Monetary Policy and Financial Stability: Empirical Evidence from South Mediterranean Countries

Ouhibi S* and Hammami S

University of Sfax, Tunisia

Abstract

This article examines the relationship between monetary policy and financial stability, in the experience of six south Mediterranean countries (Tunisia, Morocco, Egypt, Lebanon, Jordan and Turkey) over the period 2006M1-2013M12. This research analyzes the monetary policy contribution to financial stability using a structural vector Autoregressive model. Our empirical results show that the short term interest rates affect the selected asset prices depends on the strategy of the monetary policy. For countries that adopt a fixed exchange rate regime such as Tunisia, Morocco, Egypt and Turkey, the interest rate is conducive to financial stability. However in countries that adopt a fixed exchange rate regime such as Jordan and Lebanon, the interest rate is not an effective tool for promoting financial stability.

Keywords: Monetary policy; Financial stability, Structural Vector Autoregressive model; Exchange rate

Introduction

The 2007 financial crisis revealed fundamental problems led to the slowdown of economic activity and the rise of the global financial volatility. Emerging economies of the Southern Mediterranean countries had a decline of their economic activity, due to the instability caused by the Arab Spring.

Before the crisis, economists reached a wide consensus regarding the justification of the frame of the political frame of the central bank; its goals, its assessments of economic prospects, and its main role of price stability. Price stability is the main aim monetary policy and it is independent of financial stability. It do have limitations which are balance sheet of the central bank, interest rate and independence of central bank to arrest inflation.

The concern of the central bank about financial stability remains a center of debate for economists and universities and can lead to what is called “the financial domination”.

Mishkin [1], defines financial stability in terms of its opposite which occurs when shocks to the financial system interfere with information flows so that the financial system can no longer do its job of channeling funds to those with productive investment opportunities.

To limit the risks of the financial system, it is important that the price stability remains the main objective of the monetary policy and with the preservation of the financial stability. Okina et al. [2] stress the importance of conducting a monetary policy with the emphasis on maintaining an environment conducive to the sustainable economic growth that is the ultimate goal of price stability. However for sustainable economic growth proper functioning of financial system is an indispensable variable.

In this article, financial stability is defined in terms of changes in the stock index, interest rate, the nominal exchange rate and inflation. Crockett [3] defines the financial instability as the situation in which economic performance is affected by the fluctuations in the price of financial assets.

In the context that the monetary policy oriented to the price stability favors the financial stability over time, we examine the experience of six countries of the southern Mediterranean zone between 2006M1-2013M12.

Literature Review

The importance of the financial stability was recently recognized by the monetary policy for the achievement of sustainable economic growth, moreover, there is a wave of empirical research on the importance of monetary stability and financial stability. These studies use proxies for financial stability and proxy for monetary policy. Examples of recent studies are Cocris Vasile and Anca Elena Nucu [4], Brigitte Granville and Sushanta Mallick [5], Keray Raymond [6], Christophe et al. [7].

Cocris Vasile and Anca Elena Nucu [4] used the structural vector autoregressive models and the impulse response function to determine the implications of the monetary policy on financial stability in the experience of Central and Eastern Europe (CEE) during 2003M01-2012M06. They analyzed the impact of the short-term interest rates on industrial production, the loan to deposit ratio for the banking system, the stock prices and the exchange rates (proxies for financial stability). The empirical results show that the effectiveness of the short-term interest rates which affect asset prices depends on the strategy of the monetary policy. In the case of the Czech Republic, Hungary, Poland and Romania, the instrument of the interest rate used for inflation targeting is conducive to financial stability.

Using the same sample and the same econometric model, Nucu Anca Elena [4], found that the money market interest rate is conducive to financial stability in the case of the Czech Republic and Poland. In the Bulgaria and the Lithuania, which lost their autonomy in monetary policy, the fluctuations of the interest rates of the central bank are not in accordance with the specific national conditions. In Hungary and Romania, the instrument of the interest rate used for targeting is not appropriate to financial stability.

*Corresponding author: Ouhibi S, ph Student at University of Sfax, Tunisia, Tel: +216 74 242 951; E-mail: saoussenouhibi@yahoo.fr

Received July 29, 2015; Accepted August 13, 2015; Published August 20, 2015


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Brigite Granville and Sushanta Mallick [5] used a VAR-based approach restriction sign in the experience of the EMU between 1994 and 2008 with variables for monetary stability (index of consumer prices and central bank rate) and variables for financial stability (stock prices, exchange rates, the real estate prices and loan to deposit ratio of the banking sector). Their results indicate a pro-cyclical relationship between monetary and financial stability in the long term. With a positive inflation shock, stock prices fell by 2%, this suggests that the instrument of the interest rate used for inflation targeting is conducive to financial stability.

The relationship between price stability and financial stability became a crucial issue for the monetary stability. Some authors suggested introducing financial stability as an objective of the central bank. Dominique Pépin [8] states the European Central Bank reacts significantly to the financial asset prices by increasing its main rate when the stock price is over-estimated.

Christophe Blot et al. [7] explored the link between financial stability and monetary stability through three empirical models (simple correlations, VAR and dynamic conditional correlation models). They found that none of these three empirical methods show a positive relationship between financial stability and price stability. This result suggests that financial instability can develop in an environment of low inflation. Such as in Granville and Mallick [9], we define financial stability in terms of changes in the stock prices.

The academic literature abounds in studies that examine the relationship between the stock prices and the monetary indicators in Jamaica [6], Germany and the United Kingdom [10], the developed and developing countries [11], and the emerging countries [12]. Keray Raymond [6], found a long-term relationship between the stock prices and the monetary variables (monetary aggregates M2 and M3, the interest rate, inflation and exchange rates) using a vector error correction model (VECM) for experience Jamaica.

Mehmet Eryigit used the vector autoregressive model (VAR) with macroeconomic variables for Turkey (stock index (ISE 100), interest rates, exchange rates and Crude Oil Price) showed a dynamic relationship between the stock indices of Istanbul (ISE10) and the money market interest rates.

However, most studies on the interaction between the monetary policy and the financial stability have been applied to the developed economies. With the other economies, there are a few studies on the relationship between the monetary policy and financial stability in the southern Mediterranean countries. Possible causes can be explained by the lack of data for some countries. Indeed, the execution of an empirical analysis requires a large number of observations.

### Research Methodology

To analyze the role of the monetary policy contributing to financial stability, we apply a structural vector auto regression model the experience of some countries of the southern Mediterranean. Tunisia, Egypt, Morocco, Turkey, Lebanon and Jordan. Therefore, we chose these countries from the data availability.

### Model and methodology

The SVAR (structural vector auto-regressive) was developed by Sims and Bernanke [13,14]. It has become a popular tool in recent years in the analysis of the mechanism and economic and monetary transmission fluctuations.

The VAR modeling of the dynamic behavior of economic variables is not perceived as a technique based on the economic theory. This criticism may be justified by the reduced form of VAR model. However, the structural form is based on an underlying theoretical framework and centered on short and long term.

In this case, the shocks affecting the system are structural, this means that they reflect the particularities of the economic structures of the studied countries. For this reason, our empirical study is based on a SVAR.

As per Hamilton VAR model been represented as:

$$Y_t = A_1 Y_{t-1} + \ldots + A_p Y_{t-p} + U_t$$

Where $Y_t = (y_{1t}, \ldots, y_{kt})$ vector of endogenous variables; $A_1, \ldots, A_p$ are matrices of dimension parameters $K \times K$, and $U_t$ is orthogonal vector with the following characteristics:

- $U_t \sim N(0, S)$
- $E(U_t U_s) = 0 \text{ for all } t \neq s$

The VAR model can be rewritten as follows:

$$A(Y_t - L A_1 L + A_2 L^2 - \ldots - A_p L^p) = A \varepsilon = B \varepsilon$$

Where $L$ is the lag operator; $t$ is the vector of innovation with $t \sim N(0, S)$ and $E(\varepsilon_t \varepsilon_s') = 0 \text{ for all } t \neq s$; $\varepsilon_t = Be_t$, with the following characteristics:

- $t \sim N(0, K)$
- $E(\varepsilon_t \varepsilon_s') = 0 \text{ for all } t \neq s$

The matrices $A$ and $B$ represent a short-term system. Long-term analysis of this system requires the VAR model or $Y_t$ to fluctuate around its mean and matrices $A$ and $B$ are not singular.

Therefore, by $\hat{A} = (I - A_1 L + A_2 L^2 - \ldots - A_p L^p)$ its inverse is obtained as $\hat{A}^{-1}$

By pre-multiplying the equation (2) by the inverse matrix we have a long-term system as equation (3).

$$Y_t = \hat{A}^{-1} B \varepsilon_t = C \varepsilon_t$$

Then $C = \hat{A}^{-1}$ $B$ is the long-term matrix response to shocks. Then $C \sim \hat{A}^{-1} \hat{B}$ is the long-term matrix response to shocks.

Since the goal of our empirical analysis is to evaluate the response of the financial variables to the monetary policy shock, the methodology of the analysis of the impulse response is explained by the monetary policy shock. The correlation of the error term may indicate that a shock of a variable is likely by a shock of another variable.

Therefore, we assume that the structural shocks are orthogonal, which means that the covariance matrix of the VAR residuals transmits information on the coefficients of the simultaneous relationships between endogenous variables [15]. The relationship between the reduced form of disturbances $U_t$ and structural shocks $\varepsilon_t$ is as follows:

$$U_t = B^* \varepsilon_t$$

Or $B$ is a triangular matrix obtained from a Cholesky decomposition of the covariance matrix $\Sigma_u$, as $B^T \Sigma_u \varepsilon_t$ represent the shock of monetary policy.

### Data

It the end, to test the link between the monetary policy and financial stability, we identify the monetary and financial variables.

Similarly, we intend to find out establish whether the link between the monetary policy and financial stability is procylical, and empirically discover of the financial variables respond in the case of an interest rate shock. To answer the question, we consider the following...
Based on the trace and the maximum eigenvalue, the Johansen cointegration test shows at the 5% level, there is a cointegration relationship (r=1) for Morocco and two cointegrating relationships (r=2) for Jordan between variables.

Studies of causal

The existence of a cointegration relationship between the variables causes the existence of a causal relationship. The study of the direction of causality between the variables is very important. For this reason, we will carry out the classic causality test in the Granger (Appendix 2). The results show the existence of a unidirectional causality of the price index to the stock indices and of the exchange rate to the TIMM in the Moroccan economy.

For Tunisia, Turkey, Egypt and Lebanon, it is not long-term relationship, but the causality between the series enables us to estimate a VAR model. The Interpretation of the results of the SVAR model is based on the response functions.

Analysis impact of shock money market interest rate

The impulse response function to an interest rate shock in Tunisia: Figure 1 in Appendix 3 shows the responses of the financial variables for Tunisia to an interest rate shock. The analysis of the impact of a shock on the money market interest rates (variable instrument of monetary policy) on macroeconomic variables (variables instrument of financial stability) will be performed through impulse response functions. The money market interest rates shock generates a relatively small decrease in the index of consumer prices. The interest rate is an instrument used by the central bank to control inflation. Claudio Borio and Philip Lowe state what a monetary regime that ensures price stability ensures the stability of the financial system.

With the monetary shock effect (an increase of the interest rates), ongoing equity shares react negatively. This result is consistent with previous studies, of Keray [6], Humpe and Macmillan [16], Brigitte and Sushanta [5]. Vasile et al. [17]. The nominal exchange rate responds to the money market interest rates shock by depreciation, but this effect is not statistically significant. The lack of reactivity of the nominal exchange rate to monetary shock implies that it does not contribute to the stability of the financial system.

The impulse response function to an interest rate shock in Egypt: Figure 2 in Appendix 3 shows the responses of the financial variables for Egypt to an interest rate shock. Our empirical results show that after a monetary policy shock by the interest rate, all variables react in accordance with economic theory: A decrease in the index of consumer prices and prices of stocks. All these effects are statistically significant. The response of these indicators is similar to those of Tunisia.

The response functions to money market interest rate shocks showed a significant relationship between the money market interest rates and the exchange rate. This relationship is also confirmed by Anzumi and Levy who found out that increasing monetary policy rates led to the appreciation of local currencies. The exchange rate stability plays an important role in the development of foreign investment and the minimization the risk of the debtors. Kako Kviossi [18] the negative coevolution between the interest rate and the exchange rate is desirable in the monetary policy. An exogenous increase in the interest rates by the central bank that does not lead to an appreciation of the local currency shows that there is an imbalance in the financial system.

The impulse response function to an interest rate shock in Lebanon: Figure 3 in Appendix 3 shows the responses the
The combination of the price stability and financial stability objectives for the central bank returns explicitly integrates the issue of macroprudential regulations.

References


