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Growth, fluctuations and macroeconomic policies: Evidence from Arab open economies

Knani Ramzi [a,*], Madouri Asma [a], Ali Chebbi [b]

[a] Economics and Quantitative methods Department, MACMA laboratory, Management Higher University, University of Tunis, Tunisia
[b] Professor of Applied Macro-econometrics, University of Tunis, Department of Quantitative Methods and Economics, Tunisia

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ABSTRACT

In this paper, we examine empirically the Macroeconomic policy impact on economic Growth in four Arab open economies over the period 1982–2013. The multivariate Markov switching approach is used to study the trade openness, financial development, financial integration, inflation and investment shock effects on growth according to the economic state. Our findings are (i) two economies were under persistent recession states for most of the time, (ii) macroeconomic policy do not lead to dynamic gains from trade in the largest Arab countries, (iii) inflationary pressure stimulates economic growth through domestic investment, (iv) financial Integration and the financial Development suggest that structural reforms in the banking sector and financial markets should be implemented, and (v) short term stabilization policies should be accommodated to the macroeconomic fluctuations. These results in terms of economic policy recommendations were not possible to be carried out outside the RBC framework.

1. Introduction

During the last two decades, there has been a growing body of applied literature documenting the determinants of economic growth in some particular contexts. Accordingly, capital accumulation is presented as an important factor in the rapid growth of East Asian economies (Krugman, 1994; Young, 1994), while Drysdale and Huang (1997) show that productivity growth was a major contributor to the growth in these countries. In addition, some other works have emphasized the effects of policy on growth, since the new growth theory has argued the non-neutrality of economic policy in the growth process (Romer, 1990). Indeed, public expenditure, human capital investment, and the improvement of the labor quality may accelerate growth rate by their effect on productivity (Barro, 1996; Robertson, 2000). Furthermore, trade policy seems to have an interesting effect on the growth path by its effect on the price system and then on the resource allocation (Michaelly et al., 1991; Page, 1994; Kwabena, 2004).

However, given some unexpected shocks from the variability of economic policies, from the relative prices, and from demand and supply behavior, the growth rate may be unstable (Chebbi, 2015). In the empirical literature, a few models enhancing the understanding of the important factors and vehicles of economic growth have been elaborated. Hartwig (2010), Kar et al. (2011) and Tekin (2012) have used a Granger Causality. Sahoo et al. (2014), Risso et al. (2013), Sharif and Rajarshi (2013) and Shahbaz (2012) have used a co-integration approach. Barro (1996), Bleaney and Greenaway (2001)

* Corresponding author.
E-mail addresses: knaniramzi@yahoo.fr (K. Ramzi), asma_madouri@yahoo.fr (M. Asma).

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and Kwabena (2004) have focused on linear regressions. However, the nonlinear models dealing with the switching regime models are more appropriate to the fluctuation investigations since they are based on the RBC approach. For this purpose, the Markov Switching Autoregressive Vector (MS-VAR) model of Krolzig (1997) widely adopted in the empirical studies is an extension of Hamilton's work.

Although the application of this model allows the studying of the determinants of growth for different states and seems to be important in terms of political stabilization, only few works, such as Anna and Anke (2010) who identified the transmission mechanisms in Armenia and, more recently, Beatrice et al. (2013) who have applied this approach in South Africa, are available in the applied literature.

In this paper, we use the motivated switching regimes approach to study the determinants of the economic growth in some Arab countries, namely, Algeria, Morocco, Saudi Arabia and Tunisia. Indeed, these economies are currently in a macroeconomic instability affecting their growth path in different ways. For this purpose, we study the asymmetric effects of the various shocks on economic growth rate conditional on the state of the economy.

This paper is organized as follows. Section 2 describes the *MS-VAR* model and the estimation process via the Expectation Maximization (*EM*) algorithm. Section 3 provides datasets and the preliminary treatment. Section 4 presents the empirical results and interpretations. Finally, we conclude in Section 5.

2. The MS-VAR model

Following the seminal paper of Sims (1980), the autoregressive vector model has been widely used in empirical macroeconomics to study the main effects of macroeconomic shocks and the responses of the economy to them. In this model, the evolution of the economy can be described by the dynamic behavior of a set of lagged variables. The main idea through the multivariate Markov Switching (*MSM-VAR*) model is that the parameters of $p-$ *dimensional* vector time series depend upon an Munobservable regimes.

Let y_i denote a $MSM(M)-VAR(p)$ process. The corresponding equation may be written as follows,

$$\phi(B)(y_t - \mu(s_t)) = \varepsilon_t. \tag{1}$$

Where $\varepsilon_t \sim \text{NID}(0, \sigma^2)$, and the conditional mean $\mu(s_t)$ switches between M *states*.

To avoid the disadvantages of the conventional procedure of estimating the parameters of the model, we adopt the two-step Expectation Maximization (*EM*) algorithm due to Dempster et al. (1977). In the first expectation's step, population parameters, including the joint probability density of unobserved states, are estimated. In the second optimization step, probabilistic inferences about the unobserved states are made by using a nonlinear filter and smoother. Filtered probabilities $P(s_t = j|\psi_t)$ are obtained by inferences about s_t conditional on information up to time t and smoothed probabilities $P(s_t = j|\psi_T)$ are obtained by inferences about s_t by using all the information available in the sample for $t = 1, 2, \ldots T$. This two-step procedure is repeated until it reaches the convergence.

3. Dataset and preliminary treatment

3.1. The dataset

This paper uses annual data from 1980 to 2013 for four open Arab countries namely, Algeria, Morocco, Saudi Arabia and Tunisia to identify the main determinants of economic growth by means of a MS-VAR model.[1]

As a measure of the economic activity, we consider the annual real *GDP* per capita (*RGDP*). This variable is frequently used as an indicator for measuring the economic growth of a country (Edison et al. (2002), Solow (1956), Barro and Martin (1995), Makiw et al. (1992), etc.).

By referring to the new growth theory framework, we retain two types of determinants of economic growth, i.e., accumulation and economic policy, including the macroeconomic environment. For the accumulation determinant, we retain the gross fixed capital formation (GFCF). Note that some authors consider the saving rate as an accumulation determinant (Pagano, 1993; McKinnon, 1973). However, in the Arab economies' context of underutilization of capacity and structural rigidities, we consider capital accumulation as an appropriate explaining variable of growth. The policy and macroeconomic environmental variables are as follows,

- The Inflation Rate (*INF*): A macroeconomic stabilization (policy) indicator (Hermes et al., 2002; Levine and Renelt, 1992; Fischer, 1993)

- The Financial Development (FDEV): An important vehicle for economic growth (Shaw, 1973). The FDEV helps to attract foreign investors to diversify their portfolio and increase their investments and may act as a stimulant of international financial integration. In light of the empirical tradition, we measure the financial development (*FDEV*) by the sum of the domestic credit to private sector and the market capitalization of listed companies in percentage of GDP.[2]

[1] These countries are contracting parts of the Greater Arab Free Trade Area (*GAFTA*) so that the customs barriers between them are called to be considered abolished. The *GAFTA* aims to enhance the process of Arab economic integration and to increase the foreign investment in these countries.

[2] Following Goldsmith (1969) and especially Shaw (1973), the empirical literature on the link between Financial Development and Growth has been developed considerably.