically how, and to what extent, bank lending is affected by changes related to demand-side and supply-side factors. In the realm of credit market patterns, the most relevant paper in this case that uses this type of survey approach is the study by Ciccarelli, et al. (2015). These authors use a panel VAR approach to analyse empirically whether a pro-cyclicality relationship exists between credit demand and supply and business cycle. They use two unique dataset. One dataset provides plenty information from the BLS on Euro area. The other dataset, similarly,

provides qualitative data on US credit market patterns from the Senior Loan Officer Survey (SLOS). Both of these dataset provide a wide set of information regarding unobservable factors that drive shocks on credit demand and supply. This means that they can provide a supportive approach to solve the identification challenge. For these reasons, authors use both of these dataset to identify respectively in each case three sub-channels. The first two channel focus on changes in net worth and/or risk from a balance sheet approach. On the one hand, one indicator uses this approach to account for the capacity of banks to lend more. On the other hand, the other indicators uses this approach to account for the ability of firms (and households) to demand more. The third indicator expresses the extent to which firms (and household) want to demand more.

By doing so, they identify two types of shocks. First, any shock innovations caused by either the ability or the desire of firms (and households) to demand more is identified as related to demand-side factors. Second, any shock innovations cause by changes in the ability or desire of banks to supply more loans is identified as related to supply-side factors. For this reasons, they are considered as a demand and supply shock. A more eclectic point of view is adopted by Altavilla, et al. (2018). These authors identify the effects of credit supply shocks, by controlling for possible changes in demand conditions linked to the balance sheets condition of borrowers. For this, they use a sample with quarterly data over the period 2002 Q4 to 2017 Q4. This sample includes also data from the BLS approach of 13 Euro area countries. They provide individual information on the credit market patterns related to changes in factors affected by changes in demand and supply conditions. They find that bank lending are jointly affected by supply and demand pressures, not only in a statistical way, but also in an economically relevant manner[6].

Nevertheless, unlike money demand, bank lending patterns in the case of Albania have only recently attracted increasing attention.

[6] *Past paper suing information content from survey approach to measure the effect of changes in credit demand and supply factors, includes the studies by Lown, et al. (2000); Cunningham (2006); Lown and Morgan (2006); Faruqui, et al. (2008); Calani, et al. (2010); Del Giovane, et al. (2011); Ciccarelli, et al. (2013); Kurul (2013); Bassett, et al. (2014); and Metiu, et al. (2016).*

So far, empirical work that address the main demand-side and supply-side factors that are assumed that drive bank lending remains rather limited in this case. Several papers have considered various aspects of credit, but have a somewhat different focus from the one we have in this study. This includes the study by Kalluci (2012); Suljoti and Hashorva (2012); Note and Suljoti (2012). The most relevant recent papers to this research focus in this paper are those by Shijaku and Kalluci (2013); Vika and Suljoti (2015); Vrioni and Abazaj (2015); Shijaku (2016); Shijaku (2018a). However, a crucial question, yet unanswered among this set of papers, is related to the extent that credit market patterns are affected by shocks related to either demand-side and/or supply-side factors. Yet this analysis has not been so far conducted even to understand these shocks changes among loans demanded or supplied to firms (and households). This gap in the literature, as explained previously, is mostly due to the lack of data that distinguish fully and individually factors related specifically to demand-side and supply-side factors, in particular with respect to firms (and households).

For this reason, this paper solves this problem by using qualitative data from the BLS approach. The advantages of using this approach is threefold. First, as Faruqui, *et al.* (2008) put forward, this set of data supplements existing statistics by providing specific information on how, and why, credit demand and supply pressures are changing. Second, as Altavilla, *et al.* (2018) advocate, it provides a clean insight identification approach, without the need for assumptions on demand. On the other hand, it serves also as a useful tool for in-depth analysis of developments in credit market patterns as caused respectively by demand-side and supply-side factors. On the other hand, it provides an input to the assessment of monetary and economic developments carried out by the Bank of Albania Governing Council in the process of making its monetary policy decisions. This can strengthen the strategic decision-making process at the Bank of Albania to conduct monetary policy efficiently.

3. METHODOLOGICAL AND DATA ISSUES

3.1. Bank lending survey on credit conditions: survey results as an indicator of lending activity.

As of 2007 Bank of Albania conducts its first "Bank Lending Survey[7]" on bank lending conditions in Albania. The BLS is an opinion survey that aims to collect qualitative information data by commercial banks senior officers[8]. These officers are assumed to be in charge of monitoring and analysing credit developments. For this reason, they are expected to provide their opinion the extent to which demand-side and supply side factors have affected credit market patterns at least the past three months. This survey is conducted four times a year. In each case, they are required also to express their expectations on such pattern for at least the next three months. Results provide aggregation ratio of each of the survey published quarterly on the website of the Bank of Albania[9] within the 20th day of the month following each quarter. They provide information on the responses of the survey taken at the end of the previous quarter. This means that BLS provides, therefore, a summary of commercial banks' perceptions on the changing conditions of credit supply, shown through credit standards, terms and conditions, and on the changing in demand for loans to both firms (and households).

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[7] *This survey share the same features of the ECB's bank lending survey. Similar surveys were already conducted by the Federal Reserve System and the Bank of Japan. More recently, BLS has been also introduced by other central banks within the EU, introduced first in 2003.*

[8] *Depending on the organizational structure of banks, the loan officers may be part of the credit/ risk department, etc. and are responsible for in-depth monitoring of credit developments.*

[9] *For more information see https://www.bankofalbania.org/Publications/Surveys/Bank_Lending_survey/.*

Table 1. Information used to build supply and demand side indicators using data from the BLS organised by Bank of Albania

THE FACTORS AFFECTING CREDIT STANDARDS	Cost of funds and balance sheet constraints	Banks capital adequacy
		Bank's actual and expected liquidity position
	Pressure from competition	Competition in the banking system
		Competition from non-banks
	Perception of risk	Actual and expectations regarding general economic activity
		Industry or firm - specific outlook
		Non-performing loans
	Banks risk tolerance	
	Other …	
	Monetary policy decisions of Bank of Albania	
FACTORS AFFECTING LOAN DEMAND	Financing Needs	Fixed investment financing need
		Inventories and working capital financing needs
		Mergers/acquisitions and corporate restructuring
		Debt refinancing
	Use of alternative finance	Internal financing
		Loans from other banks
		Loans from non-banks
		Issuance/redemption of debt securities/equities
	Financing conditions	Monetary policy decisions of Bank of Albania
		Macroeconomic situation and perspective
		Business confidence
	Other …	
	Usage of alternative sources of financing (internal funds, loans from non-bank institutions and loans from other banks)	
	Credit standards applied by your bank	

Source: Bank of Albania

This analysis is based on the aggregated results of responses from eleven banks operating in Albania banking sector, which have the highest share of credit allocation to firms (and households). The methodology used in aggregating the results refers to the indicator of net percentage. Negative balances indicate that banks have tightened their credit standards, whereas a net positive balance indicates that banks eased the credit standards. Similar, in the case of loan demand, negative balances indicate that consumers, firms (and households), have tightened their demand for loans, and vice versa. The key patterns summarising responses to the survey through years are shown in Figure [4] to [5] in Appendix. At the most aggregated level, this survey provides averall information with

regards to developments related to non-financial private sector, namely firms (and households), lending conditions and economic performance, which has been disaggregated into credit standards and demand for loan as well as into pricing and non-pricing factors. Overall, the historical profile of changes in lending conditions derived from the BLS are consistent with our broader understanding of domestic credit cycle. The most notable patterns is the fact that credit supply and demand have been easing (tightening) at different space in time. For example, in Figure [4] results illustrate the tightening in credit standards, i.e. banks' internal guidelines or loan approval criteria, through the financial market turmoil that began in mid-2007 and those related to Greek debt crisis by 2010 for both firms (and households). Overall, while the sample is only a subset of the most important banks, holding nearly 90 percent of total volume of credit, and a consistency analysis shows very strong correlations between the aggregated results on changing conditions and developments with regards to demand and supply for both firms (and households). Also evident is the fact that information from the BLS show a situation in which there is an excess demand of loans over its supply, which also give a value associated with credit rationing occurring in the case of Albania. This pattern seems to have occurred at an earlier stage for households than for firms.

On the other hand, the analysis show that credit standards has remained broadly negative, even though with a slightly improving trend. The credit standards for households follow the same trend, but differently demonstrate a net positive change since beginning of 2012. This means that banks have been more conservative to lend to the firms rather than to households. Easing of credit standards for loans to firms have been mostly due to issues related to industry of firms' specific factors. In some moments easing of such standards was also related to risk perception by banks, such as borrowers' creditworthiness, the general economic conditions and their liquidity position. On the other hand, tightening of standards has been mostly due to concerns dealing with banks risk perception, i.e. non-performing loan, banks capital adequacy level. The easing of credits standards on loans for households is mostly due to factors relating to competition in the banking system, favourable housing market and households financial solvency prospects, and more recently the

banks' capital adequacy ratio. The inverse effect of non-performing loans and borrowers' creditworthiness have tightened credits standards for loan to households especially during the period 2012 – 2014. Surprisingly, pressure from competition in the banking systems has not been reported to contribute either on easing or tightening of credit standards for both firms and households. Also noteworthy, is the preponderance of banks reporting "no impact" or slightly a small relative impact in particular linked to the Monetary Policy decisions of Bank of Albania.

Similar factors effecting terms and conditions on new loans have been more eased for households than for firms. Overall, on an aggregated level factors contributing to the easing of terms and conditions on new loans approval to firms and households were reported to be perceived due to pricing rather than non-pricing factors. Detailed responses show that the factors driving terms and conditions for new loans for firms were assessed as narrowing in the recent years, while for households such factors have affected mostly in a positive way. For example, in the case of households, margins applied on overage loans and risker loans are assessed as to be affecting on a positive way since 2012 compare to their negative effect before that period. Similarly, other conditions related to maturity, fees and collateral requirements according to loan's size are also among the factors that are assessed to have contributed somewhat to the easing of the overall terms and conditions on approval of new loans for households.

By contrast, Figure [5] shows that net demand for loans has been higher compared to supply for all loan categories. Banks have received a stronger demand by households rather than firms during the period 2012 - 2014. Meanwhile, firms demonstrate a stronger need for bank lending thereafter. The net demand for loans to firms was driven by inventories and working capital financing needs including fixed investment financial needs, credit standards applied by banks, and slightly by other factors relating to credit standards applied by banks, the monetary policy decisions of Bank of Albania, and the general macroeconomic conditions. Net demand for households loans continue to be driven by financing needs for spending on housing and durable consumer goods, terms

and conditions applied by banks and slightly by the monetary policy decisions of Bank of Albania. In Figure [6] and [7], we match the dataset of aggregated information on developments in loan supply and demand with aggregated bank lending data by firms and households and the Economic Sentiment Index (ESI). In particular, Figure [6] shows that increasing households' demand and supply for credit, or easing credit standards and increasing demand for loans, goes hand-in-hand with improvements of economic sentiment. This relationship has become stronger after 2014. However, notwithstanding the high correlation, this relationships seems to break down in the aftermath of 2013 in the case of firms. Credit standards seems to be counter-cyclical to economic performance, i.e. lower ESI tends to soften lending standards, and vice versa. The analysis of lending standards and conditions shows that banks have managed to soften their standards by reducing spreads on average loans, but also by reducing collateral requirements and commissions and fees.

3.2. The empirical model approach

The credit market, as Sóvágó (2011) advocates, is assumed that regulates price and quantity simultaneously. This means that demand and supply in this case is determined by market forces. The literature offers a wide range of empirical studies in this case. Many authors have failed, however, to address correctly the questions whether it is shifts related demand-side factors or those related to supply-side that drives developments within credit market. The reason, as Calani, *et al.* (2010) explain, is that addressing correctly such issue is as hard as assessing which one scissor blades cuts more the paper. For this reason, the empirical analysis in this paper is built upon two assumptions. The first assumption accepts that banking sector faces a demand curve for loans (L_t^D), upon which, it decides, then, the amount of actual credit allocation (L_t^S) that it is willing to supply. On the other hand, (L_t^D) and (L_t^S) are assumed to be a function of interest rate (r_t) and a set of other endogenous control variables (Z_t). They are expressed, therefore, empirically, as follows:

$$L_t^S = a_1 + a_2 r_t + a_3 Z_t + \varepsilon_t^S \qquad [1]$$

$$L_t^D = \beta_1 + \beta_2 r_t + \beta_3 Z_t + \varepsilon_t^D \qquad [2]$$

Where, a_1 and β_1 are constants; a_i and β_i are long-run coefficients to be estimated; and ε_t^S and ε_t^D are the respectively error terms related to shocks coming from demand-side and supply-side factors.

On the other hand, as supported by Sóvágó (2011), we assume also that credit market is in equilibrium, at least as the observed actual published data do not distinguish between them. This implies that the amount of loans demanded equals the amount of loans supplied at each period of time. This means, also, that they are disturbed by an i.i.d. supply and demand shocks functions. If both supply and demand have other arguments besides the interest rate, then, there are other potential instruments that identify them. If this is the case, then, the empirical analysis should take a more realistic straightforward representation approach. This approach should reflect more a classical demand and supply system that is in equilibrium[10]. Consequently, therefore, a simultaneous equilibrium model is specified as follows:

$$L_t = a_1 + a_2 r_t + a_3 Z^S + \varepsilon_t^S \qquad [3]$$

$$L_t = \beta_1 + \beta_2 r_t + \beta_3 Z^D + \varepsilon_t^D \qquad [4]$$

Where, L_t stands for outstanding loan stock. Z^S and Z^D are exogenous to the system and contain the unitary column vector. Others are as previously discussed. These authors claim that such estimation requires an order condition[11]. This should be in addition to the identification assumptions made previously. This condition requires that there is at least one variable in Z^S which is not in Z^D as well, and vice versa. This is assumption allows us to be able to identify correctly credit demand curve from credit supply curve.

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[10] *It is worth emphasising that equilibrium approach fails to account for the asymmetric information and principal-agent problems between banks and their borrowers that may cause imperfect adjustment towards equilibrium linked to the creation of credit rationing while banks screen risky clients. See for more details also Sóvágó (2011).*

[11] *The estimation requires, in addition to our exclusion restrictions (or identifying assumption) that* $E[(Z^{S,D})' (\varepsilon^{S,D})]=E[(\varepsilon^S)' (\varepsilon^D)]=0$.

In this study, this order condition is explicitly solved by using a set of information from the BLS approach. This information provides clear data on the main factors that drive bank lending. These factors can be sorted among those that represent demand-side and those that represent supply-side effects. This approach, however, imposes a potential limitation. This limitation drains out from a methodological issue related to the BLS approach. This approach, as explained previously, offers information on both, demand perception and credit standards, from responses of Loan Officers at credit and/or risk department of banks. One potential pitfall limitation with this, as proclaimed by different authors[12], is related to the possibility that the answers to a set of question, e.g. related to demand-side factors, may influence the answers to another set of questions, e.i. supply-side factors. This means that their responses to the extent to which bank lending, in their view, is determined by demand-side factors may be influenced by their responses with regards to the other factors related to supply-side, and vice versa. The literature, in this case, offers two ways to solve this issue. On the one hand, these authors propose to use a structural approach that imposes some straightforward exclusive restrictions. These set of restrictions should be able to identify properly each of the equations representing respectively credit demand from supply. On the other hand, Ciccarelli, et al. (2015) advise to split this set of information. These authors suggest to build two distinguished equations. Each of the equation, including also respective data from BLS approach, should be able to identify correctly factors related to demand from those related to supply. If this is the case, then, each of them should provide a clear answer on the extent to which bank lending is affected by the capacity and desire of firms (and households) to demand more and/or by the capacity and desire of banks to supply more.

The second assumption, as it is the case with previous empirical works[13], accepts also that bank lending is a linear function of wider set of factors, which goes beyond those included in Equation [3] and [4]. For this reason, bank lending is expressed as a function on

[12] *See among others: Jimenez, et al. (2012); Bassett, et al. (2014); and Ciccarelli, et al. (2015).*

[13] *See among others: Ciccarelli, et al. (2015).*

interest rate (r_t) and other factors, proxy within Z^S and Z^D, that are related specifically with banks (B_t) and macroeconomics conditions (X_t) of the country in which lenders and borrowers operate. The first set of factors, B_t, is assumed to provide insight information that highlights the performance of banks from a balance sheet point of view. Such information, according to the IMF (2018), should provide insight into the health of a country's financial institutions. This means, as Navajas and Thegeya (2013) proclaim, that this set of factors should highlight increasing risks and weaknesses caused by adverse economic circumstances or increasing risks related to their balance sheet and/or possible customer defaults. These patterns and concerns are represented in this study by a bank stability indicator (BSI). This indicator is assumed to provide a clear understanding whether banks are behaving prudently and if they perform relatively well to withstand adverse financial and economic shocks. If banks are stable than their capacity to supply more loans is bigger, and vice versa. It is considered, therefore, to be related to supply-side factors. The second set of variables, X_t, represents information on macroeconomic performance of a given country. This aspect is captured by including three other macroeconomic variables. These variables account respectively for the effect of economic performance, inflationary pressure and exchange rate movements. The latter is assumed to be a relative indicator that reflects the economic performance of a given country compared to that of its trade partners.

This study is focused on the analysis in the context of a small open economy, namely Albania. Perhaps, it is from this point of view, that macroeconomic developments within the economy of its trade-partners countries are expected to affect the domestic economy. For this reason, the specified model includes, also, two other exogenous variables. These variables account for the effect related to the global financial crisis and the European sovereignty debt crisis period of time. Furthermore, in practice bank lending to the economy can be classified in two main streams, namely credit to public and to non-financial private sector. The latter group if the focus of this study. It involves bank lending to firms (and households). The basic econometrical model [3] and [4] is disaggregated and augmented to represent properly these assumption, therefore, as follows:

$$L_t^{Firms} = a_1 + a_2 r_t + a_3 BLS^{S}_{Firms_t} + a_4 X_t + a_5 B_t + \varepsilon_t^{S} \quad [5]$$

$$L_t^{Firms} = \beta_1 + \beta_2 r_t + \beta_3 BLS^{D}_{Firms_t} + \beta_4 X_t + \beta_5 B_t + \varepsilon_t^{D} \quad [6]$$

$$L_t^{HH} = \alpha_1' + \alpha_2' r_t + \alpha_3' BLS_{HH_t}{}^{S} + \alpha_4' X_t + \alpha_5' B_t + \varepsilon_t^{S} \quad [7]$$

$$L_t^{HH} = \beta_1' + \beta_2' r_t + \beta_3' BLS_{HH_t}{}^{D} + \beta_4' X_t + \beta_5' B_t + \varepsilon_t^{D} \quad [8]$$

Where, now Z^S and Z^D represent the individual information retained from BLS approach on the extent to which easing credit standards on firms ($BLS^S_{Firms_t}$) and households ($BLS^S_{HH_t}$) and the respective demand-side factor related to firms ($BLS^D_{Firms_t}$) and households ($BLS^D_{HH_t}$) affect respectively credit market developments.

This function highlights two crucial elements worth mentioning. First, as in the case of Lown and Morgan (2006), each of the explanatory variables, either related to demand-side or supply-side factors, is treated as endogenous. Second, the identification of credit shocks is unrestricted. On the other hand, they are arranged also by trusting the bankers and by interpreting their assessment as reflecting truthfully the conditions in the credit markets. Consequently, an innovation to their answers related to changes in the demand-side factors affecting bank lending is interpreted as a shock on credit demand. Similarly, we read an innovation to their answers related to changes in lending standards and conditions as a shock on credit supply. Therefore, as Del Giovane, *et al.* (2011) implies, it is important to notice that the supply and demand effects estimated on the basis of these variables provide an indication of the effects, which are captured by the BLS indicators, over and above those captured by other variables included in each of equations above.

The empirical analysis, as it is the case with Bassett, *et al.* (2014) and Ciccarelli, *et al.* (2015), is based on a flexible VAR model with exogenous variables (VARX). This model is estimated recursively. The key step applying this approach, to answer the questions at hand, is related to the focus of this study. This focus, as explained previously, is related to the aim to analyse the magnitude at which the driving force that shocks caused by demand-side and supply-side factors have on bank lending. This is released by identifying

and by splitting them among shocks coming by demand-side from those coming from supply-side factors. For this reason, variables with information from the BLS approach, belonging either to changes in demand for loans or to changes in credit conditions and standards are included separately as described in Equation [5] to [8], regardless of variable ordering[14]. This means that we distinguish between two types of bank lending shocks. One shock is related to demand-side factors. It is assumed, therefore, that this shock is caused by factors effecting the capacity and creditworthiness of firms (and households) to demand more loans. The other shock is related to supply-side factors. It is assumed, therefore, that this shock is caused by factors affecting the capacity and willingness of banks to supply more loans, independently of a shift in monetary policy rate.

The pass-through effects of these shocks are analysed, then, using a recursive shock identification. This identification process involves a two-step approach. First, it uses the means of the impulse response functions (IRFs) as offered by the VAR approach. This approach is commonly known as a useful technic to study the reaction of any dynamic system (or interaction between variables in a VAR system) in response to some external change dictated by shocks hitting the system, defined as the response of a linear time-invariant. This is in the spirit of what Christopher, *et al.* (1996) see it as a strong reasonable approach justifying the need to use the IRFs as an acceptable formal criterion to identify among the different type of shocks. Second, it uses the means of sign restriction approach. This approach is seen often in studies that use the IRFs analysis. It is similar to the work by Uhlig (2005), who proposes two important elements. On the one hand, he recommends to identify the effects of a particular shock by imposing a sign restriction directly only on the impulse response of a variable of interest. This means to place a sign restriction only on the variables related to demand and supply shocks, as retained from the survey information, and leave shocks with respect to other variables blanked[15]. On the other hand, as

[14] *Note that since the estimation process of some of the explanatory variables, namely BSI, is based on the Principal Component Approach, then our VARX model would take the form of a Factor VARX model (FAVARX).*

[15] *This is similar to previous studies by Gambetti (1999); Canova and Pina (1999); and Canova and Nicolo (2002).*

in the case of Christiano, *et al.* (1999), he proposes also to throw out all IRFs that are at odds with the theory. Most importantly, the approach proposed by Uhlig (2005) does not add restrictions until the maximum number of shocks is uniquely identified. It does not impose also an increasingly stringent restrictions to eliminate the orthogonal candidate. Rather, it complements previous works by employing a new agnostic method. This method imposes a sign restriction over a given time horizon, h, after a shock in a given moment. This means that the reactions to a given shock is constrained to respond accordingly and conditionally to the sign of the restriction and to the horizon upon on which sign is restricted. This means that the restricted bounds apply to each response entry, rather than to the entire function, and also to all variables or all horizons $h = 0,..., H$.

Numerically, this new approach is realised through a three step approach. First, we set the sign restrictions on each of the variables related to the data from the BLS approach. These restrictions support two assumption respectively. One of the restriction supports our assumption that a positive supply shock, caused either by easing of credit standards or improvement on the terms and conditions for loans, is expected to boost bank lending to firms (and households). The other restriction backs our assumption that a positive relationship is also expected in the case of a positive demand shocks. Second, we set up the time horizon upon which sign restriction is bidding. In each case, this horizon is fixed at four periods respectively[16]. Third, as it is commonly known, the sign restriction approach does not allow to achieve a unique identification of shocks in a system of equations. For this reason, based on the suggestions of Metiu, *et al.* (2016), the model generates as many rotation (impulse vectors) draws from the posterior Bayesian distribution of the SVAR coefficients as possible. It forms, then, the space of rotation matrices and plots the maximum and the minimum of the first 500 of impulse responses for those *i* that satisfy the biding sign restrictions, and discarding the ones that do not. Finally, all the accepted IRFs are reported as median response. This approach is suitable to our case study for

[16] *The time horizon, upon which sign restrictions are imposed, does not derive from any theoretical assumption. Setting it, h = 4, is based on the assumption that the decision-making of banks and firms (and households) is revised annually.*

three main reasons[17]. First, as Canova and De Nicolo (2002); and Uhlig (2005) advocate, it achieves identification of the effect of a shock by restricting the signs of the structural responses and eliminates any kind of possible puzzle by construction[18]. Second, the conventional identification of structural shocks associated with the standard VAR approach imposes the upper triangular part of the innovation matrix to be 0. In contrast, as Migliardo (2010) reveals, the sign restriction does not drop any contemporaneous effects as the variance-covariance matrix is fully identified. Finally, the summarised range of possible results follows the common strategy of sorting the impulse responses and reports the median value. This is a good approximation of the central tendency of the impulse responses across the estimation.

3.3. Data generated process

This study uses quarterly data over the period 2007 Q4 – 2018 Q4. It includes a total of 43 periods with quarterly observations. The sample imposes some constrains caused by the frequency of the macroeconomic data series and the relatively limited viability of historical data in the case of Albania, in particular limitations from survey data[19]. On the other hand, this limation is over-come by the fact that this study is based on the sign restriction approach, which uses the Bayesian estimation technique. This approach, as McNeis (2016) implies, is an excellent method to empirically analyse models with small sample data. One of the major benefits of the Bayesian approach is the ability to incorporate prior information from the historical data sets to maximise a posteriori estimation. This approach does not rely, also, on asympotics properties, a property that can be a hindrance when employing frequentist methods in small sample contexts.

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[17] *See also for a greater discussion on the use of sign restriction approach Fry and Pagan (2011), and Uhlig (2017).*

[18] *These authors believe that a VAR approach is a good approximation to the DGP of any vector of time series, as long as enough lags are included.*

[19] *This limitation is similar, however, to the paper by Borensztein and Lee (2002) who analyses the Korean credit market situation in the aftermath of the Asian financial crisis in 1997/1998 by using firm–level data.*

Variables, both endogenous and exogenous, used in this empirical analysis are proxy as follows. The BLS dataset provides only qualitative answers, where each of the values represent a balance, which is calculated as the difference between the positive and negative responses. These responses range from "eased considerably" to "tightened considerably" for the questions related to changes in the lending standards. On the other hand, they range from "decreased considerably" to "increased considerably" for those questions related to demand-side factors supposed to effect bank lending. The balance in each case takes values ranging between -100 and 100. Therefore, these data are quantified into useful time series data through a three step approach. First, each of them is initially normalised with a variance of 1 and a mean of 0[20]. Then, each of them is standarised into a notionally common scale taking a value between [0, 1], given that these are all proxy on different scale[21]. This is an important commonly known technique in statistics. It is mostly performed to make sure that data is internally consistent and have the same content and format. It comes into picture when features of input data set have large and wide differences between their variances and ranges and get more weight than those with low variance. This means that, consequently, they end up illegitimately dominating the importance of variables in empirical analysis, and vice versa. For this reason, this approach prevents this, by giving the same weightage to all features and making their coefficients become meaningful. Finally, all these variables are transformed into index. This is released, respectively, by taking as the base year the average performance during the year 2010 and multiply it by 100. This is also a commonly known approach in statistics. It is applied to improve data quality and the management of relationships between different variables or to prevent from potential landmines related to null values. This approach, as Kutner, *et al.* (2005) imply, is applied so that the data can appear to meet closely the assumptions of a statistical inference procedure that is to be applied for modelling with linear regression. It is also used to improve the interpretability or appearance of graphs. The positive value of this indicator is interpreted as an increase in the demand for loans, and vice versa.

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[20] *The formula used in this case is* $Z_t=(X_t-\bar{X}_t)/\delta$, *where* X *is the actual data from the BLS;* $\bar{X}$ *is the mean and* δ *is the standard deviation over the selected sample.*

[21] *The formula is given as* $Z_t'=(1/(1+exp(-Z_t))$.

This interpretation is similar in the case of supply of loans.

The depend variable refers to a bank lending indicator. This indicator refers to bank lending to firm (and households). This means that we distinguish between lending to firms (and households), which is based on the assumption that credit patterns between them are not homogenous. In each case, it refers to lending in domestic currency. This is related to the fact that the any shift in monetary policy, e.i. interest rates cuts, is expected to impact only lending in domestic currency. Lending in foreign currency, by contrast, is assumed to be driven also by exogenous factors. This set of variables is generated as follows. L_t^{Firms} represents the end-period amounts of total new banking lending to firms (seasonally not-adjusted). Similar, L_t^{HH} includes end-period amounts of total new banking lending to households. Both of these indicators are corrected by the write-offs of impaired loans from the outstanding bank loans to private sectors, according in each case for firms (and households). Then, they are estimating by taking the ratio of the moving annual sum of the quarterly differences of outstanding loans. Both these indicators are proxy as a ratio to annualised Gross Domestic Product. Similar to the previous variables, these indicators are also transformed into index respectively, by normalising and standardising them first, and then by taking as the base year the average performance during the year 2010 multiply by 100.

Other variables are generated as follows. GDP account for the Albanian economic performance. It represent Gross Domestic Product. It is annualised by taking the moving sum of four quarters. It is also transformed into index respectively, by normalising and standardising them first, and then by taking as the base year the average performance during the year 2010 multiply by 100. PRICE accounts for the inflation pressure based on the Consumer Price Index. Real market interest rate, $r_{t'}$ is a weighted average of the short-term and long-term market interest rate on different bank lending maturities in domestic currency deflated by contemporaneous domestic rate of inflation measured as annual percentage change in CPI. This indicator enters the model specification as annual percentage change. REER is the real effective exchange rate of domestic currency against the five main trading partner's currencies,

which comes as an index. An increase in the value of REER means a depreciation of the price of the domestic currency, namely Albanian Lek (ALL), while a decrease of the value is an appreciation. BSI is a composite synthetic variable. It is estimated and used previously by Shijaku (2018b). It reflects the co-movement of a wide set of observable indicators with information on the conditions of the balance sheet of banking system. For this reason it is referred as a variable related particularly to bank-specific factors. This indicator is estimated individually for each bank, which it is transformed for each bank individually into an index by taking as the base year the average performance during the year 2010. Finally, it is aggregated into a weighted average single indicator by multiply them with the historical market share that each banks poses at each period of time. Higher values of BSI means that banking system is becoming more stable and their financial soundness is stronger.

The exogenous indicators related to GFC and EUROZONE are binary variables. Since, GFC accounts for the financial crisis period, it therefore takes the value of 1 during the period 2008 Q03 – 2010 Q04, and 0 otherwise. On the other hand, EUROZONE accounts for the effect of the multi-year European debt crisis[22], taking place end of 2009 – early 2014, with several Eurozone countries being unable to repay or refinance their government debtor as financial institutions had serious doubts about credit-worthiness of the state. This variable takes the value of 1 during the period 2009 Q03 – 2014 Q02, and 0 otherwise.

All the data are log-transformed, besides r_t which enters the model as annual percentage change. All data represent the end-period values. Further, the dataset developed for this paper has several sources. The data on quarterly CPI are taken from the Albanian Institute of Statistics (INSTAT). The rest is taken from Bank of Albania.

[22] *See also ECB's publications on long-term interest rate statistics for EU member states.*

4. ANALYSING THE EMPIRICAL RESULTS

4.1. The main results of the baseline model

This section presents the main empirical results. These results show the extent to which bank lending to firms (and households) is effected by shocks caused by demand-side factors. This analysis includes also results with regards to shocks caused by supply-side factors. This set of results, as explained previously, is estimated through a VAR approach. As it is commonly known, the procedure to build a VAR model involves the following three-step approach.

In the first step, as Canova and De Nicolo (2002) suggest, it is important to understand if the endogenous and exogenous variables are stationary. This means to check the characteristic and stationary properties of each variables. This approach is essential for three reason. On the one hand, interpreting responses to shocks as short-term dynamics around a stationary (steady) state, requires a stationary VAR. On the other hand, it helps us to understand if their order of integration fulfils the basic premise on which VAR approach is based on. Furthermore, this is a required condition in order to achieve consistent and unbiased results. This process is conducted using the standard unit root test approach, which includes the usage of the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. Unfortunately, these tests turn to have likely lower power with relatively small size sample, as it is our case, which may affect economic inference at a second stage. For this reason, each series one-by-one is analysed by implementing also an alternative test approach, known as the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test[23]. This combining approach helps us to distinguish among those series that appear to be stationary and those that have a unit root, as well as among those for which the data (or the tests) are not sufficiently informative to be sure whether they are stationary or integrated.

[23] *This approach test a null hypothesis that time series are stationary around a deterministic trend (i.e. trend-stationary). The alternative hypothesis assumes that is has a unit root.*

Results of this analysis are reported in Table 1. These results do not reject the null hypothesis, on the non-stationarity I(I), at a conventional statistically significance level. The null hypothesis is rejected for r_t. This means that all variables, bisedes r_t, are not-stationary. For this reason they are all transformed into I(0) by taking their first difference. This means, as Endut, *et al.* (2015) suggest, that the VAR model is estimated in levels.

In the second step, as Gutierrez, *et al.* (2009) advocate, it is important to understand the lag-length (p) selection of the VAR model, since all inferences in this model depend on the correct model specification. The lag structure of the model is selected according to the results from a traditional statistical information approach related to the conventional Schwarz Information Criteria. This approach trades-off fit against the number of parameters fitted in sample with large number of parameters and limited data. For this reason, it is the initial measures that can be adopted when selecting the appropriate 'lag length' in a small sample as it is in this study. Results are reported in Table 2. They support a stable VAR model with one (1) lag. Other diagnostic tests, however, fail to support this lag level. Evidences using a VAR residual Serial Correlation LM test approach, as reported in Table 3, fail to support the null hypothesis that there is no serial correlation at lag $h = 1$. This test, by contrast, supports a model specification with two lags. This lag structure satisfies also the condition required for a stable VAR model. Results as reported in Table 4 show no root lying outside the unit circle at this lag structure. This is supported also by the results of other diagnostic tests with regards to normality and Heteroskedasticity as reported in Table 5 and 6.

Finally, as it is the case with the VAR literature, the empirical analysis is based on the concept and interpretation of IRFs. The set of IRFs comes from a pure-sign-restriction approach. This approach assumes that the effect of the shock start to materialise with 1 lag after the shock. Then, it satisfies the sign restrictions for $h = 0, 1,..., H$ months after the shock, where $H = 4$. This means that the response of bank lending as a reaction to a shock innovation caused either by demand-side or supply-side factors is restricted to be positive, at least for the first 4 quarters $h, h = 0,...,4$ following the shock. To

generate results for such analysis two important elements is worth to be mention. First, the VAR coefficients and the variance-covariance matrix have been fixed at the MLE point estimate. Second, to generate these figures, 2000 candidate draws for *i* have been generated. In addition to the bounds, 10 randomly selected impulse responses until 500 of them satisfying the sign restrictions have been drawn to show how typically responses on these bands might look.

Results for such analysis are plotted in Figure 9. The dashed lines are the confidence bands at 16% and the 84% quantiles symmetric bootstrapped bands constructed with bootstrapping method approach and reflect their statistical critical value. The shaded area identifies the horizon upon which sign restriction is bidding. Each of the solid lines are the "median" non-accumulated impulse response. They display the reaction of bank lending to firms (and households) as a response to a one standard deviation shock innovation caused either by a demand-side and/or by a supply-side factors. A glance at the estimated results confirms that bank lending to firms (and households) does react to shock innovations caused either by demand-side or by supply-side factors. In each case, this reaction looks rather conventional with the predictions obtained from the theory. It is also conventional with the sign restriction imposed on them. This means that bank lending to firms (and households) responses positively to a positive shock caused either by a positive demand shock or an "easing" of lending standards and conditions[24].

Two crucial elements need to be mention in each case. First, results prove that the initial 5-quarters positive marginal effect lasts slightly longer then the time horizon upon which sign restrictions is imposed. This means that the reaction to a shock scenario stands positively far beyond the horizon upon which sign restriction is imposed. This

[24] *The analytical estimator is particularly sensitive to the number of h included in the estimated regression equation. For this reason, a set of sensitive analysis is performed for different values of h, ranging from 1 to 4, and for any value we repeat the identification process as previously explained. Results show that the response of bank lending to firms (and households) as a reaction to a positive demand and supply shocks remains still positive, despite changing h. This positive response last longer than the horizon upon which restriction is imposed. Similarly, results show that as h goes down the percentage of draws accepted in terms of those rejected increases. These results can be provided upon request.*

period corresponds also with the statistically significance level as suggested by the statistical critical value of the confidence bands in each case. Second, these results show also that the effect of a demand and a supply shock start to materialise with one quarter lag. This marginal effect is relatively small in each case. On the one hand, this is easily explained and expected given that bank lending is a slow moving variable. Therefore, any shock effects on it will take a longer time to materialise[25]. On the other hand, this means that bank lending to firms (and households) exhibits relatively similar patterns. This means that credit behaviour in such case share homogenous patterns.

In addition, detailed analysis imply that a supply shock innovation, caused by one percentage point standard deviation causing easing of lending standards and conditions by banks, would be associated (with a one quarter lag) by a 0.05 percentage point increase in bank lending to households. This response reaches at nearly 0.14 percentage point in the case of banking lending to firms. This means that a supply shock has a greater effect on bank lending to firms rather to households. On the other hand, bank lending to firm increases by nearly 0.07 percentage point in response to demand shock innovation caused by nearly one percentage point. This initial marginal effect reaches at nearly 0.05 percentage point in the case of bank lending to households. This means that bank lending to firms, rather than to households, is affected more by a demand shock. These results recommend that bank lending to firms is initially more sensitive to market developments compared to that in the case of bank lending to households. Surprisingly, results point out that the initial marginal effect diminishes, until getting close to zero after five periods, faster in the case of shocks innovation related to supply-side factors. Another interesting element that might need further investigation in the future is the fact that in the case of firms shocks innovations, both related to supply and demand, become negative after five periods, suggesting the existence of a sort of puzzling. This effects last for nearly two periods and is also statistically significant.

[25] *This is also found by Shijaku (2018a).*

Furthermore, Figure 10 plots the accumulated IRFs respectively in each case. Figure 11 plots graphically a combination of these accumulated responses. The latter approach offers a cross-check comparison analysis. This serves to compare easily the respectively bank lending response to each of the shock innovations. This is important to understand properly which shock effect predominates bank lending. This set of results confirm that the accumulated response of bank lending to firms, as a reaction to a one percentage point supply shock, maturates at nearly 0.23 percentage point. For the same shock, this marginal effect matures at nearly 0.12 percentage point in the case of bank lending to households. This means that a supply shock upsurges bank lending to firms approximately twice as much in percentage terms compared to that in the case of households. This reconfirms that supply shocks play a greater role in the case of bank lending to firms rather than to households. This reaction is relatively similar also to a demand shock scenario. Results show that the accumulated response of bank lending to firms, as a reaction to a one percentage point demand shock, reaches at nearly 0.2 percentage point. This effect matures after nearly five periods. On the other hand, in the case of bank lending to households this marginal effect matures in just four and a half periods. By this time this accumulated response reaches at nearly 0.10 percentage point. These results reveal three important elements. First, they suggest that the response of bank lending to firms, as a reaction to either a demand shock or supply shock, is twice as bigger than that in the case of households. This re-confirms that bank lending to firms, rather than to households, is more sensitive to demand (and supply) shocks. Second, shocks caused by supply-side factors have a relatively bigger effect on bank lending to firms (and households) that those caused by demand-side factors. This means that bank lending is effected more by a shock that eases lending standard and conditions than another shock that might boost demand. This means that a supply shock explains better movements in credit markets patterns for both firms (and households). Third, this set of results do not support, however, the assumption of Cuthbertson (1985) that credit market is generally demand-determined at the ongoing interest rates, which confirms that credit-market in Albania is driven mostly by supply-side factors. Despite, given that no restrictions is imposed after four periods on

these responses, it is notable to assume that all of these reactions are persistent and protracted.

4.2. Other empirical results: price versus non-price

This section discusses the results of a different set of IRFs, which are an extension obtained from an alternative set of information. This set of information is also related to data from the BLS approach. On the one hand, it provides information on the extent to which bank lending is determined by factors related to terms and conditions applied by banks at the time they decide to meet the demand for loan. This approach is advantageous for two reasons. First, as de Bondt, *et al.*, (2010) proclaim, since overall credit standards include all the terms and conditions of a loan, these two variables tend to be collinear and therefore it seems inappropriate to examine credit standards and conditions and terms simultaneously due to multicollinearity. Second, this approach allows us to understand the extent to which bank lending is driven by shocks related to stability (prudential) conditions of banks. This means that this set of data is related to supply-side factors. This set of data is provided simultaneously for firms (and households). It is provided also as a disaggregated information. This approach offers an alternative set of data that distinguishing between various factors, in particular those related to price (PF) and non-price (NPF) conditions and terms. This means that this set of information provides us with an understanding to the extent to which bank lending to firms (and households) is effected by price and non-price factors. PF represents the sum of margins on average loans and margins on riskier loans. The NPF generally consists of the agreed spread over the relevant reference rate, the size of the loan, other terms and conditions in the form of non-interest rate charges (i.e. fees on revolving loans, administration fees and charges for enquires, guarantees and credit insurance), collateral or guarantees requirements which the respective borrower needs to provide (including compensating balances), loan covenants and the agreed loan maturity.

This set of results, as explained previously, is estimated also through means a VAR approach. This model is estimated also using

a pure-sign restriction approach with 4-quarters restrictions (H = 4). The variables are as previously explained[26]. Figure 13 plots the accumulated IRFs respectively in each case. Figure 14 plots graphically a combination of these accumulated responses. Each of the data, respectively, comprises the median responses to a one percentage point standard deviation caused by factors related to lending terms and conditions. All specifications produce similar estimates of bank lending responses as a reaction to shocks caused by price and non-price factors. Results show that a positive shock is found to increase bank lending to firms (and households). This is a suggestion that stability (and prudential) conditions of banks is related positively with bank lending. This means that bank lending increases as banking sectors becomes more stable. This is also true if banks behave more prudently. This relationship is also statistically significant. It becomes, however, statistically insignificant after just 8 periods in the case of bank lending to households. Similarly, the effect of a possible PF and NPF shock are found to increase bank lending. Their affects are found, however, to become statistically insignificant after just 8 periods only in the case of bank lending to households. This a confirmation of previous results.

Detailed analysis shows that shocks related to credit standards have a stronger affect than those related to terms and conditions of bank lending to households. The magnitude of this response is estimated to be nearly 12 percent stronger during the first 4 periods after the shock. This effects diminishes at nearly 5 percentage at the end of the twelve periods. This is also the case with bank lending to firms. This effect, however differently, is estimated to be nearly 70 percentage stronger at the beginning. It ends up at nearly 20 percentage after twelve periods. This implies that shock related to credit standards are more important that those related to terms and conditions of bank lending. This means that it is not only the stability condition and prudential behaviour of the banks, but also their desire and willingness to provide loan that matter for bank lending. This patterns are found to be stronger in the case of firms.

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[26] *PF and NPF enters the model as the first difference of the logarithm generated variables, which are first transformed into index using the same approach as in the case of other BLS-related variables.*

In addition, shocks related to non-price factors have a slightly stronger effect on bank lending to households. This lasts as much as nearly 5 periods. Thereafter, it is shocks related to price factors that have a stronger effect on bank lending to households. On the other hand, bank lending to firms seems to react equally to each type of shocks. This means that neither a price-related nor a non-price related shock is superior over bank lending to firms. This reaction seems to be relatively similar at least during the first 3 periods. The magnitude of such responses each case indicates that shocks caused by non-price-related factors prevail in terms of the impact that a shock innovation might have. This means that bank lending to firms is more sensitive to shocks caused by non-price-related factors, at least in the long-term. Furthermore, a cross check analysis on the estimated results, show that the response to a shock is stronger in the case of bank lending to firms is stronger than that to households. This indicates that firms react more to any type of shocks. This means that bank lending is more sensitive to shocks effects. The magnitude of such responses is estimated to be on average nearly 35 percentage stronger in the case of firms if a shock to price factors occurs. Meanwhile, in the case of non-price factors, the stronger reaction is estimated to be on average nearly 40 percentage. This means that it is the firms that would suffer more the consequences of tightening terms and conditions of lending. Therefore, if banks are to increase lending than they have to pay a particular attention to issue related to non-price factors.

5. CONCLUSIONS

Few market are as important to macroeconomists as the credit market. Similarly, the role played by the banking sector in affecting economic activity at large, in particular through the supply of credit to the private sector, has become a crucial central issue of concerns for academic and policy makers alike, especially among central bankers. These important aspects have been more evident than ever during the events of unfolding in the global economy in the last decade. The issues of interest revolve around three main aspects. It is has already been proven that the provisions of credit to the private sector may be impaired in periods of financial distress. It is especially at the period of time that credit constraints may reflect banks' solvency and liquidity problems, which restrain their ability and incentive to supply more credit. At the same time, the worsened financial position of firms and households may restrict their capacity to borrow more, because of their increased riskiness. Finally, the grim economic outlook may also weaken the demand for loans.

For this reason, this paper analyses empirically the recent developments for credit allocation in Albania. The goal is to understand the role that shocks, caused either by demand-side or supply-side factors, have in explaining these patterns in the case of a small open economy, Albania. The main interest is to answer the conventional wisdom on a key question that offers an understanding on whether and to what extent bank lending is a result of credit demand and supply factors. The idea is to understand whether patterns in credit market are influenced by the ability of firms (and households) to borrow, or instead, they are driven by issues related to balance sheet characteristics of banks, which by tightening their credit standards and conditions are likely to impair bank lending. On the one hand, a better understanding of the drivers of such patterns is not helpful to better interpret past developments, but it can also shed light on the causes of the current sluggish credit growth. On the other hand, understanding these causes is essential to explain the expectation on the role of policy in helping to revive credit growth. Against this background, this paper relies heavily on a detailed content information from bank lending survey conducted

by the Bank of Albania. This approach provide responses for firms and households at the country level in the case of Albania on credit supply and demand side factor related firms (and households). Similarly, it allows us to separate credit demand and supply. This offers us the opportunity to address empirically how bank lending is effected by the decision of banks to change their lending conditions and standards for their borrowers and by the ability and desire of borrowers demand more. Then, the empirical model is estimated based on a vector autoregressive approach with sign restrictions, upon which results are analysed through means of impulse response functions.

Results show that credit variables response to shock innovation on supply and demand side. This response is consistently with the theory. It is found to be also statistically significant. This means that bank lending to firms (and households) reacts to shock innovations caused either by demand-side or by supply-side factors. On the one hand, results imply that shock on supply, caused by an "easing" of credit standards and conditions would be associated with an increase of bank lending to private sector. On the other hand, they suggest that shocks on demand, caused either by increasing capacity to borrow more or improving financial position of firms and households, may boost demand for loans. Such positive shocks would increase significantly bank lending to private sector. This highlights the importance to include credit market patterns in the toolkit of monetary policy. It underpins also the reasoning to give credit market analysis, through means of bank lending survey approach, a prominent role in the monetary policy strategy of Bank of Albania. In addition, our analysis bridge also a consensual clear cut conclusion that can serve as a guideline indication on actions to be pursued by central banks in response of the events of unfolding due to macroeconomic and financial distress. On the one hand, results show that changes in factors affecting the capacity of banks to supply more have a relatively stronger effect on lending to firms. This means that the effect of easing of credit standards and conditions is stronger in the case of bank lending to firms. This behaviour is found to be similar also in the case of changes in the factors affecting demand for loan. This means that it is also bank lending to firms that reacts more to shocks caused by factor

affecting their capacity and desire to borrow more. On the other hand, they show that it is changes in the factor related to supply side rather than demand-side that that are found to be relatively more crucial for credit market developments. These latest results emphasis the effectiveness of policy actions seeking to support a continued provision of credit to private sector. This is particular true in the case of bank lending to firms, which provide the prominent actor in promoting economic activity. They confirm and support, thereby, also the policy actions taken by Bank of Albania that were aimed at alleviating the negative repercussions on credit supply as a results of balance sheet constraints faced by banks in the recent years. Finally, result show that it is not only the stability condition and prudential behaviour of the banks, but also their desire and willingness to provide loan that matter for credit market. It is in this spirit through which results shows that it is the non-price-related factors that would have a stronger effect on bank lending. Similarly, this is found also to be stronger in the case of firms.

Results of this paper should be considered, however, with a limitation that is related to the assumption of credit market equilibrium. Assuming that credit supply and demand clear out at each period of time is a relatively fundamental assumption, which fails to account for asymmetric information between lenders and borrowers that may cause imperfect adjustment. This has two important implications, as while banks try to screen risky clients through non-price terms, credit rationing may occur. The first imperfection is taken into account, since credit standards is among one of the explanatory variables, but fails to handle the second problem, namely credit rationing. A common approach to this issue is to examine whether developments in credit market are a result of credit crunch. Therefore, to understand properly such developments in the case of Albania, the disequilibrium approach should be the direction of further research. In addition, the quantification of qualitative survey questions regarding the loan supply and demand enhanced the testing the leading indicator properties of survey data in explaining and forecasting credit developments. However, little attention has been paid to investigate whether directional predictions are valuable for users and especially policymakers. Similar, despite the fact that BLS data provides information on the direction of the

change in loan supply and demand, of great interest would be to analyse whether deviations from credit supply and demand expectation can explain financial and economic cycles in the case of Albania. Finally, analysis should consider also bank lending in foreign currency. Such analysis would improve our understanding of how shock of demand and supply change among different type of lending.

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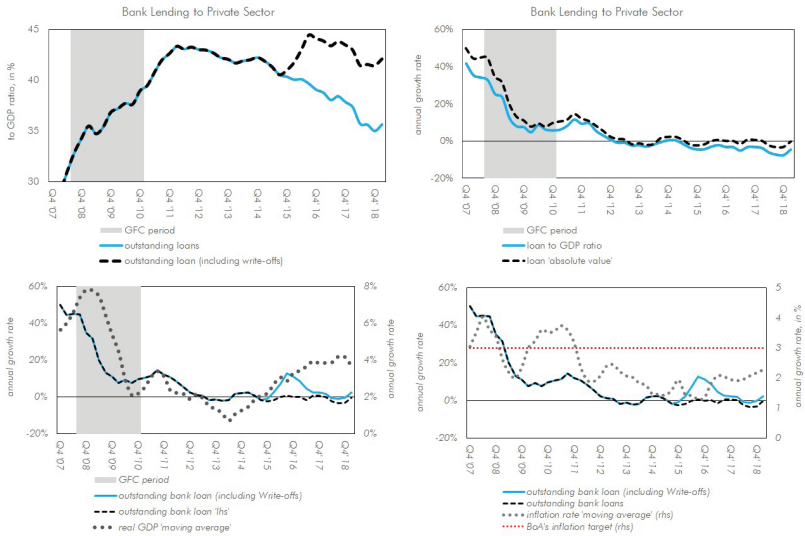
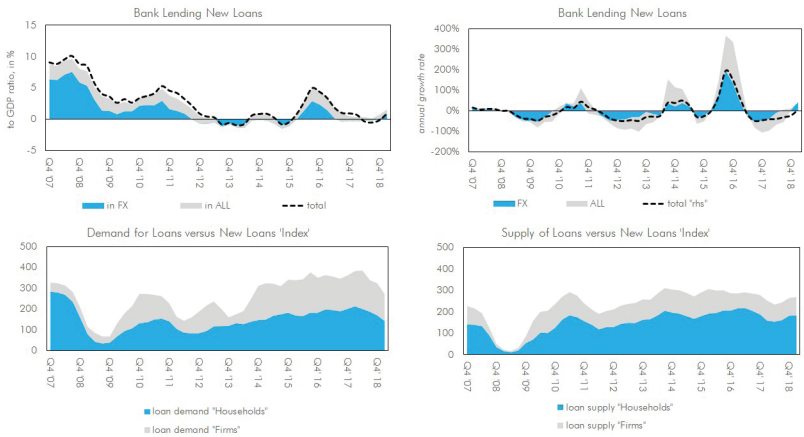
APPENDIX

Figure 1. Bank lending and macroeconomic conditions, during 2007 Q4 – 2019 Q1.



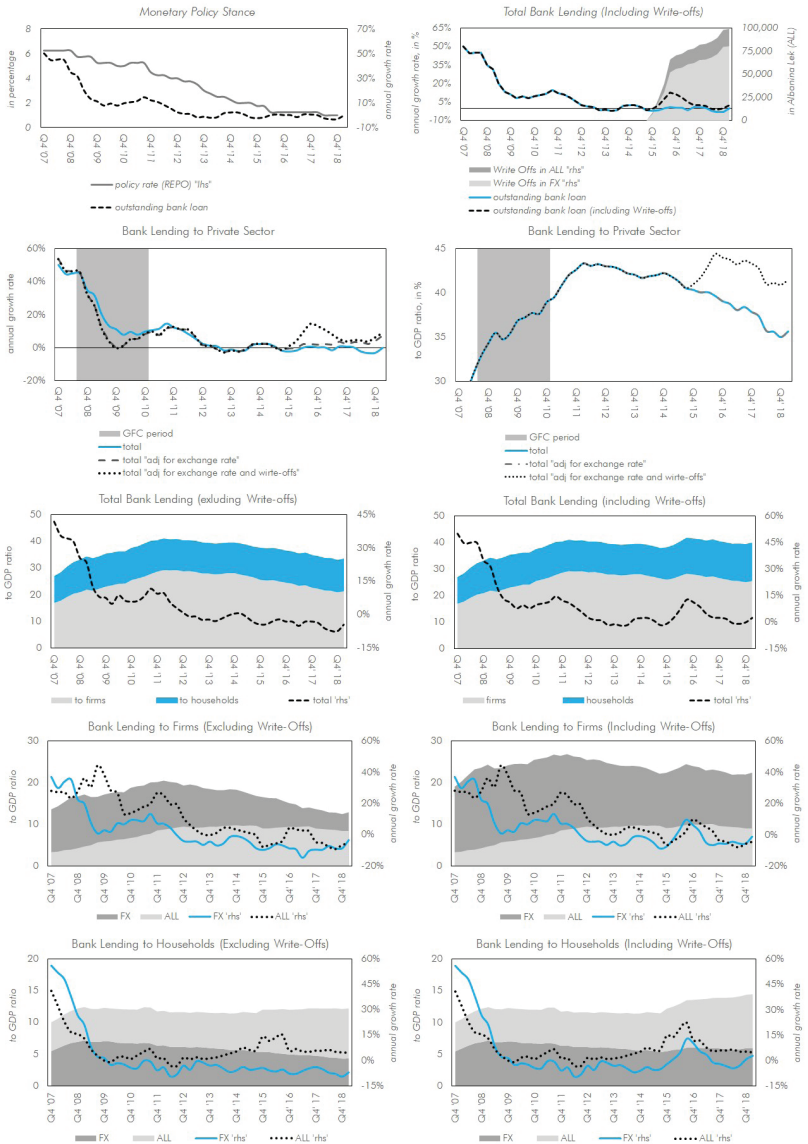
Source: Bank of Albania, INSTAT, Ministry of Finance

Figure 2. Net Bank Lending Flows during 2008 Q4 – 2018 Q4.



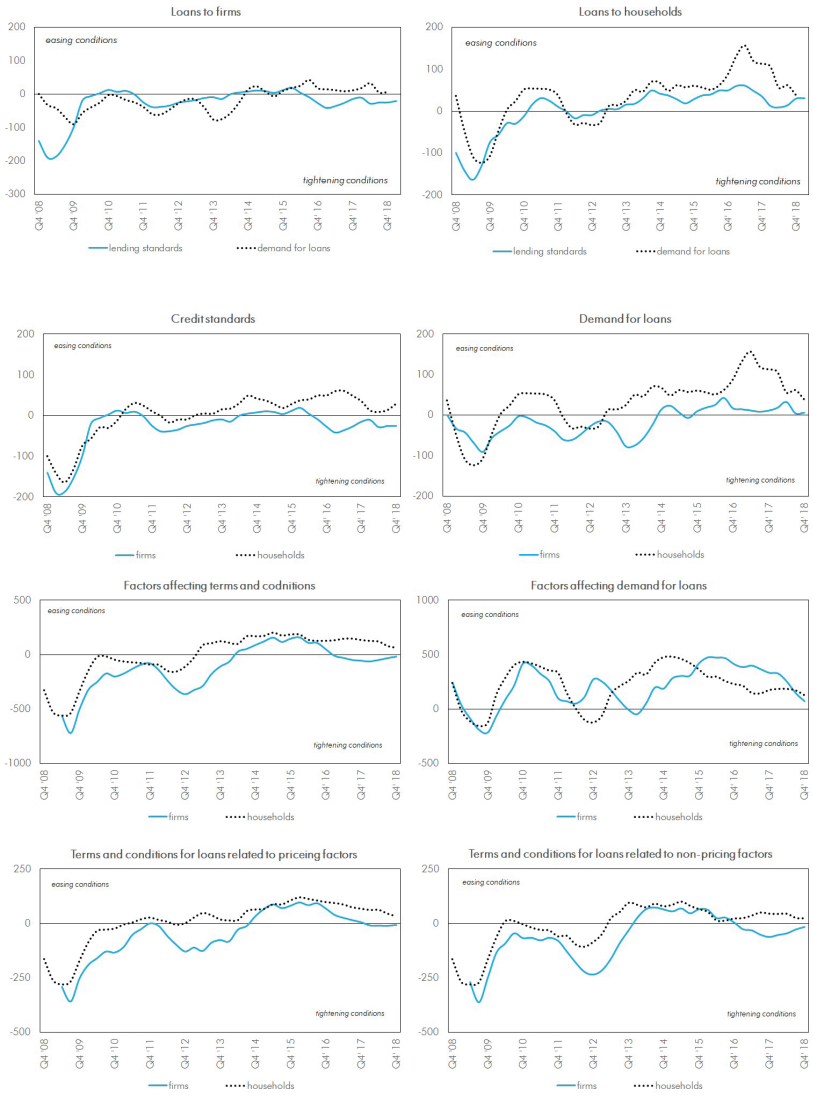
Source: Bank of Albania, author's calculations

Figure 3. Bank lending and policy easing patterns, 2007 Q4 – 2018 Q4.



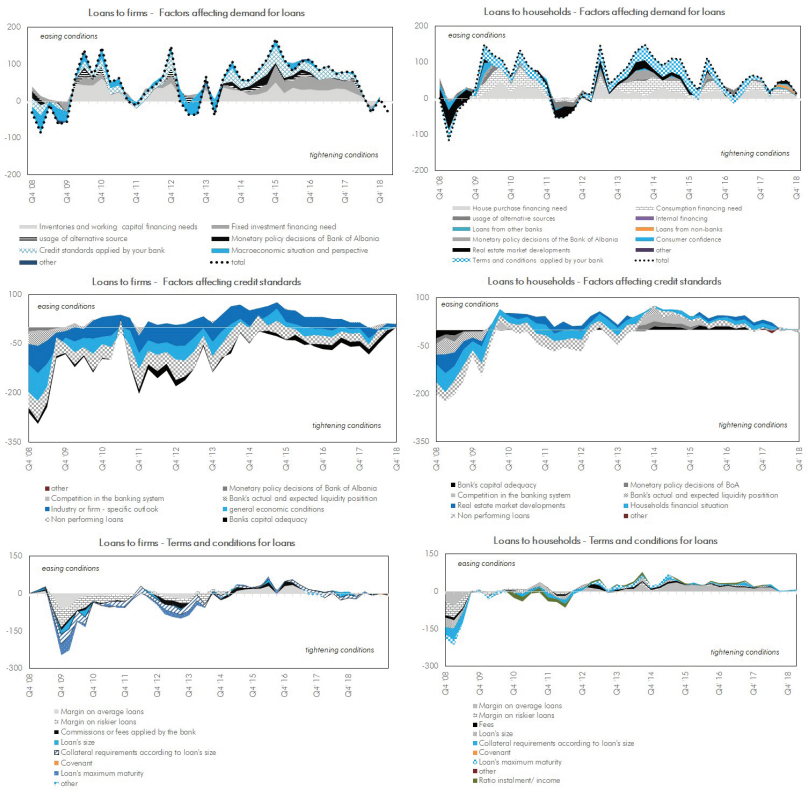
Source: Bank of Albania, author's calculations

Figure 4. BLS information on supply and demand for loans [annualised].



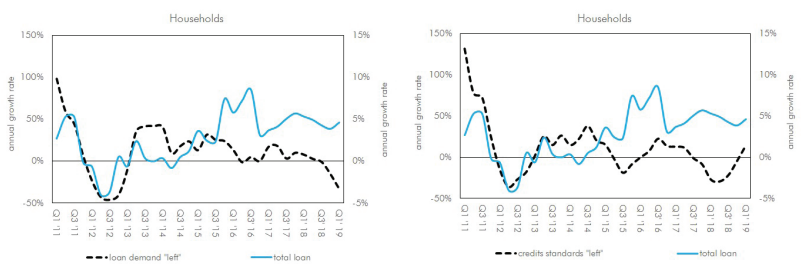
Source: Bank of Albania, author's calculations

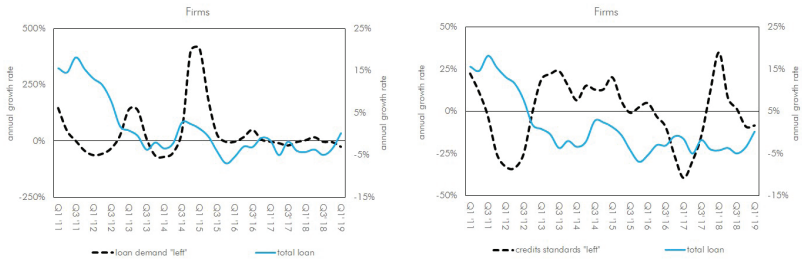
Figure 5. BLS disaggregated information on supply and demand for loans.



Source: Bank of Albania, author's calculations

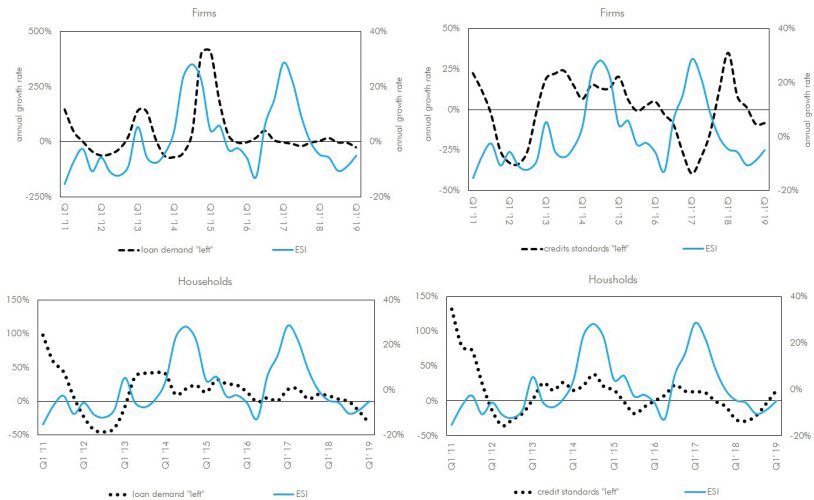
Figure 6. Bank lending patterns and BLS information on credit standards and loan demand.





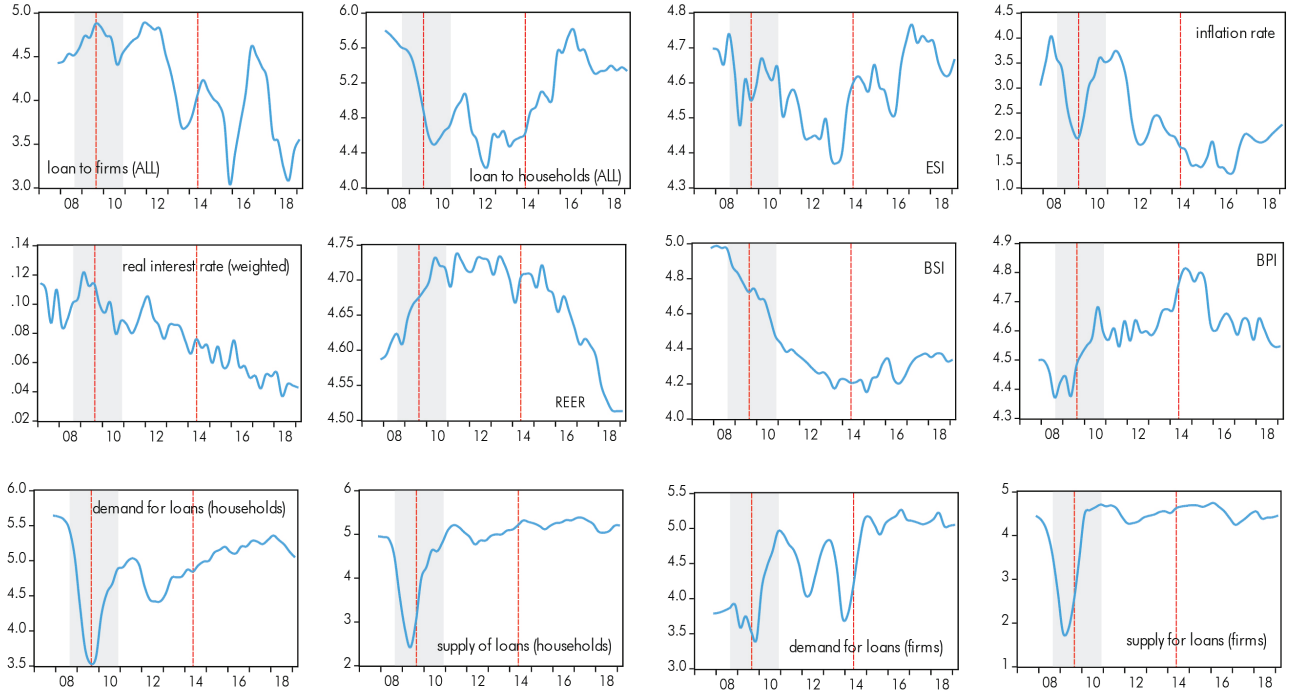
Source: Bank of Albania, author's calculations

Figure 7. Economic Sentiment Index and BLS information on credit standards and loan demand.



Source: Bank of Albania, author's calculations

Figure 8. Dataset used in the empirical estimation, 2007 Q4 – 2018Q4.



Source: Bank of Albania, author's calculations

Table 2. Unit root test analysis

Variable	Augmented Dickey-Fuller Test						Phillips-Perron Test					
	Level			First Difference			Level			First Difference		
	Constant	Constant & trend	None	Constant	Constant & trend	None	Constant	Constant & trend	None	Constant	Constant & trend	None
	[0.8179]	[0.2162]	[0.2974]	[0.0000]	[0.0002]	[0.0000]	[0.4852]	[0.2144]	[0.4078]	[0.0006]	[0.0038]	[0.0000]
	[0.4302]	[0.5605]	[0.4876]	[0.0002]	[0.0006]	[0.0000]	[0.3220]	[0.5242]	[0.5098]	[0.0001]	[0.0005]	[0.0000]
GDP	[0.1406]	[0.3082]	[0.6034]	[0.0000]	[0.0000]	[0.0000]	[0.1424]	[0.3082]	[0.5959]	[0.0000]	[0.0000]	[0.0000]
PRICE	[0.3708]	[0.6516]	[0.9968]	[0.0658]	[0.0925]	[0.3061]	[0.6411]	[0.0010]	[1.0000]	[0.0000]	[0.0000]	[0.0000]
r	[0.0023]	[0.0051]	[0.0003]	[0.0000]	[0.0000]	[0.0000]	[0.0020]	[0.0039]	[0.0003]	[0.0000]	[0.0000]	[0.0000]
	[0.0127]	[0.0072]	[0.6721]	[0.0000]	[0.0001]	[0.0000]	[0.1305]	[0.2862]	[0.6078]	[0.0074]	[0.0395]	[0.0004]
	[0.0018]	[0.0006]	[0.4887]	[0.0781]	[0.2458]	[0.0069]	[0.2159]	[0.2985]	[0.5466]	[0.0722]	[0.2311]	[0.0062]
	[0.0012]	[0.0002]	[0.9993]	[0.0000]	[0.0000]	[0.0080]	[0.1456]	[0.2344]	[0.5022]	[0.0400]	[0.1312]	[0.0031]
	[0.2584]	[0.0072]	[0.9663]	[0.0041]	[0.0057]	[0.0007]	[0.3967]	[0.3399]	[0.6296]	[0.0891]	[0.2573]	[0.0077]
REER	[0.8495]	[0.9294]	[0.3372]	[0.7325]	[0.0260]	[0.3083]	[0.9374]	[0.9750]	[0.4842]	[0.0000]	[0.0000]	[0.0000]
BSI	[0.0932]	[0.9518]	[0.0230]	[0.0001]	[0.0000]	[0.0000]	[0.1144]	[0.9670]	[0.0462]	[0.0001]	[0.0000]	[0.0000]

Source: Author's calculations

Table 3. VAR lag order selection criteria

Endogenous variables: ΔL ΔGDP ΔPRICE r ΔBLS ΔREER ΔBSI
Exogenous variables: GFC EUROZONE
Sample: 2007Q1 2019Q1 [Included observations: 42]

Lag	LogL	LR	FPE	AIC	SC	HQ
0	453.3644	NA	1.25e-19	-20.82688	-20.16491*	-20.58424
1	519.7877	101.2165	1.20e-19	-20.94227	-17.63243	-19.72908
2	587.0641	76.88724	1.52e-19	-21.09829	-15.14056	-18.91455
3	723.2961	103.7958*	1.62e-20*	-24.53791*	-15.93231	-21.38362*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Author's calculations

Table 4. Roots of characteristic polynomial

Endogenous variables: ΔL ΔGDP ΔPRICE r ΔBLS ΔREER ΔBSI
Exogenous variables: GFC EUROZONE

Lag specification: 1 1

Root	Modulus
0.454808 - 0.297528i	0.543483
0.454808 + 0.297528i	0.543483
-0.242662 - 0.293416i	0.380759
-0.242662 + 0.293416i	0.380759
0.349595	0.349595
-0.248589 - 0.120126i	0.276092
-0.248589 + 0.120126i	0.276092
-0.042214	0.042214

No root lies outside the unit circle [VAR satisfies the stability condition]

Source: Author's calculations

Table 5. VAR residual serial correlation LM tests

Sample: 2007Q1 2019Q1 [Included observations: 43]						
Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	Degree of freedom	Probability	F-stat	Degree of freedom	Probability
1	79.44093	64	0.0924	1.299032	(64, 116.1)	0.1113
2	68.46191	64	0.3284	1.075135	(64, 116.1)	0.3630
Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	Degree of freedom	Probability	F-stat	Degree of freedom	Probability
1	79.44093	64	0.0924	1.299032	(64, 116.1)	0.1113
2	161.4070	128	0.0244	1.317492	(128, 92.0)	0.0807
*Edgeworth expansion corrected likelihood ratio statistic.						

Source: Author's calculations

Table 6. VAR residual normality tests

Orthogonalization: Cholesky (Lutkepohl)				
Null Hypothesis: Residuals are multivariate normal				
Sample: 2007Q1 2019Q1 [Included observations: 43]				
Component	Skewness	Chi2	Degree of Freedom	Probability
1	-0.584539	2.448749	1	0.1176
2	-0.717189	3.686247	1	0.0549
3	0.767185	4.218108	1	0.0400
4	0.380758	1.039001	1	0.3081
5	-0.473286	1.605328	1	0.2051
6	-0.034661	0.008610	1	0.9261
7	-0.150500	0.162327	1	0.6870
8	-0.101174	0.073359	1	0.7865
Joint		13.24173	8	0.1038
Component	Kurtosis	Chi2	Degree of Freedom	Probability
1	3.214140	0.082158	1	0.7744
2	3.581487	0.605811	1	0.4364
3	3.114883	0.023647	1	0.8778
4	1.997345	1.801194	1	0.1796
5	2.840657	0.045491	1	0.8311
6	2.926976	0.009554	1	0.9221
7	2.548403	0.365393	1	0.5455
8	2.217804	1.096195	1	0.2951
Joint		4.029444	8	0.8545

Component	Jarque-Bera		Degree of Freedom	Probability
1	2.530907		2	0.2821
2	4.292058		2	0.1169
3	4.241755		2	0.1199
4	2.840195		2	0.2417
5	1.650819		2	0.4381
6	0.018164		2	0.9910
7	0.527720		2	0.7681
8	1.169554		2	0.5572
Joint	17.27117		16	0.3683
*Approximate p-values do not account for coefficient estimation				

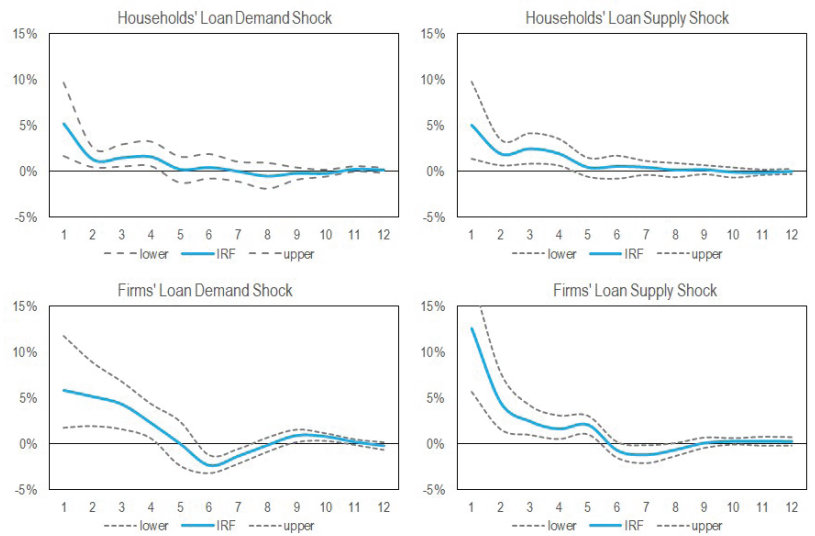
Source: Author's calculations

Table 7. VAR residual heteroskedasticity tests (levels and squares)

Sample: 2007Q1 2019Q1 [Included observations: 43]		
Joint test:		
Chi2	Degree of Freedom	Probability
1256.936	1224	0.2504

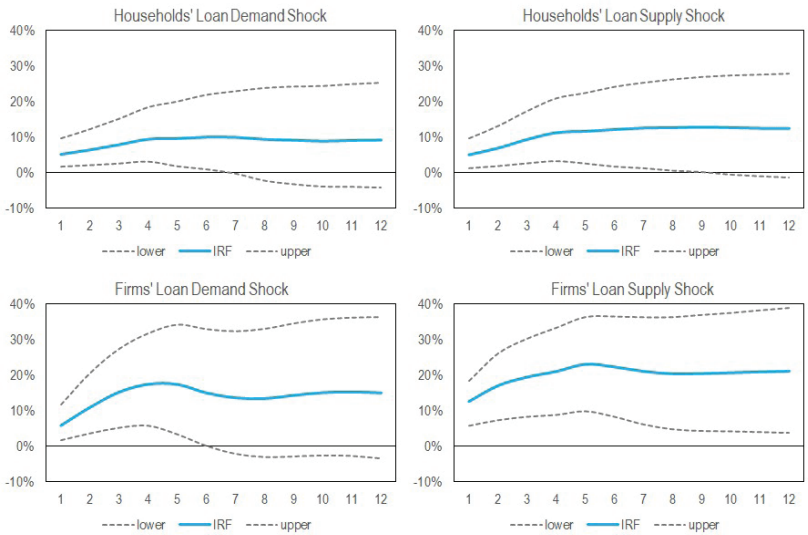
Source: Author's calculations

Figure 9. The non-accumulated IRFs results based on the baseline model shock scenario.



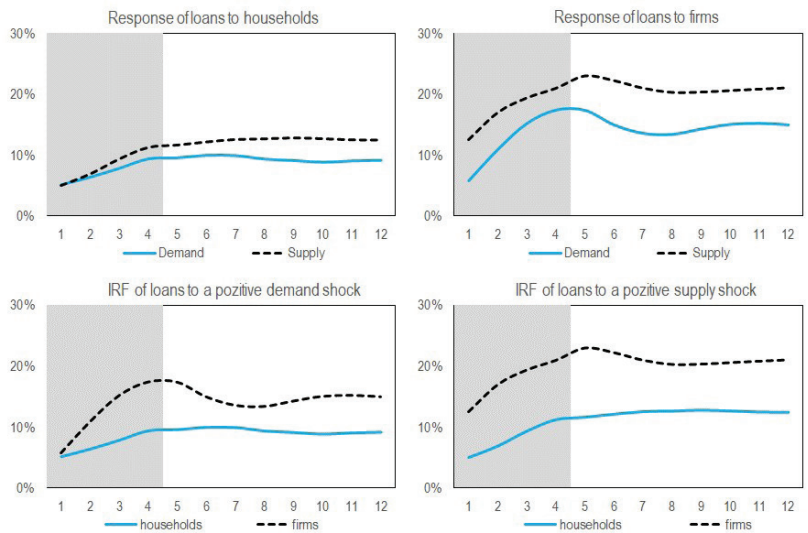
Source: Author's calculations

Figure 10. The accumulated IRF results based on the baseline model shock scenario.



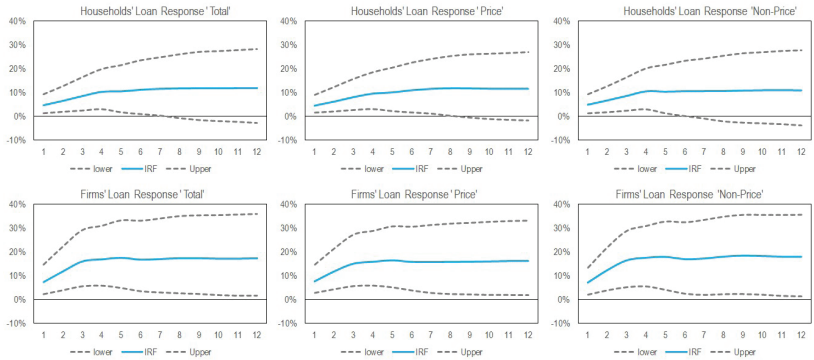
Source: Author's calculations

Figure 11. Cross-check analysis on shock scenario based on accumulating IRFs.



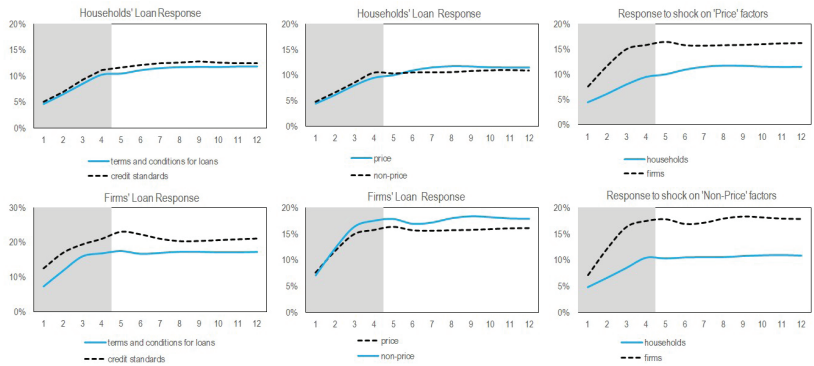
Source: Author's calculations

Figure 12. Accumulating IRF based on shock scenario on terms and conditions, price versus non-prices.



Source: Author's calculations

Figure 13. Cross check analysis on the accumulating effects with regards to shock on Terms and Conditions.



Source: Author's calculations

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