Examining the Monetary Policy Transmission in Jordan: The Bank-Lending Channel

Idries Mohammad Al-Jarrah, Khalid Shams Abdulqader, Rami Mohammed Zeitun, Khalifeh Naim Ziadat*

ABSTRACT

This study examines the relevance of banking lending channel in Jordan using OLS, fixed effect model and random effect over the period 2001-2012. The growth in bank loans of all the sixteen local banks operating in Jordan is regressed on the current and lagged values of changes in the short-term money market rate, bank securities holdings, deposits, GDP and the lagged value of change in bank lending. Furthermore, the interaction of bank features including size, liquidity, capitalization and loan-loss provision with monetary policy stance on the loan supply is evaluated to control for potential bias of endogeneity that result from including the lagged values of explanatory variables.

Our results unexpectedly show that the bank lending responds positively to changes in the contemporaneous stance of monetary policy. In other words, the increase in the short-term interest rate motivates the banks to increase their loans holdings. This behavior has been reinforced by the synchronized regulatory pressure on banks to increase their equity capital holding over the study period. Thus, the administrators of the banks and the monetary authority in Jordan should watch the concomitant consequences of the monetary policy transmission and monitor the micro-dynamics of individual banks as the excessive expansion in loan supply may exposes the banks to higher levels of operating risks and other forms of risk.

JEL Classification: C33, E5, E31, E58, P24, G21, E52, O16, O23.

Keywords: Jordan, Monetary Policy, Transmission Mechanism, Lending Channel, Panel Data.

INTRODUCTION

Monetary policy transmission is the process by which changes in monetary policy affect real economic activity. While there is agreement that banks play a part in the transmission of monetary policy, there is a controversy over the appropriate policy stance that achieve the favourable results on the economic growth. Bernanke and Blinder (1988, 1992), Christiano and Eichenbaum (1992) and Mishkin (1996), among others have identified four main channels through which changes in monetary policy actions are transmitted to the economy: interest rate, exchange rate, other asset prices and the credit channel.

According to ‘interest rate’ channel, a contractionary monetary policy will result in an increase in short-term nominal interest rates, and since prices are sticky at least in the short-run, real interest rates follow. The high cost of capital causes firms and households to cut down investment spending which consequently leads to a fall in output. On the other hand, the ‘exchange rate’ channel affects aggregate spending via two sub-channels. First, through the ‘balance-sheet effect’, in which movements in foreign currency exchange rate affects values of assets and liabilities of households and enterprises denominated in foreign currency. Second, the relative price effect, in which an appreciation of the domestic currency increases the demand for foreign goods relative to domestic goods (Mishkin, 1996).

The ‘other asset’ channel affects economy given the changes in monetary policy stance affect the prices of other assets such as foreign and domestic bonds, real estate and equities. Two sub-channels are often emphasized, the Tobin’s q theory of investment and

* Department of Finance and Economics, Qatar University (1,2,3); Al-Zaytoonah University, Jordan (4). Received on 10/11/2014 and Accepted for Publication on 29/1/2015.
wealth effect on the consumption (Opolot, 2013). The Tobin’s q theory presents a mechanism through which monetary policy affects the economy through its effects on the valuation of equities. When monetary policy is tightened, the public finds that it has less money, so it reduces spending, mainly in the stock market which consequently leads to a fall in equity prices which lead to a lower Tobin’s q (Altunbas et al., 2009). When stock prices fall, the value of financial wealth decreases, which leads to a decline in lifetime resources, and a fall in the consumption and output.

The fourth channel is the credit channel, which is fairly the most important one, emphasizes on how the cost of enforcing contracts and the role of asymmetric information, may create agency problems in financial markets (Bernanke and Gertler, 1995). This channel has two sub-channels, the bank-lending channel (BLC) and the balance sheet channel (BSC). According to Bernanke et al. (1996), the BSC is related to the financial accelerator, which states that in an economic downturn, the cost of borrowing rises due to decline in the firms’ net worth (Bernanke and Gertler, 1989). Thus, borrowers’ financial position could be affected by contractionary monetary policy due to an increase in interest expenses, a decline in the value of collateral due to the decline in asset prices, or due to a decrease in consumer spending (Lensink and Sterken, 2002). The monetary policy also affects the supply of bank loans depending on the features of the banking sector investigated. The stronger the banking sector, the weaker the policy movements will be since balance sheets of large, healthy banks are not sensitive to policy movements. The strength of the banking sector are evaluated by indicators like the size of banks, market concentration, capitalization and liquidity (Opolot, 2013). Monjon et al. (2002) examine the sensitivity of the firm cost of capital to changes in the interest rates for firms in the three different size classes in the EU countries and evaluate the sensitivity of corporate investment to changes in the user cost of capital for these firms. Monjon et al. (2002) find significant impact for the user cost of capital on private investment at the industry level but they do not find support for the view that small firms are more sensitive with respect to the response of borrowing rates to monetary policy changes.

Kashyap and Stein (1995) argue that the effect of policy stance on the bank loan supply depends on the regulatory framework, as risk-based capital requirements can tie a bank ability to extend loans to its level of equity capital and constrain lending. Bank lending behaviour could also be affected by deposit insurance requirements, as high deposit insurance decreases the risk level for clients. A lower risk-level reduces deposit costs for banks and thus increases bank dependency on other type of liabilities (Opolot, 2013).

Finally, the role of the BLC was raised by Bernanke and Blinder (1988) who emphasizes the impact of monetary policy through its direct effects on the credit supply provided by banks, and thus the economic growth. According to this mechanism, banks respond to a monetary contraction by reducing the supply of loans, which eventually affects inflation and real economic activity (Kakes and Sturm, 2002). Kashyap and Stein (1995) discuss the conditions under which the BLC work. First, as for all forms of monetary policy, nominal rigidities must exist. Second, some firms must be dependent on bank loans. Thirdly, the central bank must be able to shift the loan supply schedules of private banks.

In the next section, we will provide an overview for selected literature that addressed the monetary policy transmission mechanisms in developing, developed and emerging markets with the aim of highlighting the most important methodologies employed, shedding the light on the most important monetary policy mechanisms examined and the various explanatory variables that have been investigated. The rest of the paper is organized as follows. Section 2 reviews the relevant literatures that have examined banks’ lending channel in international markets. Section 3 gives an overview of the key features of Jordan’s economy and banking sector over the study period. Section 4 discusses the study methodology. Section 5 discusses empirical findings while section 6 concludes.

Literature Review

There is a lack of consensus about the relevance of the credit view of monetary policy transmission and the bank-lending channel particularly in the literature conducted before 1995 due to the identification problem. The identification problem may arise from employing aggregate data to evaluate monetary policy stance (Bernanke and Gertler, 1995; Kashyap et al., 1993, 1996, and Oliner and Rudebusch, 1996); where the fall in aggregate lending after monetary policy stance may be driven by decrease in the demand rather than supply of credit. Then, other transmission channels including
changes in interest rates or the exchange rate may cause an economic downturn and bank lending follows passively. Thus, studies that analyse the response of aggregate credit to monetary shocks are inconclusive, in particular those studies that follow Bernanke and Blinder (1992).

Recent studies on the existence of bank lending channel in developed countries have avoided the identification problem by considering disaggregated bank level data. These studies have sought to test for the existence of the bank lending channel by investigating the response of bank loan and other asset and deposit categories to changes in monetary policy stance (mainly, changes in the federal funds rate). These studies also investigate whether monetary policy has a differential impact on banks of different assets size (Kashyap and Stein, 1995); asset size and liquidity (Kashyap and Stein, 2000); asset size and capital strength (Kishan and Opiela, 2000). These studies find that a bank-lending channel exists and this channel is mainly transmitted through small banks (Altunbas et al., 2002; 2009).

In Europe, Kashyap and Stein (1995) is the first to employ disaggregated data of banks and find that large banks are better able to neutralise monetary shocks than small banks. The reason is that small banks have more problems of asymmetric information and so have more difficulties substituting non-deposit sources of external finance. Similarly, Gertler and Gilchrist (1993a, 1994), and Gilchrist and Zakrajsek (1998) use panel data of nonfinancial firms in the US and conclude that bank credit to small firms is reduced more than bank credit to large firms after monetary contractions. Kashyap and Stein (2000) also find that, within the category of small banks, lending is reduced most by institutions with less liquid balance sheets. Besides, Kashyap and Stein (1997) review various indicators that may affect the bank lending channel in European countries and find that the characteristics of the Italian system is likely to be sensitive to the bank lending channel, whereas the impact of lending channel is weak in the United Kingdom.

de Bondt (1998) use disaggregated bank data to test for evidence of the lending channel across European countries. Following a similar approach to Kashyap and Stein (1995), de Bondt (1998) tests the existence of important differences in which European banks with varying characteristics respond to changes in the stance of monetary policy during the 1990-1995 period. He finds strong evidence for bank-lending channel in Germany, Belgium and the Netherlands, while no effect is found in the rest of the countries under study (France, Italy and the United Kingdom). de Bondt (1999) adopts a different approach by using aggregate bank data to examine the main bank lending channels in the same six European countries. The security holdings is included in the model as a variable used to detect loan supply effects and the author finds evidence that credit constraints due to monetary policy are important in Italy, Germany and France, but not in the United Kingdom, Belgium and Netherlands.

Favero et al. (1999) use individual bank balance sheet data to investigate the response of banks in France, Germany, Italy and Spain to monetary tightening during 1992. They find no evidence of the bank-lending channel though they observe that banks in different countries respond in different ways to policy stance to protect the supply of loans from the liquidity squeeze. Small banks in Germany, Italy and Spain maintain loan supply by raising new deposits, whereas banks in France use their excess capital to maintain lending levels.

Altunbas et al. (2002) examine evidence for a bank-lending channel in Europe and use bank balance sheet data to estimate the response of bank lending to changes in monetary stance between 1991 and 1999. They classify banks operating in European Monetary Union (EMU) according to asset size and capital strength and report evidence that undercapitalized banks respond more to change in policy mechanisms. Altunbas et al. (2009) expand their earlier study on banks operating in EMU systems and examine how risk influences banks’ credit supply and their ability to shelter that supply from the effects of monetary policy changes. They find that bank risk plays an important role in determining banks’ loan supply and in sheltering it from the effects of monetary policy changes.

As for the research on monetary policy transmission in the emerging countries, Kelilume (2014a) employs the cointegration and error correction modelling to test the long-run relationship between real interest rate channel and output in Nigeria over 1996 to 2013. He reports a significant impact for interest rate on long-run output in Nigeria over his study period. In another study, Kelilume (2014b) uses the Multivariate Vector Autoregressive Model to analyze the effects of monetary policy rate on other rates in Nigeria and observed that the monetary policy rate has little impact on short-term and long term retail rates over 2007-2012. Hsing (2014) tests the bank
lending channel for South Korea based on a simultaneous-equation model consisting of the demand for and the supply of bank loans. He finds that demand for bank loans is negatively associated with the lending rate and positively affected by real GDP. The author also finds that the supply of bank loan is positively associated with the lending rate but negatively with the central bank policy rate.

As for the studies that evaluated monetary transmission in Jordan, the only study we were able to find is that of Poddar et al. (2006) who employ the Vector Autoregressive Approach (VARs) to evaluate the effectiveness of the policy in maintaining the peg between the Jordanian currency and the U.S. dollar over the period 1995-2005. The results indicate that the monetary policy stance has no impact on bank credit and has no impact on prices of equities in stock market. Besides, the exchange rate channel is found to be insignificant in transmitting monetary policy in Jordan. On the other hand, the study reports that short-term interest rate of monetary policy has a significant impact on the bank retail rates which reflected positively on the foreign reserves, bank deposit and lending rates. However, the authors notify that their study period are characterized by instability among the variables used and such instability has been observed by the high standard errors in the VARs and thus their results should be taken with caution.

Based on this survey for the literature, we can observe that the monetary policy is a link through which variations in monetary mechanisms affects the supply and availability of credit. This channel is a potent tool in driving the movement in other macroeconomic aggregates in most of the studies addressed earlier. Most of the studies have concluded that a tight monetary policy reduce bank credit, which negatively affect the economy.

This study, in its turn, aims to contribute to the established literature by examining evidence for a bank-lending channel in Jordan. Evaluating the success of such important channel in an emerging market like Jordan using disaggregated micro-data where money market mechanisms have not been fully developed seem to be a worth objective. To best of our knowledge, only one study has addressed the monetary policy mechanisms in 2006.

**Key Features of the Jordan’s Economy and Banking Sector**

The main indicators of Jordan’s economy have witnessed significance growth over the last decade. In this regard, the gross domestic product, GDP at market prices has increased from US$ 8.4 billion in 2000 to arrive around US$ 33.7 billion in 2012. On the other hand, the real GDP growth has grown by about11% per annum over our study period.

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**Jordan’s Gross Domestic Product over 2001-2012 (US$ Millions)**

![Graph1. Jordan’s Gross Domestic Product over 2001-2012](source: Central Bank of Jordan (www.cbj.gov.jo))
The financial services, insurance, real estate and business services sector and the manufacturing sector maintained their status as the most important pillars of GDP, as their combined contribution to GDP was about 37% in 2012 (see Graph 2). The inflation, as measured by the change in the consumer price index (CPI) has decreased from its highest level of 14 percent in 2008 before it settles to around 5.5 percent in 2014.

![Graph 2. Structure of the Assets for Jordanian Banks over 2001-2012](image)

Most of the financial items of the banking sector of Jordan have witnessed significant growth over the last decade. The total assets of the banks have increased from around US$ 22.9 billion in 2001 to arrive more than US$ 50 billion in 2012, with an annual growth of around 11%. However, noticeable changes have occurred on the structure and the mix financial statements of the banks under study that deserve mentioning.

Graph 2 shows that the structure of the assets of banking sector have changed significantly where the total cash and balances have witnessed significant drop from 41 percent in 2001 to about 28% in 2012. This drop has associated with parallel increases in both the loans which have increased by around 7% and the investment portfolio by 4% over the study. This change on the asset structure increases the operating leverage and liquidity risk as banks are moving to holding more long-term assets. As for the main asset item specifically the loans, the loans to private sector are remained at around 90 percent of the total credit without noticeable changes over the period 2001-2011.

As for the sources of funds for the Jordan’s banks, deposits which arrived about US$ 33 billion by 2012, has remained the main source comprising 65 percent of the total sources of funding over the last decade. On the other hand, owners’ equity have grown significantly from 9 percent in 2001 to reach 15 percent of the sources on the account of other liabilities held by the end of 2012 (see Graph 3). Thus, the regulatory pressure to increase the shareholders’ equity of the Jordanian banks above the international capital requirements criteria seems to be the main driver for banks to increase their loans holdings.

As for the structure of deposits, Graph 4 shows that the share of time deposits has witnessed continual decline from 70 percent in 2001 to reach 55 percent in 2012 on the account of increase in less costly demand deposits which increased from around 18 percent in 2001 to around 30 percent in 2012.

As for the income, net income arrived to around US$ 624 million in 2012, with significant annual increase of about 20 percent over the period 2001-2012. As for the major items of the income, the share of net interest income as percent of net income has shown noticeable fluctuations over the last decade. Specifically, the net interest income has decreased from about 270 percent of net income in 2002 to reach 167% in 2007 before it has recovered to arrive 230% of net income in 2012 (see Graph 5). Besides, Graph 5 shows that the provision for loan losses has also shown wide fluctuations. Similarly, the other income (expenses and losses) has improved
over the last decade, mainly due to the ability of the banks under study to lower their other expenses and losses, as a percent of net income.

![Structure of Liabilities for Jordan’s Banks as % of total assets over 2001-2012](source: Central Bank of Jordan (www.cbj.gov.jo))

**Graph 3. Structure of Liabilities for Jordanian Banks as % of Total Assets over 2001-2012**

![Changes in the Deposit Structure over 2001-2012](source: Central Bank of Jordan (www.cbj.gov.jo))

**Graph 4. Changes in Deposit Structure over 2001-2012**

As for the interest rate on loans versus time deposits, Graph 6 shows that the spread between the two has witnessed some fluctuations but remains on the range of 3 to 5 percent, showing that the income from the core intermediation activity for the banks is firm and steady.

In the rest study, we will investigate that drivers of the expansion of the credit supply by the banks and the contribution of the monetary policy transmission to this expansion.
The Study Methodology

The present study employs a similar approach to that of Kashyap and Stein (1995), de Bondt (1998) and Kishan and Opiela (2000), Ehramann et al. (2003) and Altunbas et al. (2002 and 2009), among others to examine the relevance of bank-lending channel of monetary policy using micro-level data of all the national banks operating in Jordan over the 2001-2012 period. The growth in bank loans of all the sixteen banks is regressed on the monetary policy stance which is proxied by the annual average of short-term interest rates on demand deposits. While there is no best indicator of monetary policy stance, the short-term interest rate is the most widely employed indicator, Bernanke and Blinder (1992). Securities and deposits are included to control for any funding effects on loans.

We include a number of one-period lagged variables for these variables to distinguish between
contemporaneous and lagged responses of banks to monetary policy stance. Furthermore, given the structure of banks’ balance sheet items may respond to changes in the stance of monetary policy in less than a year, we include both the current and one-period lags of these items to identify the relevant portfolio adjustments (Altunbas et al., 2002; 2009). The growth in supply of loans is also regressed on the growth of GDP, ln (GDP) to control for loan demand shifts. In this regard, ameliorate economic conditions increases the number of profitable projects which in turn increases the demand for credit (Kashyap, Stein and Wilcox, 1993). The introduction of this variable also captures cyclical macroeconomic movements and isolates the monetary policy component of interest rate changes (Δ). Thus, the study main model is specified as:

\[
\Delta \ln(LOAN)_{t} = \alpha_{t} + \beta_{1} \Delta \ln(\text{Int})_{t} + \beta_{2} \Delta \ln(\text{Loan})_{t-1} + \beta_{3} \Delta \ln(\text{Sec})_{t} + \beta_{4} \Delta \ln(\text{GDP})_{t} \\
+ \beta_{5} \Delta(\text{Dep})_{t} + \beta_{6} \Delta \ln(\text{Int})_{t-1} + \beta_{7} \Delta \ln(\text{Sec})_{t-1} + \beta_{8} \Delta \ln(\text{GDP})_{t-1} \\
+ \beta_{9} \Delta(\text{Dep})_{t-1} + \gamma X_{t-1} + \sum \eta \Delta(\text{Int})_{t} * X_{t-1} + u_{t}
\]

\(\Delta\text{Loan}_{it}\) is the annual growth in total loans; \(\Delta\text{Int}_{it}\) is the annual change in the average interest rate on demand deposits; \(\Delta\text{Loan}_{it-1}\) is one-period lag of annual growth in total loans; \(\Delta\text{Sec}_{it}\) is annual growth in total securities; \(\Delta\text{GDP}_{it}\) is the annual growth rate of gross domestic product; \(\Delta\text{Dep}_{it}\) is annual growth in total deposits; \(\Delta\text{Int}_{it-1}\) is the first lag of the average changes in the interest rates on the demand deposits, \(\Delta\text{Sec}_{it-1}\) is the first lag of the annual growth in total securities; \(\Delta\text{GDP}_{it-1}\) is the lag of the annual change growth in GDP; \(\Delta\text{Dep}_{it-1}\) is the lag of the annual growth in total deposits; \(X_{it}\) is a vector of lagged bank characteristics and the interaction of these characteristics with monetary policy stance (the change in the short-term interest rate). The characteristics include \(\text{SIZE}_{it} = \log\) of total assets; \(\text{LIQ}_{it}\) = liquidity ratio; \(\text{CAP}_{it}\) = capital to asset ratio; \(\text{LLP}_{it}\) = loan loss provision over total assets. One lag has been introduced to obtain white noise residuals (\(^\dagger\)).

The specification also includes interactions between changes in the monetary policy stance, and bank-specific characteristics, which is argued to be important in influencing the supply of bank loans. In addition, inserting these variables in the model helps avoiding the “identification problem” which confuses the demand factors that affect the credit with the supply factors. These characteristics include Size, the log of total assets (Kashyap and Stein, 1995), Liquidity, securities and other liquid assets over total assets (Stein, 1998), Capital Adequacy, the capital-to-asset ratio (Kishan and Opieia, 2000; Van den Heuvel, 2002). The risk is also considered to control for financial innovation, in line with Hansel and Karhen (2007) and Instefjord (2005) and to control for credit risk. LLP is loan loss provision as a percentage of total loans. This variable signals whether banks of different level of credit risk react differently to monetary policy shocks. Bank-specific characteristics refer to t-1 in order to avoid endogeneity bias. In this regard, Zulkefly et al. (2010) argue that the positive coefficient of the interaction between bank liquidity and the monetary policy variable indicates that the lower the interaction between liquidity with monetary tightening tends to reduce the supply of bank loans. Kashyap and Stein (2000) also argues that liquid banks can insulate their loan portfolios by reducing their liquid assets, while less liquid banks are unable to do so, which makes liquidity an important determinant of banks’ loan supply (Opolot, 2013). Faveoro et al. (1999) pointed out that macroeconomic data allow identifying the presence of credit channel by clarifying the implication of credit view concerning the response of banks to a shift in monetary policy depending on their characteristics.

The main model of the study have been estimated using a number of specifications including the Ordinary Least Square (OLS) with and without the interaction terms, Fixed Effect and Random Effect to decide the appropriate panel estimator that evaluate precisely the functioning of the lending channel of monetary policy in Jordan over the last decade. While the indications of various model estimations are comparable, we will depend on the results of the random effect which seem to be more robust.

\(^\dagger\) The pairwise-correlation among explanatory variables has been examined and the highest observed correlation is -0.56 between \(\Delta\ln(\text{GDP})\) and \(\Delta\ln(\text{Int})\) which signals the derisory of multicollinearity.
Empirical Results

The results of the main model specifications based on Ordinary Least Squares Regression (OLS) with and without interaction terms, Fixed Effect and Random Effect Models are presented in Table 1. The Redundant Variable test is performed to compare pooled OLS Regression models with the Fixed Effect Model. The test results are evaluated using “Cross-section F” and “Cross-section Chi-square” that assess the joint significance of the cross-section effects using sums-of-squares (F-test) and the likelihood function (Chi-square test). The two statistic values and the associated p-values fail to reject the null that the cross-section effects are redundant.

The Hausman test is also used to compare the results of Fixed Effect Model with the Random Effect model (which assumes that random effects are uncorrelated with the explanatory variables). The results of the test and the observed significance level in estimation failed to reject the null hypothesis which states that the random effect model is more appropriate (see Table 1). Thus, the model that will be employed to evaluate the impact of monetary policy on credit supply is the Random Effect Model, though the four specifications for the study main model show high consistency in their indications.

The results of random effect model show that the bank lending responds positively to changes in the contemporaneous stance of monetary policy as the coefficient of $\Delta \ln(\text{Int.})$ is positive and statistically significant. This implies that the banks under study increase, not decreasing their lending when the short-term interest rate level increases in the market. Several studies have established why short-term lending increases after a monetary contraction (see e.g. Gertler and Gilchrist, 1993b). This might be due to buffer stock behaviour, as firms demand more short-term loans to compensate for declining cash flows or shorten the maturity of their debts as a reaction to increases in the lending rate (Kakes and Sturm, 2002). However, our finding may also be related to excessive liquidity holding by the banks under study, especially in the aftermath of international financial crisis. Besides, the lending supply is not affected by the lagged stance of monetary policy, lag($\Delta \ln(\text{Int.})$) which have the expected negative sign but with no statistical significance; indicating no inertia in the transmission mechanism.

The results also show that the relationship between growth in the supply of loans and the banks securities holding is negative and statistically significant ($\Delta \ln(\text{Sec})$). This reduction in the growth of securities holding signals the funding effects on loans and suggests that banks adjust their securities holdings as loan supply changes. Furthermore, banks under study do change their funding structure given the sign of the deposits holdings variable (lag($\Delta \ln(\text{Dep})$)) is positive and statistically significant. Thus, banks seem to increase their borrowing at a time of monetary tightening to maintain credit supply.

On the other hand, the growth in the contemporaneous growth of bank lending is not affected by the lagged growth of bank lending, as the coefficient of lag($\Delta \ln(\text{Loans})$) is positive but not statistically significant. Thus, the historical growth in bank lending is not related to the current growth in bank lending. Our results also reveal that there is a negative significant relationship between supply of credit and the expansionary economic policy, lag($\Delta \ln(\text{GDP})$), but not in the contemporaneous form lag($\Delta \ln(\text{Dep})$). Thus, changes in economic activity seem to have little effect on loan demand, which disagree with the findings of Kashyap et al. (1993). Various explanations have been provided of why credit supply is reduced in an expansionary phase of economic policy that attributed mainly to the market perception of risk (Borio et al., 2001).

<table>
<thead>
<tr>
<th>Table (1)</th>
<th>The responsiveness of total loans (LOAN) to changes in monetary stance in Jordan over 2001-2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable = $\Delta \ln(\text{Loans})$</td>
<td>OLS</td>
</tr>
<tr>
<td>$\Delta \ln(\text{Int.})$</td>
<td>2.634</td>
</tr>
<tr>
<td>lag($\Delta \ln(\text{Loans})$)</td>
<td>0.002</td>
</tr>
<tr>
<td>$\Delta \ln(\text{Sec})$</td>
<td>0.448</td>
</tr>
<tr>
<td>$\Delta \ln(\text{GDP})$</td>
<td>0.453</td>
</tr>
</tbody>
</table>
**Dependent Variable:** Δ ln(Loans)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>OLS</th>
<th>OLS</th>
<th>Fixed Effect</th>
<th>Random Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ(Dep)</td>
<td>0.033</td>
<td>0.000***</td>
<td>0.028</td>
<td>0.000***</td>
</tr>
<tr>
<td>lag(Δ ln(Int.))</td>
<td>-0.049</td>
<td>0.296</td>
<td>-0.126</td>
<td>0.040**</td>
</tr>
<tr>
<td>lag(Δ ln(Sec))</td>
<td>-0.231</td>
<td>0.002***</td>
<td>-0.415</td>
<td>0.006***</td>
</tr>
<tr>
<td>lag(Δ ln(GDP))</td>
<td>-0.897</td>
<td>0.092*</td>
<td>-0.849</td>
<td>0.208</td>
</tr>
<tr>
<td>lag(Δ(Dep))</td>
<td>-0.006</td>
<td>0.189</td>
<td>0.004</td>
<td>0.469</td>
</tr>
<tr>
<td>X1(Δ ln(Int.)*lag(ln(TA (size))))</td>
<td>-0.096</td>
<td>0.002***</td>
<td>-0.090</td>
<td>0.004***</td>
</tr>
<tr>
<td>X2(Δ ln(Int.)*lag(Liquidity Ratio)</td>
<td>-0.667</td>
<td>0.016**</td>
<td>-0.809</td>
<td>0.006***</td>
</tr>
<tr>
<td>X3(Δ ln(Int.)*lag(Capital Adequacy Ratio)</td>
<td>-0.835</td>
<td>0.029**</td>
<td>-0.574</td>
<td>0.155</td>
</tr>
<tr>
<td>X4(Δ ln(Int.)*lag(LLP Ratio)</td>
<td>-1.762</td>
<td>0.000***</td>
<td>-1.678</td>
<td>0.000***</td>
</tr>
<tr>
<td>C</td>
<td>-0.025</td>
<td>0.518</td>
<td>0.091</td>
<td>0.047</td>
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<tr>
<td>R-squared</td>
<td>0.746</td>
<td>0.533</td>
<td>0.777</td>
<td>0.746</td>
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<tr>
<td>F-statistic</td>
<td>32.059</td>
<td>0.000</td>
<td>18.541</td>
<td>0.000</td>
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<tr>
<td>Durbin-Watson stat</td>
<td>2.488</td>
<td>2.656</td>
<td>2.464</td>
<td>2.488</td>
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**Redundant Fixed Effects Tests (Test cross-section fixed effects)**

<table>
<thead>
<tr>
<th>Effects Test</th>
<th>Statistic</th>
<th>d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section F</td>
<td>1.163993</td>
<td>-15,127</td>
<td>0.3083</td>
</tr>
<tr>
<td>Cross-section Chi-square</td>
<td>20.09512</td>
<td>15</td>
<td>0.1683</td>
</tr>
</tbody>
</table>

**Correlated Random Effects - Hausman Test (Test cross-section random effects)**

<table>
<thead>
<tr>
<th>Test Summary</th>
<th>Chi-Sq. Statistic</th>
<th>Chi-Sq. d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section random</td>
<td>17.36152</td>
<td>13</td>
<td>0.1833</td>
</tr>
</tbody>
</table>

The interaction terms between size, liquidity, capitalization and monetary policy stance have surprisingly negative signs which indicate that relatively large, liquid and well-capitalized banks are not insulated against shocks affecting the availability of external finance as the interaction between monetary policy stance and the bank specific variables, are all negative and statistically significant. As for the size, our results agree with Ehrmann et al. (2003b) findings who suggest that small banks are less affected by the adverse implications of informational frictions. Our results also are partially in line with those of de Bondt (1999) on banks operating in European Monetary Union who indicates that Italian banks most likely contract their loans in time of a monetary tightening though these banks are adequately capitalized. Altunbas et al. (2002) find little evidence for a bank lending channel for banks with different capital structure in EMU countries. However, our findings about relatively more liquid banks disagree with those of Kashyap and Stein (2000) who argue that liquid banks can insulate their loan portfolios by reducing their liquid assets (Opolot, 2013).

The interaction monetary policy stance and LLP ratio, which is employed to control for riskiness of credit portfolio has a negative effect on the lending supply, in all the models estimated. This result reflects “market discipline” in which less risky banks are better able to absorb future losses.

To summarize, our results mainly show that the Jordanian banks increase not decreasing their credit supply as the short-term interest rate increases. Furthermore, the supply of banks credit is positively
associated with banks’ deposits holdings but negatively with securities holdings. The latter results signal funding effect for banks in response to monetary policy stance to keep the level of credit supply. Our results also reveal that there is a negative significant relationship between supply of credit and the expansionary economic policy. Finally, the results show that the interaction terms of size, liquidity, and capitalization with monetary policy stance on one hand, and the credit supply on the other hand have negative signs which indicate that relatively large, liquid and well-capitalized banks are not insulated against shocks affecting the availability of external finance.

Conclusion

This study employs the approach followed by Kashyap and Stein (1995), de Bondt (1998), Kishan and Opiela (2000) and Altunbas et al. (2002) among others, on disaggregated bank level data to examine the relevance of banking lending channel in Jordan over the period 2001-2012. Using individual bank level data of all the sixteen national banks operating in Jordan, the growth in bank loans is regressed on the current and lagged values of changes in the short-term money market rate, bank securities holdings, deposits, GDP and lagged value of change in bank lending. Various regression models specifications have been estimated but we depend mainly on the results of the random effects panel data model, as it is the appropriate panel estimator to evaluate the functioning of the lending channel for banks under study. The interaction of bank features including size, liquidity, capitalization and loan-loss provision with monetary policy stance on the loan supply is also evaluated to control for potential biases of endogeneity that result from including the lagged values of explanatory variables.

Unexpectedly, our results show that the bank lending respond positively to changes in the contemporaneous stance of monetary policy. More specifically, Jordanian banks increase not decreasing their lending as the short-term interest rate increases. Earlier literature have established for why lending might increase after a monetary contraction, a phenomenon that is attributed to buffer stock behavior (Gertler and Gilchrist, 1993b). However, we argue that the increase in the short-term interest rate has increased the costs of funds of the banks’ and motivated them to shift their asset structure by increasing the volume of their loans holdings. This behavior has been reinforced in response to synchronized regulatory pressure on the Jordanian banks to increase their costly equity capital. The equity capital as a percent of total asset has increased from 9 percent in 2001 to around 15 percent in 2012. Besides, the banks have respond to the concomitant financial crisis by increasing their liquidity buffer, the balance of cash and due with other banks as percent of total assets has increased from 37 percent in 2001 to around 44 percent in 2012. On the other hand, our results signal funding effect for banks in response to increase in the volume of loan supply. More specifically, results show negative relationship between growth in credit supply and growth in securities holding and positive relationship between loans supply and deposits holdings.

On the other hand, the growth in the contemporaneous growth of bank lending is not affected by the lagged growth of bank lending. Our results also reveal that there is a negative significant relationship between supply of credit and the expansionary economic policy, in the lag but not in the contemporaneous form. Thus, changes in economic activity seem to have little effect on loan demand. Finally, the results show that the interaction terms of size, liquidity, and capitalization with monetary policy stance and the credit supply have negative signs which indicate that relatively large, liquid and well-capitalized banks are not insulated against shocks affecting the availability of external finance.

These results call that the banks and the Jordanian’s monetary authority should pay attention to the concomitant consequences of the monetary policy transmission and monitor the micro-dynamics of individual banks. Mainly, the resulting excessive expansion in loan supply due to monetary policy stance may increase the operating risks of the sector and exposes the banks’ to other forms of market risk.
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تقييم انتقال السياسة النقدية في الأردن: القيود الإقتصادية للبنوك

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ملخص
تهدف هذه الدراسة إلى التحقق من ملامحة قوات الائتمان في الأردن باستخدام الإحصاء الخطي، ونماذج الإحصاء ذات الأثر الثاني والأثر العشوائي خلال الفترة 2001-2012. تم تقدير الارتباط بين النمو في القروض لجميع البنوك ونسبة عدد العوائد، وحجم مستUTFwhite_0of平板تفة الاستثمارات، والدوافع، والنتائج المحلي الإجمالي والقيمة السابقة للنمو في حجم الائتمان. تم أيضاً تقدير التأثير التفاعلي لخصائص البنوك المتمثلة بالحجم، والسيرة ومكانة رأس المال وحجم مخصص الدوائر المشكوك في تحصلها مع أدوات السياسة النقدية وتأثير ذلك على حجم الائتمان وذلك لتجنب مشكلة التحيز الثاني الذي قد ينتج من استخدام القيم السابقة للغير متغيرات المستقلة.

بينت النتائج بصورة غير متوقعة أن حجم الائتمان يرتبط إيجاباً بالتغييرات التي تحدثها السياسة النقدية، أي أن الزيادة في سعر الفائدة فيgresة الأجل تزيد من حجم القروض الممولة من قبل البنوك. هذا السلوكن تعزز نتيجة الضغوطات التشريعية المتمثلة بزيادة متطلبات رأس المال الموروثة على البنوك والتي تزامنت مع فترة الدراسة. استنادا إلى هذه النتائج ينصح على إدارات البنوك والسلطة النقدية في الأردن مقاومة التأثيرات التي ترافقت أدوات السياسة النقدية وضبط التغيرات الهيكليّة المرافقة ذلك ان التسويق المغرز بحجم الائتمان قد يزيد المخاطر التشغيلية للبنوك. ويعبر عنها أشكال أخرى من المخاطر المرتبطة بذلك.

الكلمات الدالة: الأردن، السياسة النقدية، انتقال السياسة النقدية، قوات الائتمان المصرفي، السلسلة الزمنية للبيانات.

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