DOI: https://doi.org/10.37075/EA.2023.3.03 Economic Alternatives, 2023, Issue 3, pp. 484-520

Dynamic Effects of External Shocks on Current Account Imbalances in the MENA Countries: A Structural VAR (SVAR) Analysis

Received: 09.05.2022
Available online: 30.09.2023

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Abstract

In this paper, we tried to contribute to the previous literature by analyzing the effect of external and domestic shocks on the current account balance. Using a Structural vector autoregression (SVAR) technique, we specifically examine the effect of external and domestic shocks on the current account balance considering the case of the MENA region during the period 1970 to 2019. Our results indicate that the oil shock leads to a deterioration of the current account and a depreciation of the terms of trade while its impact in terms of growth is significant but more attenuated. For oil-importing countries, the magnitude of current account responses to shocks is much smaller on average than for oil-exporting countries. Our findings have important policy implications, especially in light of discussions in recent years about whether current account surplus countries impede growth abroad. Thus, the most important policy implication of this paper is that different channels would be used by economic policymakers to control the current account deficit.

Keywords: current account imbalance. Structural vector autoregression. MENA

JEL: F15, F32, F51

1. Introduction

For more than thirty years, the world economy has been marked by a fundamental trend: the globalization of business and finance. The liberalization of capital flows and the international division of labor in the production process have shaken its center of gravity, leading to the emergence of new forces. Indeed, financial globalization has increased financing possibilities between countries and reduced restrictions on current account imbalances. However, the huge surpluses and deficits of some countries increased financial risks and contributed to the crisis that began in 2007-2008. Though, current account imbalances increased dramatically globally in the years leading up to the subprime crisis, as well as in MENA countries.

Therefore, it may seem surprising to study the impact of the accumulation of current account imbalances in the MENA region, at least when one only looks at its contribution to international savings transfers. Since the financial crisis of 2008, the price of Brent

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crude has tended to decline, it had previously created a rather dramatic change with a quadrupling of its price between 2005 and 2008. Certainly, it is not as sudden a shock as those observed in the 1970s, but it is a variation of the same magnitude as in the years 1973-75, although it is more spread out in time. In addition, interest rates were particularly low, mainly in the United States. Three-month rates were on average twice as low between 1998 and 2008 as between 1980 and 1997. They remained below 2% for three years between 2002 and 2005 and are now below 1% since December 2008, following the subprime financial crisis. Furthermore, to these real and monetary shocks, it is legitimate to add the financial stocks that have grown in the last decade. The United States, and then the world via the domino effect and given the high level of financial integration at the international level (Borgy and Mignon, 2009) have experienced two successive financial crises in seven years. The question remains whether such imbalances require corrective measures, or whether they can be considered as a logical consequence of the economic environment. Some believe that excessive current account surpluses slow growth in deficit countries (Mankiw, 2014).

Nevertheless, MENA is a region sensitive to external shocks since its size accounts for about 60% of global oil reserves and its growing integration into the global value chain is expected to mitigate foreign influence. Thus, with the magnitude of external shocks, the MENA region's current account went from a surplus of around 15 percent of GDP in 2011 to a deficit of almost 5 percent of GDP in 2015. This finding suggests that the MENA region has been strongly affected by these shocks. However, this could be an illusion for two reasons. First, the MENA current account balance is the result of aggregating the balances of member countries. Oil is seen as the main source of growth in the region. Oil revenues account for between 60 and 90 percent of the export earnings of oil-producing countries and more than 60 percent of their GDP, making the per capita income of these countries much higher than that of nonoil-producing countries. Over the period from 1970 to 2019, the stability of economic growth in MENA countries has been influenced by several exogenous shocks. On the export side, natural resources are the main source of income for oil-producing countries in the region. Non-oil-producing countries, on the other hand, export primary products or low-tech manufactured goods such as textiles. In terms of imports, this region is identified from the others by its low autonomy, due to its dependence on food imports. As a result, it remains the geographic area of the world most exposed to commodity price shocks (WorldBank, 2019). On the other hand, the level of the current account depends on the combined effect of exchange rate changes and the growth differential. In the end, the MENA current account imbalance could be the result of these two conflicting effects of external shocks: a negative impact of lower oil prices and a positive effect of a lower growth differential. A large theoretical and empirical body of work has analyzed possible adjustment mechanisms for these current account imbalances. However, the issue of current account imbalances in the MENA region has been less studied. Apart from Neaime (2005) or Allegret and Benkhodja (2011), few studies have focused on the impact of external shocks on the current account of MENA countries, their propagation within the region, and the means of adjustment available to countries to return to sustainable levels of current account balances. Furthermore, this study aims to fill theoretical and empirical

gaps in the existing literature and contribute to the debate on the political economy of the current account in various ways. We examine the extent to which the MENA region has been affected by the different types of external shocks that the global economy has experienced in recent years for a panel of 12 MENA countries over the period 1970-2019.

To do this, we use the methodology of structural vector autoregression models (SVAR) to identify short-run and long-run constraints and make an exogeneity assumption with respect to external shocks. The model includes three domestic variables - the growth rate, the terms of trade and the current account - and two types of external and internal shocks. The econometric analysis allows us to determine the response of domestic variables to the different external and internal shocks. In addition, we study the correlation coefficients of the response functions to measure the degree of homogeneity/heterogeneity of the responses to shocks within the modified MENA region. Finally, we determine the contributions of external shocks to the variance of domestic variables to observe the relative importance of different shocks on the current account.

2. Theoretical Background and Literature Review

The determinants and dynamics of current account deficits have received much attention because of the severe imbalances in some countries, particularly the United States. Several studies (Kandil and Greene 2002; Edwards 2006; Fratzscher, Juvenal, and Sarno 2007) are devoted to the search mechanisms and different channels that can be affecting the U.S. current account deficit and extrapolating certain policy measures.

A first channel concerns the potential effects of the hypothesis of twin deficits via savings and investment (Baxter and Crucini 1995; Erceg et al., 2005). In fact, when public expenditure increases without a corresponding increase in tax revenue, so-called Ricardian consumers rationally expect higher taxes in the near future, so they reduce their consumption. On the other hand, the current account deteriorates, leading to a double deficit. However, most undergraduate macroeconomic studies such as Mankiw (2014) provide a similar but simpler explanation for the twin deficit hypothesis with a public spending increase, national savings decrease, leading to an increase in the real interest rate. In this case, there is a massive inflow of capital into the domestic market, which results in a decrease in net capital outflows. Likewise, the decrease in capital outflows leads to an increase in the real exchange rate, which worsens the current account balance. Recently, Jia and Kim (2018) re-examined this question by introducing the role of consumer sentiment. Their research assumes that private spending declines as the fiscal shock generates consumer pessimism. In other words, the unexpected increase in budgetary expenditure confirms an imminent decline in productivity in the near future.

In a similar vein, Melesse (2020) applied the structural vector auto-regressive (SVAR) model on annual time series data to study general government debt and current account dynamics in Ethiopia for the period 1980–2018. The author assumes that fiscal balance exerts the strongest influence on both government debt and current account balance in the short run. In addition, own shock as well as shocks stemming from gross fixed capital formation and growth have significant effects on general government debt.

Other channels through which current account imbalances may impact abroad are related to the effects of oil shocks on the macro

economy, a small literature has explored the impact of shock on the current account of an economy, and those that have attempted to focus primarily on industrialized countries. Agmon and Laffer (1978) provided an early study based on the monetary approach to the balance of payments of industrialized countries. They found that the trade balance deteriorated immediately, following a rise in oil prices, but after the initial deterioration, trade balances improved again, with adjustments exclusively in non-oil trade. The current account balance deteriorated soon after the shock and, after some time, returned to more normal deficits and surpluses. Various authors have focused on the study of this relationship by examining either (i) the effect of an oil shock on economic activity via the supply and demand channel, or (ii) the impact of world trade on the floating price of oil. In fact, empirical studies that focus on the effect of oil shocks on the current account are scarce, although fluctuations in oil prices have played a crucial role in determining current account imbalances (Blanchard and Milesi-Ferretti, 2009; Arezki and Hasanov, 2012). A sizeable literature has indirectly studied this issue through the so-called "Dutch disease[1]" phenomenon. Indeed, Bodart et al., (2015) suggest that there is a positive relationship between oil prices and the exchange rate. This increase will lead to an appreciation of the real exchange rate for oil-exporting countries. As a result, the terms of trade for non-oil exporting firms deteriorate "income effect" and lead to a transfer of resources from on oil sector's "substitution effect". Another wave of the literature involves linking the current account balance with net savings in an indirect accounting identity in order to understand the impact of domestic oil investment-saving allocation on current account balances (Chinn and Ito, 2008).

Nevertheless, Bruno and Sachs (1982) and Gavin (1990) were among the first economists to study the direct effect of oil price shocks on current account balances. Though, this work seems limited and does not take into account the exogenous and endogenous components of oil shocks, as recent empirical model agrees that not all shocks are similar (Kilian and Murphy, 2014).

More recent studies by Bodenstein et al, (2007) show how oil revenues are recycled in the global economy by distinguishing between supply and demand shocks. Through these suggestions from these empirical works, we can say that an increase in oil prices will lead to a current account surplus for oil exporting countries at the expense of importing countries. Another investigation of the effect of a shock on the current account illustrates that there are two important channels: (i) the trade channel, and (ii) the valuation channel. However, the first channel works through the adjustment of prices and quantities of exported and imported goods, reflecting the response of trade balances. The second channel operates through the adjustment of income flows and foreign liability positions, signaling the composition of the international portfolio of oil importing and exporting countries.

From a macroeconomic perspective, it follows that after a positive oil price shock, oil-producing (respectively oil-importing) countries adjust their trade balances corresponding to a current account surplus (respectively deficit). Thus, according to the previous literature, the non-oil trade balance

[1] An economic phenomenon that links the exploitation of natural resources to the decline of the local manufacturing industry. This phenomenon is driven by increased export earnings, which in turn causes the currency to appreciate. The result is that in other sectors, exports become less favorable than imports.

has a primordial role since it can either amplify the initial effect or offset oil trade deficits (Kilian, 2009).

As Kilian (2009) has pointed out, the response of the non-oil trade balance also sheds much light on the integration of international financial markets as well as foreign exchange reserve management. From the perspective of international integration, it is well known that current account adjustment differs according to the completeness of the markets. Indeed, the literature generally identifies three possible situations: (i) complete markets, (ii) financial autarky, and (iii) incomplete markets. In the standard framework of complete markets, a temporary positive shock on oil prices led oil exporting countries to lend their excess oil revenues. For non-oil producing countries, the oil deficit must be financed by borrowing in order to maintain a sustainable current account balance (a transitory flow imbalance). As a result, no domestic adjustment will be necessary and the current account will only react to the oil trade balance. In the extreme framework of financial autarky, current account imbalances cannot arise in response to oil price shocks. Standard theoretical models focus only on the complete or autarkic case, and little is known about the incomplete situation. Nevertheless, the latter case seems to be the most realistic. Therefore, the incompleteness of the market necessitates the adjustment of the non-oil trade balance in order to cushion movements in the oil trade balance. Such an adjustment implies a modification of the terms of trade by an appreciation or a depreciation of the real exchange rate (Cashin et al., 2004; Kilian, 2009; 2014). By analyzing Gulf Cooperation Council (GCC) member countries, Nasir et al., (2019) use a structural Vector auto-regression (SVAR) model for the period 1980–2016 to estimate the influence of oil price shocks on the macroeconomy. The results found that there are positive effects of oil price shocks on the GDP, inflation and trade balance of those countries; they also asserted the intensity of the impact of oil shocks on the general price, which implies that the monetary policies adopted by the member countries of the GCC could face several challenges to achieve price stability. In another study, the investigation evidence revealed by Balli et al., (2021) investigate the effects of oil supply and demand shocks on the current account balances of China and Russia using a time-varying parameter vector autoregression (TVP-VAR) model with stochastic volatility for the period 1993Q1-2018Q3. Also, using the VAR approach for the Azerbaijan economy from 2006 to 2018, Yildirim and Arifli (2021) report that negative oil price shocks exert the recessionary and inflationary effects. Besides, the results of estimating imply that the oil price-led devaluation shapes the inflationary and recessionary consequences of this shock.

Considering the role of foreign exchange reserves as an adjustment factor, Habib et al., (2016) show that although the exchange rates of oil exporters do not systematically appreciate relative to those of oil importers after real oil price shocks, oil exporters experience significant appreciation pressures following an oil demand shock to compensate for this. Countries thus accumulate foreign exchange reserves.

Using structural vector autoregression models (SVAR), Ozcelebi (2019) considers that the improvement in the current account balance will reduce the pressure on the foreign exchange market (EMP), while the deterioration in the current account balance may create the potential for a more severe

speculative attack in Iceland and Poland, due to the high debt to GDP ratio.

The idea that external shocks are important for MENA countries goes back to the empirical studies of Bouri (2015). Nevertheless, external shocks, whether macroeconomic, such as global interest rates, or sudden stops in capital flows, can have an extremely strong impact on the current account balance. From a theoretical point of view, the answer to this question has remained ambiguous. However, Mundell's (1962) model predicts that in the context of a floating exchange rate regime, an expansionary U.S. monetary shock causes a downward trend in foreign output. This is due to the "expenditure switching effect". Based on this theory, a U.S. interest rate shock produces a devaluation of the U.S. currency. Therefore, since prices are assumed to be sticky, the relative prices of U.S. goods will fall. In this case, U.S. products become more competitive in the market, which will lead to an improvement in the current account balance. On the other hand, U.S. production increases while foreign production decreases. The expansionary U.S. monetary policy thus has a beggar-thy-neighbor[2] effect. First, as for the foreign countries, imports become cheaper and the depreciation of the exchange rate causes a fall in the foreign price level. In a similar action, an expansionary shock to U.S. monetary policy may cause not only the U.S. interest rate to fall, but also the foreign (long-term real) interest rate. Second, the declining in international spillover effects of U.S. monetary policy will induce global aggregate demand, which will increase the demand for U.S. and foreign goods, which in turn will increase foreign production. This mechanism is likely to boost U.S. monetary policy because of the dominant role of the U.S. in the global economy. Intuitively, any country with a current account deficit leads more money abroad than it earns by purchasing imports, paying returns on past investments or transferring other payments such as remittances. The country needs to finance this short fall with a financial surplus by such means as selling debt and equity, bank loans, and more attractive foreign direct investment. From this perspective, domestic or external shocks can cause an abrupt halt in this external financing, leading to tighter financial conditions, reduced credit availability, increased borrowing costs, asset market declines, and currency depreciation. In addition, a sudden stop can trigger a currency crisis or a broader financial crisis with a sharp devaluation and an increase in bank collapses, and debt defaults (Mendoza et al., 2009).

3. Specification of the structural VAR model

In general, the VAR model of order p, where X is of dimension n, is written as follows:

$$X_t = A(L)X_{t-1} + \mu_t \quad (1)$$

The parameters of the reduced VAR (p) can be estimated by the Ordinary Least Squares (OLS) method, provided that the assumptions underlying the use of this estimation method are validated (normality, absence of autocorrelation, homoscedasticity). To better understand the VAR estimation model, consider a VAR of order (1) constructed with two variables "y and x" as follows (in this case, we speak of the primitive form):

$$\begin{cases} y_t = b_{10} + b_{11}x_t + b_{12}y_{t-1} + \mu_t \\ x_t = b_{20} + b_{21}y_t + b_{22}x_{t-1} + \omega_t \end{cases} \quad (2)$$

[2] In economics, a beggar-thy-neighbour policy is an economic policy through which one country attempts to remedy its economic problems by means that tend to worsen the economic problems of other countries.

With, $\mu_t \sim (0, \sigma_\mu^2); \omega_t \sim (0, \sigma_\omega^2)$

Failure to take into account the hypothesis of simultaneous effects between variables makes the VAR model an unrealistic model, i.e., devoid of an economic basis, not reflecting the economic reality, liable to bias decisions in terms of economic policy. However, the VAR model relies on assumptions to identify the equations to be estimated that have no economic basis. This is the great weakness of VAR models, which has attracted criticism until leading to the development of structural VAR models. In this case, the shocks are no longer random, their origin is identified.

To better understand the dynamics of the SVAR model, we will start from a standard VAR model (eq. 2) whose reduced form is formulated as follows:

$$Y_t = A^{-1}\theta + \sum_{i=1}^{p} A^{-1} B_i y_{t-i} + A^{-1}\mu_t \qquad (3)$$

To generalize equation (3), i.e., the reduced form, we present the following formulation:

$$Y_t = \pi + \sum_{i=1}^{p} \varphi_i y_{t-i} + e_t \qquad (4)$$

With, $\pi = A^{-1}\theta$; $\varphi_i = A^{-1}B_i$; $e_t = A^{-1}\mu_t$

Suppose the existence of a contemporary correlation relation between the variables Y_t and X_t, in this case the matrix A will be presented as follows:

$$A = \begin{pmatrix} 1 & \beta_{12} \\ \beta_{21} & 1 \end{pmatrix}$$

This matrix, with its non-zero elements β_{12} and β_{21}, reflects the correlation between errors. If we return to equation (4), we can write: $e_t = A^{-1}\mu_t, Ae = \mu$, with:

$$A_\mu^{-1} = \begin{pmatrix} y_{11} & y_{12} \\ y_{21} & y_{22} \end{pmatrix}\begin{pmatrix} \mu_t \\ \omega_t \end{pmatrix} = \begin{pmatrix} y_{11}.\mu_t & y_{12}.\omega_t \\ y_{21}.\mu_t & y_{22}.\omega_t \end{pmatrix}$$

We write $e = \int(\mu)$ as follows:

$$e_t = A^{-1}\theta = \begin{Bmatrix} e_1 = y_{11}.\mu_t + y_{12}.\omega_t \\ e_2 = y_{21}.\mu_t + y_{22}.\omega_t \end{Bmatrix} \qquad (5)$$

The equations of relation (5), obtained using matrix A, will not be identified, since we have 2 equations with 4 unknowns. To identify the SVAR model, one must find the variance-covariance matrices of the equations to be assimilated (i.e., the " " and "e" errors). The variance-covariance matrix of the errors of the primitive form "u" is given by:

$$E(\mu\mu') = \begin{bmatrix} \sigma_\mu^2 & 0 \\ 0 & \sigma_\omega^2 \end{bmatrix}$$

The variance-covariance matrix of the reduced form "e" errors is as follows:

$$\sum = E(ee') = \begin{bmatrix} \sigma_{e_1}^2 & \sigma_{e_1 e_2}^2 \\ \sigma_{e_2 e_1}^2 & \sigma_{e_2}^2 \end{bmatrix}$$

Where: $e = A^{-1}\mu$; e'=$\mu' A'^{-1}$, then $ee' = A^{-1}\mu\mu' A'^{-1}$ and $E(ee') = A^{-1}E(\mu\mu')A'^{-1} = \sum$. We replace each term $E(ee')$ by its expression, we thus obtain the following relation in matrix form:

$$\begin{pmatrix} \sigma_{e_1}^2 & \sigma_{e_1 e_2}^2 \\ \sigma_{e_2 e_1}^2 & \sigma_{e_2}^2 \end{pmatrix} = \begin{pmatrix} y_{11} & y_{12} \\ y_{21} & y_{22} \end{pmatrix}\begin{pmatrix} \sigma_\mu^2 & 0 \\ 0 & \sigma_\omega^2 \end{pmatrix}\begin{pmatrix} y_{11} & y_{12} \\ y_{21} & y_{22} \end{pmatrix} = \begin{pmatrix} y_{11}.\sigma_\mu^2 & y_{12}.\sigma_\omega^2 \\ y_{21}.\sigma_\mu^2 & y_{22}.\sigma_\omega^2 \end{pmatrix}\begin{pmatrix} y_{11} & y_{12} \\ y_{21} & y_{22} \end{pmatrix}$$

We estimate the Structural VAR model by proposing hypotheses Exogeneity. This estimate reduces the number of parameters to be estimated, thus limiting the reduction in the number of degrees of freedom and improving the efficiency of the estimate. To address this issue, we present the contribution of external shocks to the variance of domestic variables. We use the model developed by Mackowiak (2007):

$$\sum_{s=0}^{p} \begin{bmatrix} \beta_{11}(k) & \beta_{12}(k) \\ \beta_{21}(k) & \beta_{22}(k) \end{bmatrix}\begin{bmatrix} y_1(t-k) \\ y_2(t-k) \end{bmatrix} = \begin{bmatrix} \varepsilon_1(t) \\ \varepsilon_2(t) \end{bmatrix}$$

Where $\beta_{21} = 0$ for each k= 0, 1,..., p and $\varepsilon(t) = [\varepsilon_1(t); \varepsilon_2(t)]$ is a Gaussian random vector satisfying: $E[\varepsilon_{(t)}|y_{t-k}, > 0]$ and $E[\varepsilon_{(t)}, \varepsilon_{(t)}'|y_{t-k}, > 0] = I$. The variable $y_1(t-k)$ is a vector containing the set of external variables while $y_2(t-k)$ is a vector covering the domestic variables. I is the identity matrix. $\varepsilon_1(t)$ is the vector of external structural shocks and $\varepsilon_2(t)$ is the vector of domestic structural shocks. This model is estimated for each modified MENA country. The vector of external shocks includes the real price of oil, the productivity of OECD member countries, and the U.S. monetary policy shock.

3.1. Sample and control variables

We draw on a panel of 12 MENA countries (see appendix for list of countries). The data are annual, covering the period 1970-2019. We collected and constructed data on the basis of the list of potential determinants of the current account position presented in literature (Chinn and Ito, 2008; Bousnina et al., 2020). Table B1 of the Appendix display data sources of the variables employed in the study.

Table 1. Summary statistics

Variables	Mean	Std. dev	Minimum	Maximum	Kurtosis	Jarque-Bera
CA	0.053	0.022	-2.220	4.885	5.188	0.000
OIL	0.873	0.188	0.341	1.161	1.720	0.051
KA	0.248	0.635	0.031	0.551	1.003	0.013
TOT	1.029	0.122	0.885	2.167	1.220	0.001
CREDIT	0.730	0.558	0.016	0.026	0.002	0.001
GDP-OECD	0.077	0.113	0.001	1.338	1.028	0.008
GROWTH	0.047	0.088	-0.015	0.166	1.332	0.004
REER-USA	1.922	0.029	-13.621	12.362	1.0395	0.000

The GDP growth rate (GDP) and current balances (CA) are taken from the International Monetary Fund (IMF). The foreign real interest rate (REER-USA), measured as the lending interest rate of the United States adjusted by inflation. The price of oil (OIL), measured by the annual average of the price of crude oil, private sector credit as a percentage of GDP (CREDIT), the growth rate of countries OECD members (GDP-ODCE) and the balance of payments financial account as a percentage of GDP (KA). First, to investigate the statistical properties of the data, in table 1, we start by giving descriptive statistics of the main variables used in this study, the average current account balance of the total sample over the period studied is 5.3%. Of which the highest balance is in Kuwait (48.85%) for the period 1970-2019. As already mentioned, these variables are platykurtic with a Kurtosis less than 3; yet, the current account is anti-platykurtic with a Kurtosis of 5.188. In addition, the series normality hypothesis was rejected by the Jarque-Bera test. In total, this distribution rejected the normality assumption (p-value = 0.00).

3.2. Some brief stylized facts

Evidence shows that the financial and economic upheaval in the MENA region in the 1970s and -1980s tested the government's ability

to create a stable macroeconomic environment, including stable external conditions. This financial volatility was mainly due to the two oil price booms in the 1970s that led to increased economic activity in the region's oil-exporting and oil-importing countries, followed by a decline in oil prices in 1981 and elsewhere in the late 1990s. Thus, in the oil-exporting countries of MENA, the current account surplus equivalent to 14.6 percent of GDP on average in the 1970s evaporated within a few years and reached an average of 4.4 percent of GDP in the 1980s. The impact of the external trade shocks of the 1970s and 1980s on the MENA region, combined with the resistance of several countries to adjust quickly to these shocks, is well reflected in their current account balances. For most of the 1970s and 1980s, many non-oil-exporting MENA countries (such as Morocco and Tunisia) were not able to keep their current account deficits below 5 percent of GDP. On the other hand, most oil-exporting MENA countries managed to accumulate extreme current account surpluses during the same period, particularly in the 1970s (see figure 1). Moreover, huge surpluses were quickly consumed, and when oil prices fell, the government was forced to make difficult and painful fiscal adjustments (Krueger, 2006). Ultimately, these different developments in the current account dynamics of the two subgroups of MENA countries contribute to a balanced external position for the MENA region as a whole. For those MENA countries that have attracted capital, the first half of the 1990s was characterized by increased volatility in external payments, as reflected in the share of the current account deficit in total GDP in the 1990s (on average 2.6 percent of GDP).

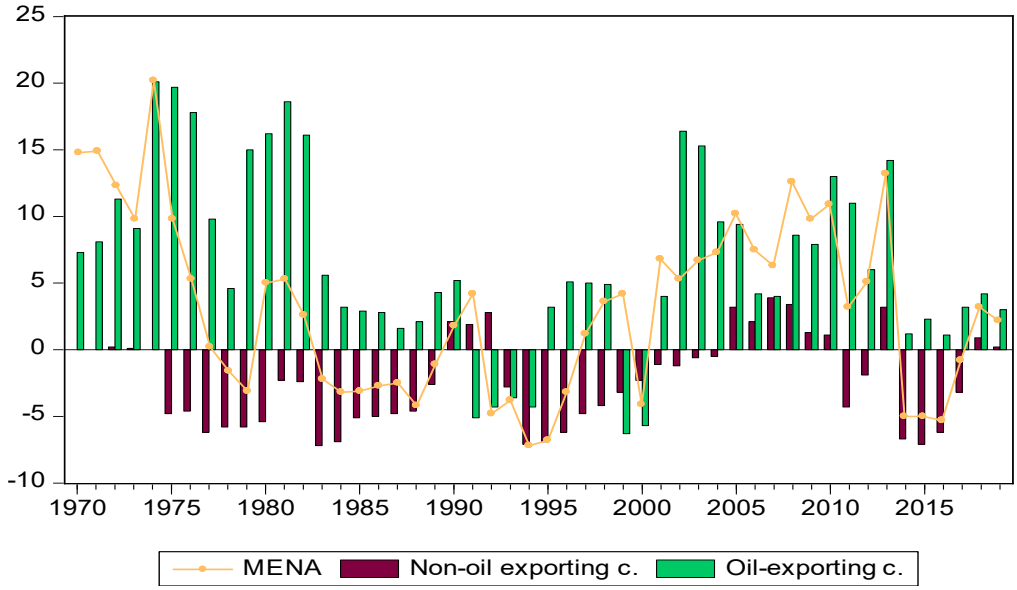


Figure 1. Average current account balances (CA) in the MENA region

Debt restructuring in some countries has reduced interest payments on debt and helped control current account deficits. In extreme cases, Egypt and the Islamic Republic of Iran have recorded structural current account surpluses. Similarly, oil-exporting countries were negatively affected by the Gulf War (especially Saudi Arabia and Bahrain), which resulted in relatively small current account surpluses in these countries in the 1990s (on average 2.5 percent of GDP).

Otherwise, MENA countries experienced an economic slowdown starting in 2011. This decline, which concerns all groups of countries, is particularly noticeable among oil producers. The average current account balance of GCC countries, which showed a comfortable surplus of 16.5% of GDP between 2000 and 2014, turned slightly in deficit during the period 2015-2017, at 0.7% of GDP. This development could have repercussions on the financing of the current account deficits of other countries in the region (as well as on the financing needs of their public sectors) in the future. In addition, MENA has seen the most dramatic decline in current account balances in recent years. In fact, the current account of the MENA region went from a surplus of around 15% of GDP in 2010 to a deficit of more than 5% of GDP in 2015 and 2016 although a slight improvement was noted in 2019.

4. Results and discussion

The necessary condition to use the Structural VAR model is that all the underlying variables must be stationary and not co-integrated. As a first step in the empirical analysis, we investigate the time series properties of the variable us using unit root tests. The stationarity of each variable is first checked using a linear unit root test, i.e., the Augmented Dickey and Fuller (1981), the results of test indicate that all variables are stationary in first difference, whereas reemits is found to be integrated of order one, I (1) (see appendix A1). Secondly, we perform the co-integration test by applying the method proposed by Johansen (1991). Therefore, we can apply the SVAR model to study how the current account reacts to external and domestic shocks over time within the MENA region. Before estimating the SVAR model, the next step is to choose the optimal lag length of the SVAR via the vector autogressive (VAR) model. Table 2 indicates that the length of the first-order lag should be selected due to Akaike's information criterion (AIC), Schwarz's information criterion (SIC), and Hannan-Quinn's information criterion (HQ). The delay that will be retained is the one that minimizes the AIC and SC criteria.

Table 2. Summary of Lag selection

Lag	AIC	SC	HQ
0	-15.188	-11.031	-15.135
1	-15.923	-11.015	-15.638*
2	-15.536	-13.096	-15.038
3	-15.735	-13.055	-13.516
4	-16.616*	-13.173*	-15.053
5	-16.001	-12.308	-13.716

We used two sets of econometric tests: first, the BDS test (Brock, Dechert, and Scheinkman, 1987) to test the non-linearity of the series; second, we performed the Kapetanios (2005) unit root test to check the relevance of the variables used. While the first test (BDS) detects the independent and identically distributed hypothesis (i.i.d.) of the time series studied, the Kapetanios (2005) unit root test allows for a wide variety of breaks and other types of nonlinearity. Table 3 presents the results of the BDS test for all the variables studied. The results provided strongly suggest that all variables for different dimensions of integration (m) reject the null hypothesis at the 1% level of significance involving series nonlinearity by inference.

Table 3. The BDS test results

m	CA P=1	KA P=1	OIL P=1	TOT P=1	CREDIT P=1	GDP-OECD P=1	GROWTH P=1	REER-USA P=1
2	33.263	44.264	42.355	64.269	33.269	44.326	22.261	34.562
3	21.362	36.379	72.365	66.329	21.397	11.295	24.318	23.843
4	39.26	22.161	51.239	69.296	22.843	11.329	33.594	12.596
P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: p represents the multiple of the standard error to use for the closeness threshold; m represents the embedding dimension.

The results of the unit root test by Kapetanios (2005) presented in Table 4 identify significant structural breaks in almost all the countries studied. Notably, although the temporal coverage of the data is the same for all countries, in most cases the specific dates of structural disruptions differ between oil exporting and importing countries, reflecting the extent to which the effects of changing conditions oil prices and the mechanisms by which these effects occur vary across countries and over time.

Nevertheless, there are also instances where the two subgroups have been subjected to common shocks and, therefore, common structural disruptions. For example, dates of disruption in oil production and in growth rates in oil-exporting countries are detected in the early 1973s reflecting the impact of the oil shock of that time which occurred in the United States. Which, as a major supplier of oil, has strongly affected both world oil production and oil prices and, as a result, has influenced the current account balances and overall economies not only of exporting but also oil-importing countries.

Table 4. Kapetanios unit root tests with structural breaks

variables	In level		First Difference	
	t-statistic	Breaking Dates	t-statistic	Breaking Dates
ALGERIA				
GROWTH	-3.689	1973, 2008, 2015	-7.689***	1973,2007,2016
OIL	-1.017	1973, 2008, 2013	-10.017***	1973,2009,2016
CREDIT	-2.673	1980,2008,2012	-29.673***	1981,2009
REER-USA	-1.533	1980,1997,2002,2008	-10.533***	1981,1998, 2003,2009
GDP-ODCE	-1.850	2008	-10.850***	2009
KA	-1.993	2002,2008	-10.993***	2003,2009
TOT	-1.625	2008	-11.223***	2009,2010
SAUDI ARABIA				
GROWTH	-1.229	1973,1981,2010,2013	-6.119***	1973,1980,2009,2016
OIL	-1.226	1973,1979,2008,2013	-12.017***	1973,1980,2009,2015
CREDIT	-2.215	1980,2002,2008	-11.683***	1982,2003,2009

variables	In level		First Difference	
	t-statistic	Breaking Dates	t-statistic	Breaking Dates
REER-USA	-3.523	1980,1997,2002,2008	-13.662***	1980,1997, 2002,2009
GDP-ODCE	-2.883	2008	-9.880***	2009
KA	-1.220	2002,2008	-8.933***	2003,2009
TOT	-1.022	2001	-9.155***	2002,2005
		BAHRAIN		
GROWTH	-2.332	1973,1981,2009,2015	-5.622***	1973,1980,2010,2016
OIL	-3.153	1973,1979,2008,2013	-8.022***	1973,1980,2009,2015
CREDIT	-2.003	1981,2008	-9.223***	1982,2008
REER-USA	-1.559	1981,1997,2002,2008	-11.883***	1982,1998, 2003,2009
GDP-ODCE	-3.336	2008	-19.899***	2009
KA	-2.266	2002,2008	-9.851***	2003,2009
TOT	-2.389	1982,2002	-10.623	1977,1980,2002
		UAE		
GROWTH	-2.338	1973,1981,2010,2013	-6.119***	1975,1980,2009,2016
OIL	-3.558	1973,1979,2008,2016	-8.552***	1973,1981,2009,2017
CREDIT	-1.220	1980,1997,2002,2008	-19.553***	1982,2003,2009
REER-USA	-3.332	1980,1997, 2002,2008	-11.511***	1981,1998, 2003,2009
GDP-ODCE	-1.227	2008	-9.820***	2009
KA	-2.006	2008,2013	-11.913***	2009,2015
TOT	-1.225	2008	-11.266***	2010,2016
		EGYPT.		
GROWTH	-3.119	1973,1981,2010,2013	-10.889***	1975,1980,2009,2016
OIL	-5.326	1973,1979,2008,2013	-11.817***	1973,1981,2009,2013
CREDIT	-2.332	1981,2008	-21.883***	1982,2009
REER-USA	-3.266	1980,1997, 2002,2008	-11.223***	1981,1998, 2003,2009
GDP-ODCE	-1.233	2008	-11.220***	2009
KA	-1.330	2008,2013	-12.113***	2009,2015
TOT	-2.166	2001,2013	-13.256	2010,2016
		IRAN		
GROWTH	-7.686	1973,1988,2013,2016	-7.689***	1976,1989,2015,2017
OIL	-1.001	1973,1979,2008,2016	-10.017***	1973,1981,2009,1980,
CREDIT	-2.673	1980,1997,2002,2008	-29.673***	1982,2003,2009
REER-USA	-1.513	1980,1997, 2002,2008	-10.533***	1981,1998, 2003,2009
GDP-ODCE	-1.150	2008	-10.850***	2009

variables	In level		First Difference	
	t-statistic	Breaking Dates	t-statistic	Breaking Dates
KA	-1.983	2016	-10.993***	1988,2009,2017
TOT	-1.266	2007	-12.228***	2010,2012
		KUWAIT		
GROWTH	-1.889	1973,1981,2013,2016	-8.996***	1975,1980,2009,2016
OIL	-1.817	1973,1979,2007,2013	-9.557***	1973,1981,2009,2015
CREDIT	-2.873	2002,2008	-9.223***	2003,2009
REER-USA	-1.332	1980,1997, 2002,2008	-11.233***	1981,1998, 2003,2009
GDP-ODCE	-1.220	2008	-12.150***	2009
KA	-1.888	2016	-13.193***	2016
TOT	-1.288	2008	-13.266***	2017
		JORDAN		
GROWTH	-2.689	1973,1981,2010,2015	-7.689***	1975,1980,2009,2016
OIL	-0.017	1973,1979,2008,2013	-10.017***	1973,1981,2009
CREDIT	-2.673	2008	-29.673***	2009
REER-USA	-1.533	1980,1997, 2002,2008	-10.533***	1980,1997, 2002,2008
GDP-ODCE	-1.850	2008	-10.850***	2009
KA	-1.993	2008	-10.993***	2009
TOT	-1.238	2002,2017	-11.216***	2010,2017
		MOROCCO		
GROWTH	-1.689	1973,1981,2010	-7.229***	1975,1982
OIL	-1.012	1973,1979,2008,2013	-10.017***	1973,1981,2009,2015
CREDIT	-2.673	2008	-9.673***	2009
REER-USA	-1.533	1980,1997, 2002,2008	-13.533***	1980,1997, 2002,2008
GDP-ODCE	-1.850	2008	-11.850***	2009
KA	-1.993	2008	-12.993***	2009
TOT	-1.278	2007	-13.218	2011,2017
		QATAR		
GROWTH	-1.689	1973,1981,2010,2016	-22.689***	1975,1980,2009,2017
OIL	-1.017	1973,1979,2008,2013	-10.017***	1980,1981, 2002,2008
CREDIT	-2.673	2008	-29.683***	2009
REER-USA	-1.533	1980,1997, 2002,2008	-22.533***	1980,1997, 2002,2008
GDP-ODCE	-1.850	2008	-10.850***	2008
KA	-1.993	2008,2013	-23.993***	2009,2015
TOT	-2.155	2007,2013	-13.326***	2011,2016

variables	In level		First Difference	
	t-statistic	Breaking Dates	t-statistic	Breaking Dates
		TUNISIA		
GROWTH	-2.689	1973,1986,2011,2019	-11.689***	1975,1987,2012,2015
OIL	-1.017	1973,1979,2008,2013	-12.017***	1973,1981,2009
CREDIT	-2.673	2008	-11.113***	2009
REER-USA	-1.533	1980,1997, 2002,2008	-10.223***	1980,1997, ,2009
GDP-ODCE	-2.850	2008	-10.850***	2008
KA	-2.993	2008,2011	-10.223***	2009,2012
TOT	-1.266	2010,2015	-13.263***	2017
		TURKEY		
GROWTH	-2.689	1975,1981,2010,2018	-7.611***	1976,1980,2009,2016
OIL	-1.017	1973,1979,2008,2013	-10.117***	1973,1981
CREDIT	-2.673	2008	-19.673***	2009
REER-USA	-1.533	1997, 2002,2008	-18.573***	1998, 2002,2008
GDP-ODCE	-1.850	2008	-12.810***	2009
KA	-1.993	2008,2013	-13.923***	2009,2015
TOT	-1.283	2006,2012	-23.625	2001,2013

Notes: *, ** and *** indicate significance at the 10, 5 and 1% levels, respectively.

Since, according to the Oil and Gas Journal (2009) report, the MENA region alone accounted for around 60% of global oil production, it is no surprise that the fourth disruption in global oil production, triggered by a sharp drop in production from Saudi Arabia, coincided with the 2013 breaking points of the real oil price and the current account balance of exporting countries. Overall, the importance of structural breakpoints in the time series of the two subgroups supports the perspective that the use of linear methodologies may be inappropriate for quantifying the impact of oil shocks on current account balances over time. In order to infer the general relationship between the current account and macroeconomic indicators, we first estimate a Structural VAR model using a sample from the MENA region as a reference case.

4.1. The effects of domestic shocks on the current account

The impulse response function plays a role in representing the effects of a one-time shock. Therefore, after estimating the long-run SVAR model, we compute the impulse response function (IRFs). The transmission channels of the current balance were evolved using the impulse response functions. The three channels are identified from figure (2) to (4). The first channel we identify in our analysis is credit channel and the results confirm our initial expectations. The results show that, notably, financial cycles do have strong implications for macroeconomic

imbalances and constitute an important driver of business cycles, as expected. Indirectly, financial shocks always affect the current account via pass-through effects, as financial overheating stimulates aggregate demand, which in turn results in increased imports and hence a deterioration in the current account. The diagram in figure (2) indicates that the current account balance responds negatively to a positive innovation of credit. Overall, the results indicate that a shock of credit result in deterioration in current account balance. The second channel we consider is the capital flow channel as in figure (3). Indeed, the current account balance deteriorates in response to a shock of capital flows, especially in the non-oil exporting MENA countries.

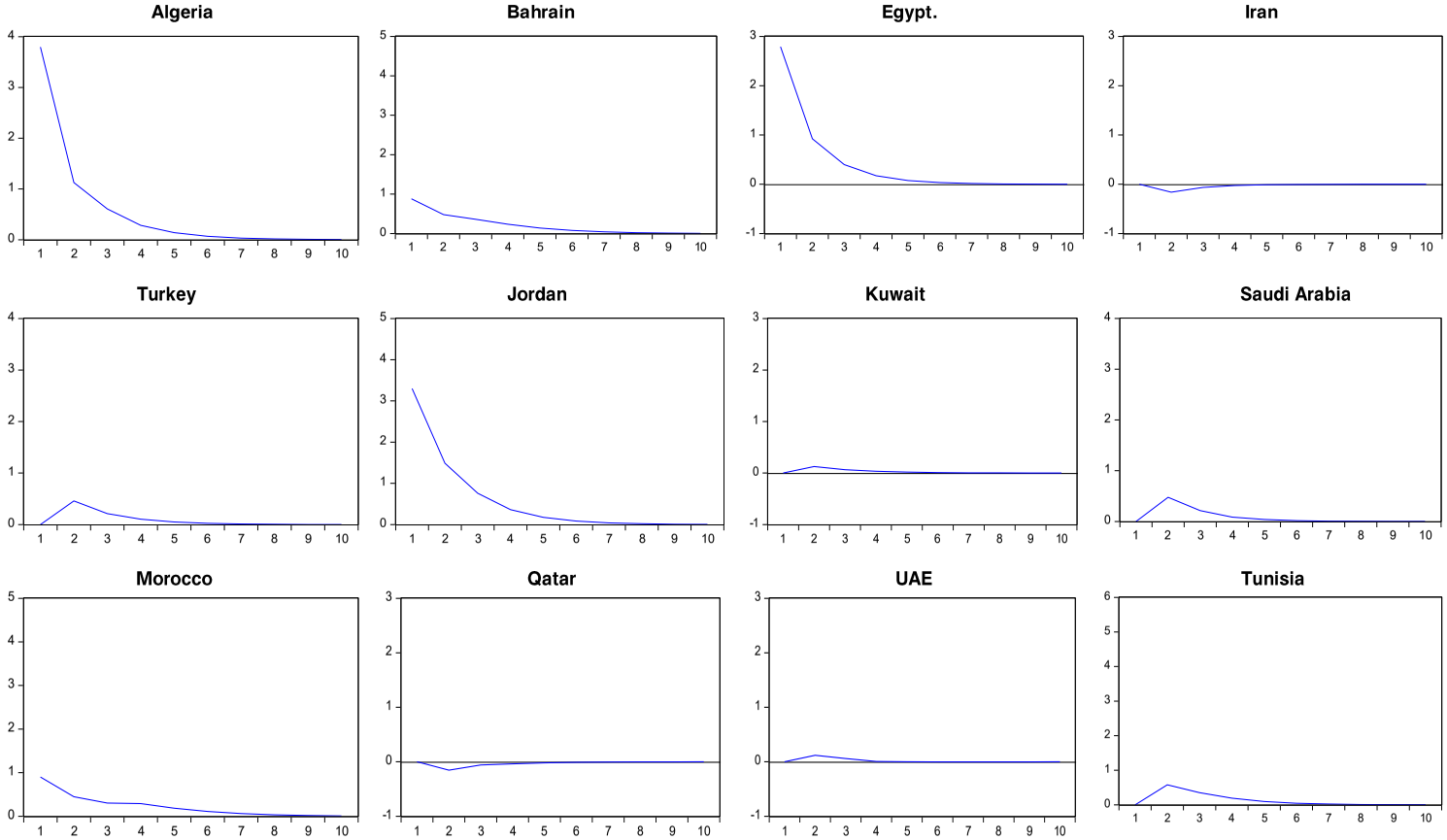
The response to financial cycle innovations is also rapid, peaking in the first year, and persistent, taking around four years to gradually disappear in the case of the output gap. In general, capital flows to the MENA region have traditionally been low. The net inflow of FDI during the period 1971 to 1999 does not exceed 1% of GDP per year, which can be explained by the absence of economic reforms and flaws in the institutional environment (Aysan et al., 2005). However, one of the main consequences of this moderate-scale private capital flow is that the region is less affected by the high volatility and the ensuing monetary and financial crises.

The third channel that we identify in our analysis is the productivity channel and the results confirm our initial expectations. In response to a productivity shock, the current account appreciates for all countries. An increase in the growth rate of domestic production (GDP) is expected to widen the current account deficit. Nevertheless, the empirical result is contradictory with theoretical expectations for the countries studied, according to which economic growth leads to an acceleration in demand for foreign goods and services and consequently deteriorates the current account (Gandolfo, 2004; Suresh and Tiwari, 2014).

4.2. The effects of external shocks on the current account balance

Regarding the impact of an oil shock (Figure 5), we find a traditional model of impulse response functions. The current account balances of all oil-producing countries (Algeria, Bahrain, Egypt, Iran, Kuwait, Qatar, Saudi Arabia and United Arab Emirates) react negatively or weakly to the shock. Though, the current account balances of non-oil-exporting countries (Tunisia, Jordan, and Morocco), which are vulnerable to fluctuations in oil prices, are deteriorating.

Figure 2. Impulse response functions of Current account to credit channel



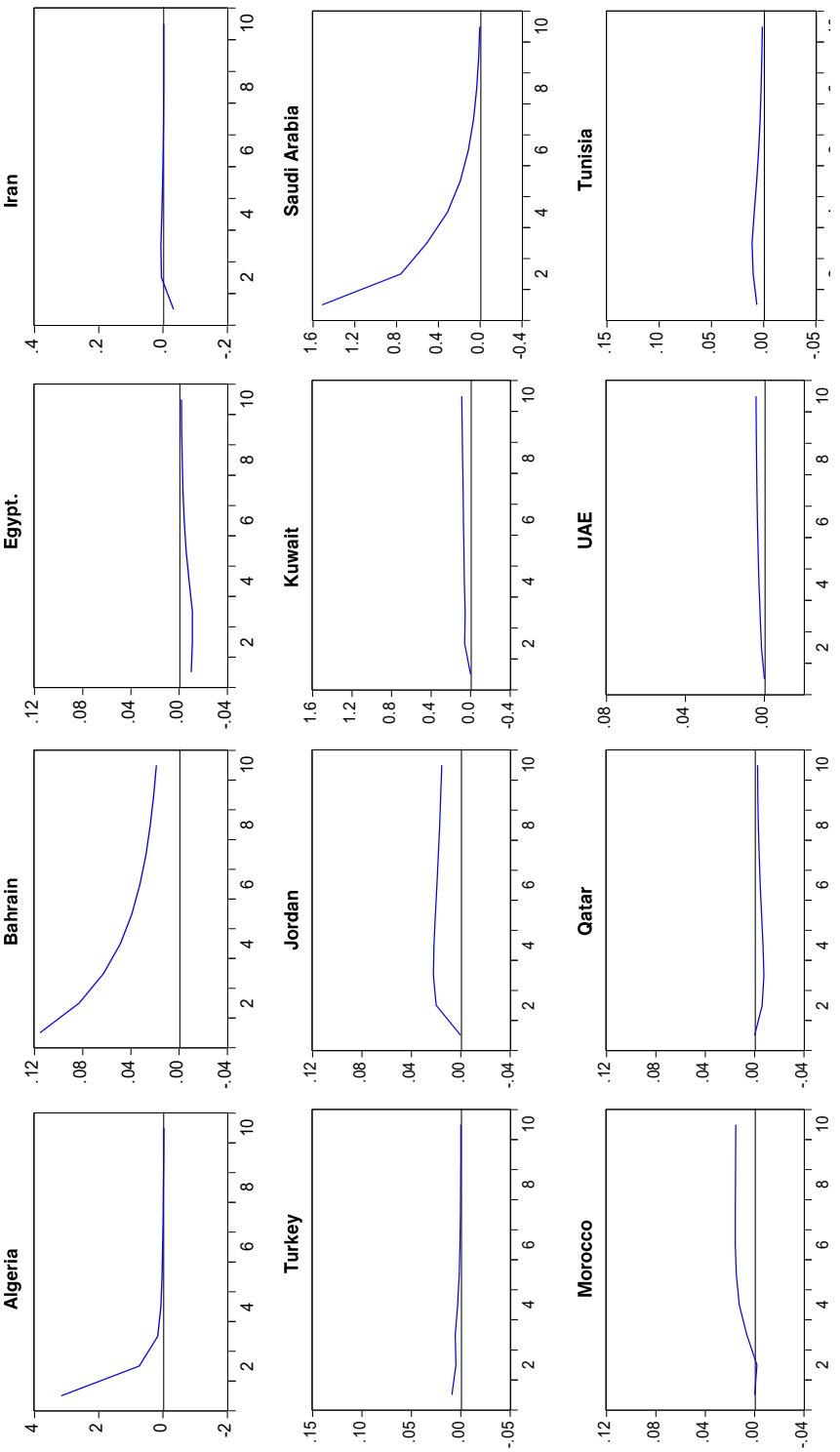
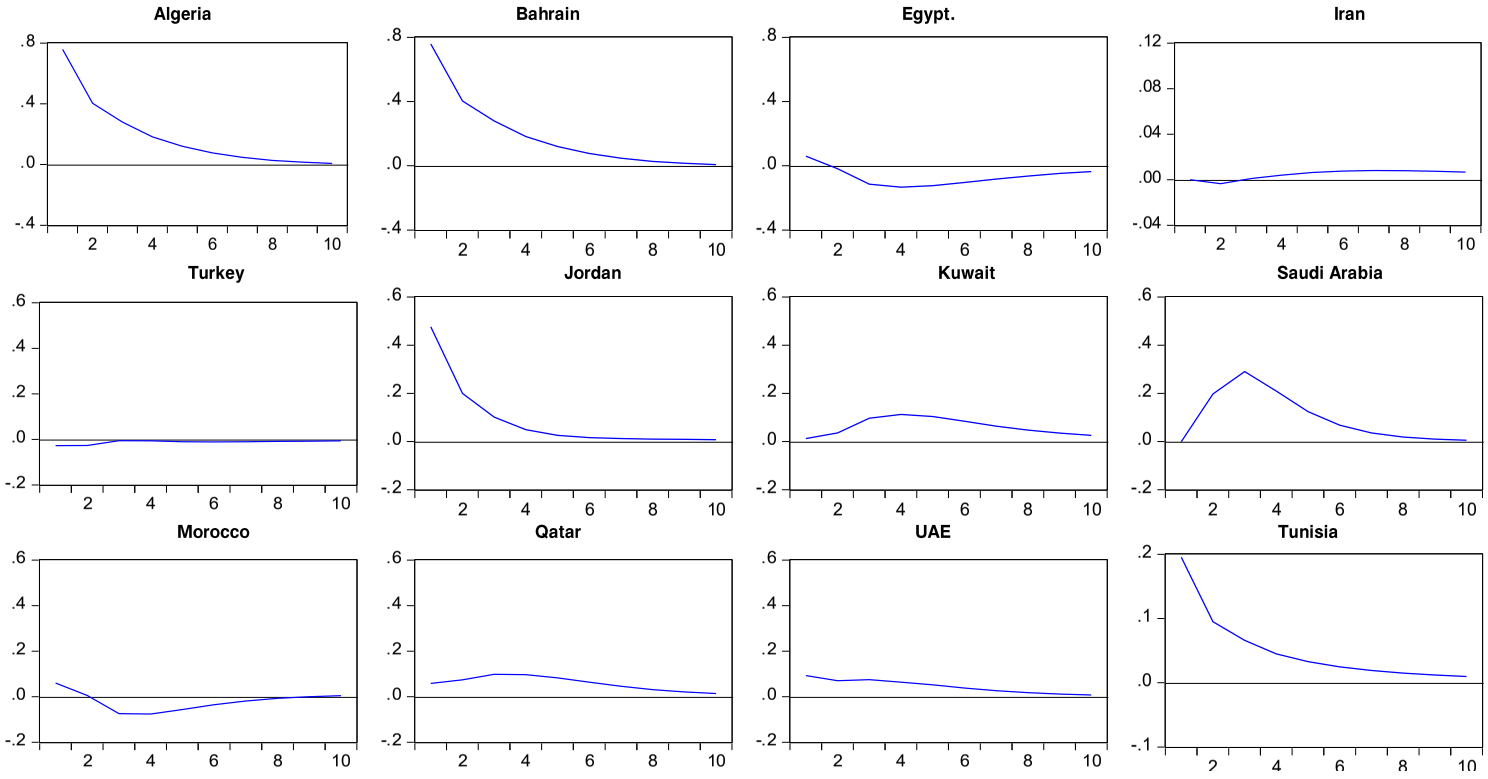


Figure 3. Impulse response functions of Current account to capital channel

Figure 4. Impulse response functions of Current account to growth channel



In fact, for hydrocarbon producing countries, an increase in the price of oil leads to an increase in their exports. Note that in terms of growth, Saudi Arabia, the United Arab Emirates and Kuwait benefit rather better from the oil shock than the rest of the region. There is ample evidence in the literature on contemporary current account responses of oil-exporting countries to an oil shock via a positive impact on the terms of trade (Cashin et al., 2004; Balcilar and Bagzibagli, 2010; Saha, 2022). For example, the period following the crisis of the invasion of Kuwait in 1990, the war in Afghanistan in 2001 and the war in Turkey in 2002-03 are episodes characterized by sharp spikes in oil prices and are also those that have led to significant fluctuations in current account balances. This result is even more relevant for the episodes of 1990 and 2002-2003, where the empirical literature found alarming evidence of speculative demand for oil (Kilian, 2013). Hence, the most interesting episode in the oil market of the last decades is of course the unprecedented fluctuation in prices during the recession of 2007-2009. This price increase was the consequence of speculative market behavior, the so-called financialization of oil futures markets, and could not be explained by changes in fundamentals (Fattouh et al., 2012). The correlation of responses to an oil price shock (Appendix B9 and Figure 5) is significant and positive for all countries except Saudi Arabia and Kuwait. This result appears to be in line with our expectations, including for these two countries, which are oil producers. Indeed, apart from Saudi Arabia and Kuwait, the countries of the Middle East have a fairly strong oil dependency.

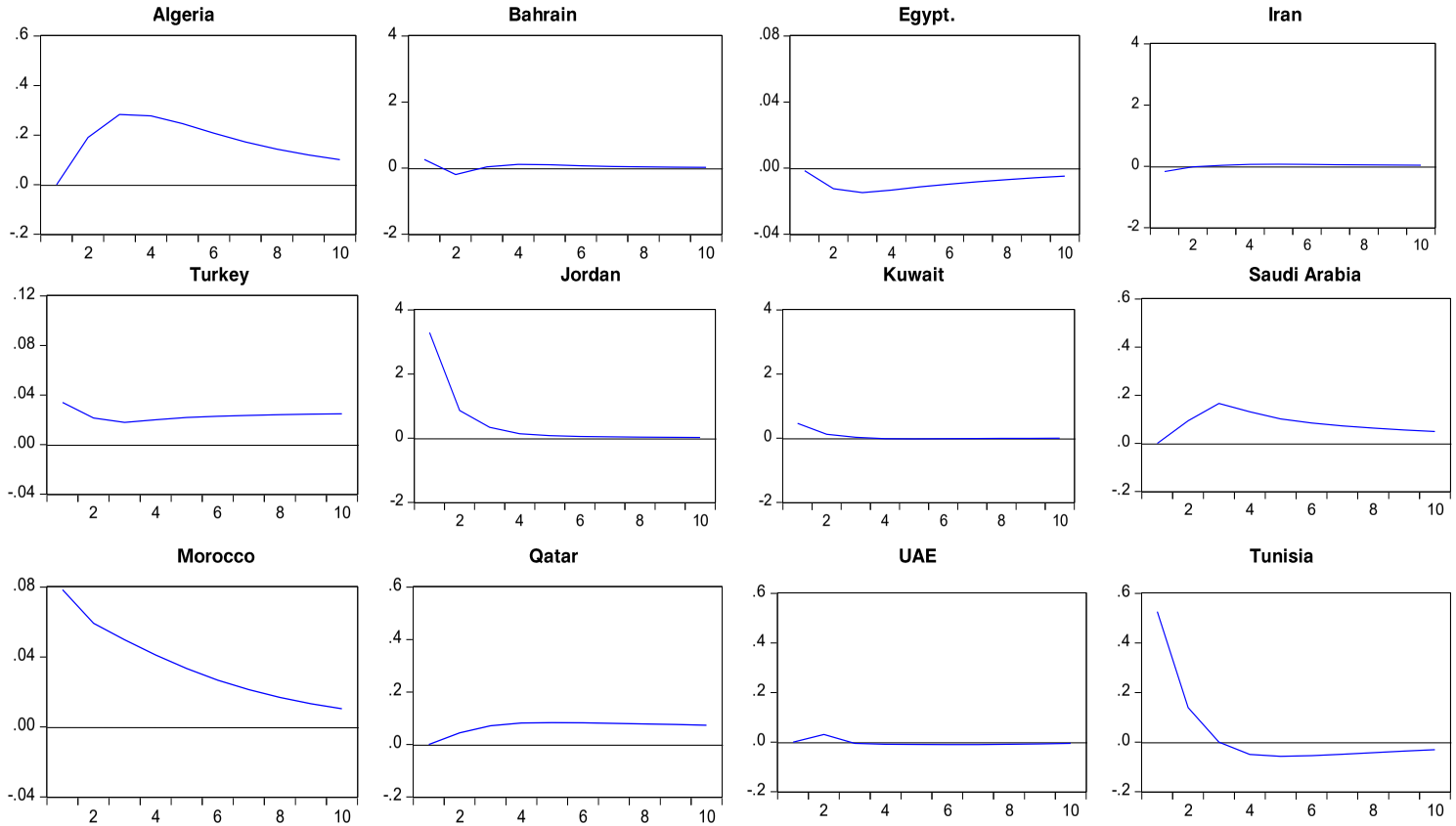
The resumption of economic growth in OECD countries leads to an increase in the current account surplus of MENA oil-exporting and non-exporting countries (Figure 6). This can be explained both by an increase in export demand from MENA countries and by an increase in capital flows between developed countries to the detriment of flows to MENA countries. Indeed, the results are consistent with the previous conclusions of Milesi-Ferretti and Razin (1996) and Calderon et al. (2001). All the countries in our sample are in the same configuration as the modified MENA region.

Finally, following the impact of the U.S. interest rate shock, responses to a U.S. interest rate shock, the findings are more interesting. The results show that there is a negative effect on the current account of almost all countries. When the U.S. Federal Reserve decides to raise its benchmark rate (Fed Funds), the MENA region suffers more from the impact of the slowdown in the U.S. economy. This result is not consistent with the argument that net creditor countries, like most MENA countries, increase their supply of financial capital in response to an increase in interest rates. Indeed, the correlation is significant and negative for all countries except Saudi Arabia, Kuwait and Bahrain (Appendix B11 and Figure 7). As expected, despite their membership in oil-producing countries, Egypt and Turkey are in a current account deficit. Thus, the reaction of the current account balances of these countries is opposite to that of the countries with a current account surplus. Turkey and Egypt face a currency crisis following a hike in the U.S. interest rate.

4.3. Analysis of the contributions of external shocks

Variance decomposition explains the contributions of each shock to the behavior of a particular variable in the SVAR model. The results of the contribution of external shocks to the variance of domestic variables are presented in Table 5 for MENA countries. Specifically, the approach is based on the study of the interactions between external shocks and the main variables. In the long run, external shocks explain one-third of the variance of the term of trade of all member countries.

Figure 5. Impulse response functions of current account to oil shock



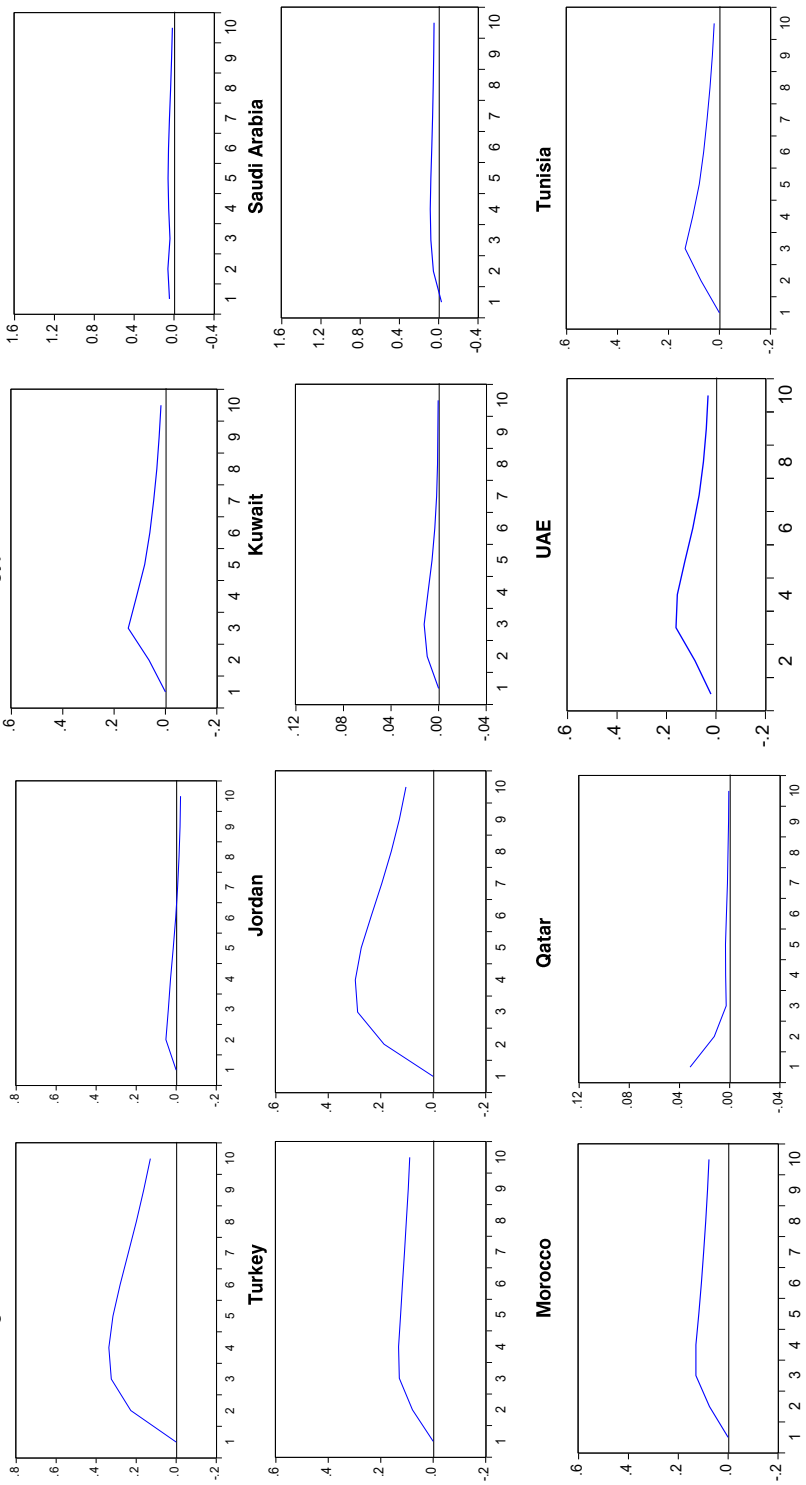
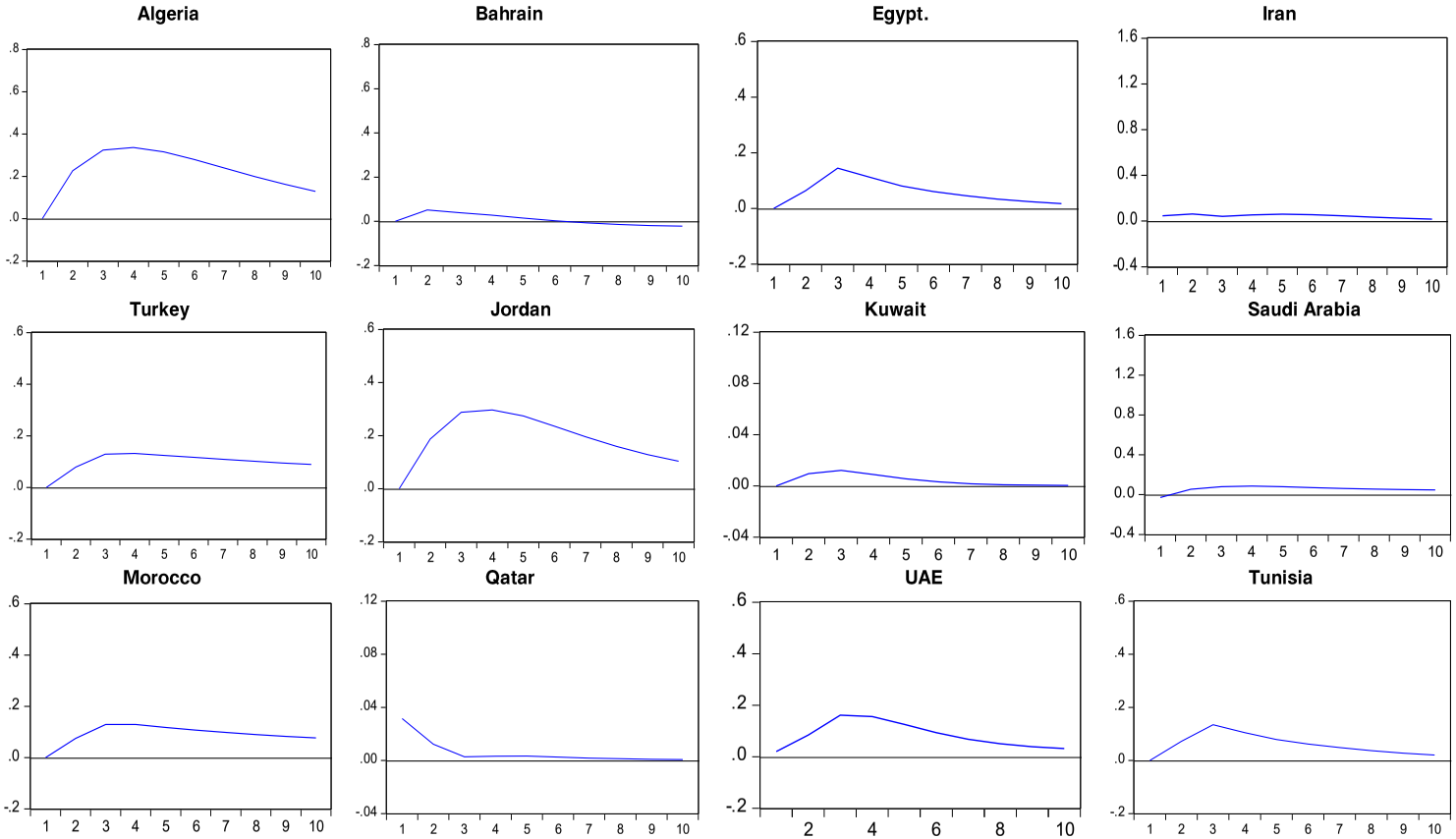


Figure 6. Impulse response functions of current account to productivity shock

Figure 7. Impulse response functions of current account to productivity shock



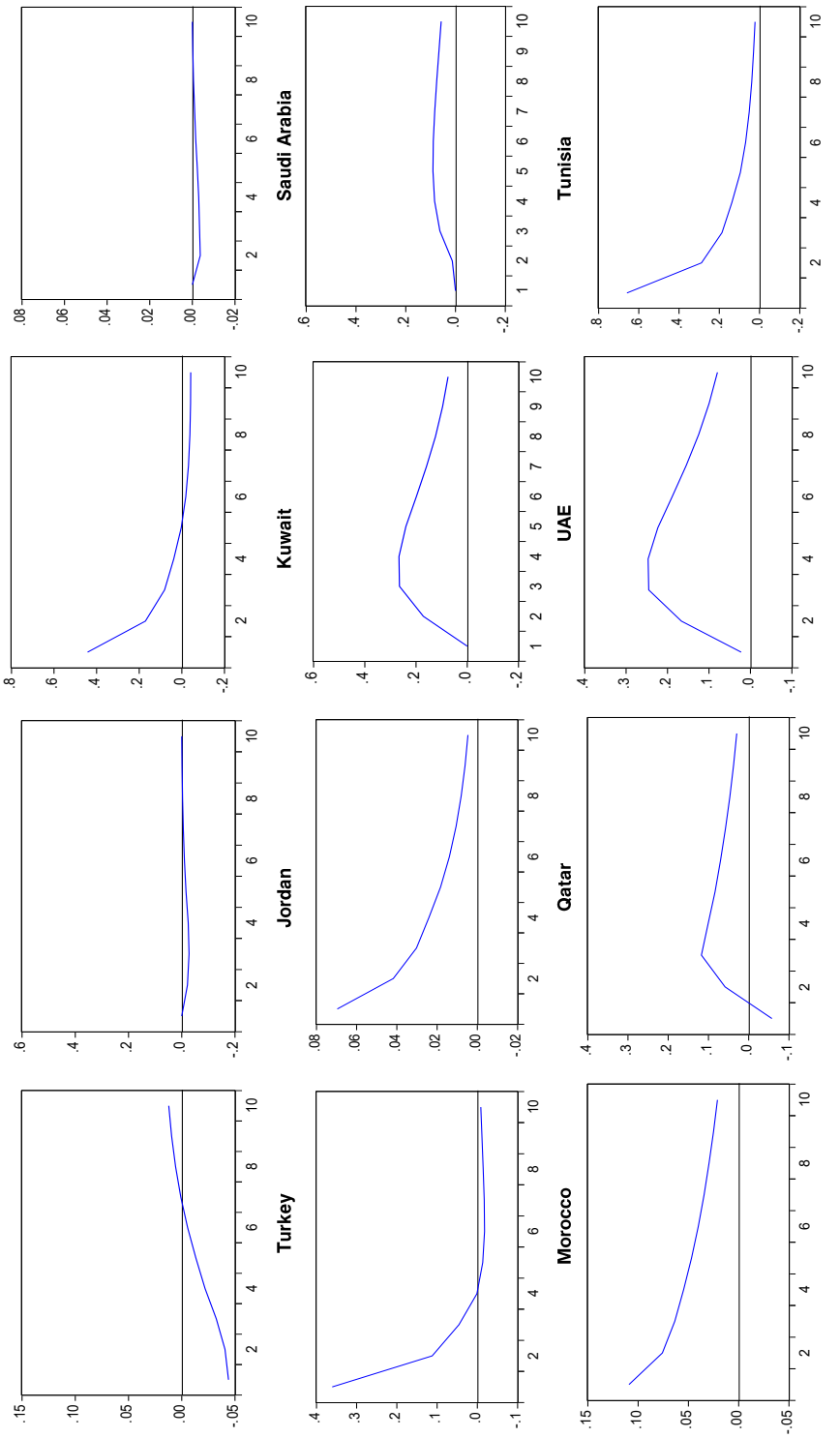


Figure 8. Impulse response functions of current account to monetary shock

Table 5. Contribution of external shocks to the variance of domestic variables

Variables	Source of disturbance	Horizon	Algeria	Bahrain	Egypt.	Iran	Turkey	Jordan	Kuwait	Saudi Arabia	Morocco	Qatar	UAE	Tunisia	MENA
CA	Shock 1	1-3	5	1	2	12	11	8	12	13	2	9	10	15	20
		5-10	1	3	3	1	3	3	10	9	0	8	5	10	28
	Shock 2	1-3	3	6	5	5	2	2	3	5	1	3	2	9	18
		5-10	3	3	6	3	3	2	5	2	1	1	1	7	11
	Shock 3	1-3	10	1	20	20	10	1	1	0	0	0	8	2	9
		5-10	7	2	9	17	8	0	0	1	0	1	7	1	8
	Sum of external shocks	1-3	**19**	**8**	**27**	**37**	**23**	**11**	**16**	**19**	**3**	**13**	**20**	**26**	**37**
		5-10	**11**	**9**	**19**	**25**	**15**	**5**	**15**	**12**	**1**	**10**	**13**	**18**	**31**
TOT	Shock 1	1-3	6	1	3	13	11	8	3	1	3	9	12	16	19
		5-10	3	3	3	1	3	3	2	2	2	8	6	12	11
	Shock 2	1-3	3	6	16	6	13	3	3	6	1	3	3	9	9
		5-10	9	3	6	3	3	13	6	3	1	1	1	7	22
	Shock 3	1-3	12	1	17	11	12	1	1	2	2	2	8	3	7
		5-10	7	3	9	12	8	2	2	1	10	1	7	1	6
	Sum of external shocks	1-3	**22**	**8**	**36**	**30**	**35**	**12**	**8**	**9**	**6**	**15**	**23**	**30**	**31**
		5-10	**19**	**10**	**19**	**17**	**15**	**18**	**10**	**6**	**15**	**10**	**13**	**20**	**28**
GROWTH	Shock 1	1-3	8	11	2	10	9	18	13	11	9	8	11	11	22
		5-10	11	13	3	11	13	9	7	8	7	7	9	7	11
	Shock 2	1-3	2	0	5	8	12	5	3	3	6	3	3	8	9
		5-10	3	3	6	13	0	7	2	1	0	0	3	7	11
	Shock 3	1-3	10	9	20	0	11	1	0	0	2	3	0	2	17
		5-10	2	12	9	7	9	0	0	3	3	2	1	3	9
	Sum of external shocks	1-3	**20**	**20**	**27**	**18**	**32**	**23**	**16**	**15**	**17**	**15**	**15**	**21**	**38**
		5-10	**17**	**29**	**19**	**32**	**23**	**16**	**13**	**12**	**10**	**9**	**13**	**17**	**31**

Notes: growth, TOT and ca correspond, respectively, to the growth rate, to the terms of trade and to the current account in Shock 1, shock 2, and shock 3 correspond, respectively, to the oil price shock, to the shock monetary policy in the United States, and the productivity shock.

Indeed, Table 5 shows the contribution of external shock results, which specify the magnitude and the degree of the shocks' impact viewed in one variable on the detected fluctuations of the other variables. In contrast, they explain only one-third of the variance in the current account and growth rate, with an oil shock explaining the largest share of the fluctuations. A shock to U.S. monetary policy is the main source of terms-of-trade fluctuations in Egypt and Turkey. It also contributes strongly to the terms of trade fluctuations in the MENA region almost entirely. The contributions of external shocks to the variance of domestic variables are very heterogeneous in the MENA region. In Saudi Arabia and Kuwait, external shocks contribute less than 15% of the variance of the current account, while this share reaches 30% in Iran. On average, for the other countries, the share is between 15 and 25%. On the other hand, external shocks help explain a large share of the variance in the terms of trade, except for Saudi Arabia, Bahrain and Kuwait. Finally, external shocks explain, on average, between 20% and 30% of the variance in the growth rate, except for Morocco and Qatar, where this contribution is around 10%.**Conclusion**

The principal aim of this paper is to investigate empirically the consequences of current account imbalances in the MENA region. In this article, we address the effect of both domestic and external shocks on the current account balance, based on the Structural VAR methodology for the period 1970-2019. In terms of domestic shocks, our results from the impulse response analysis suggest that all three channels have a significant impact on the current account.

The results of the present paper suggest that external shocks should play an important role in models of MENA countries. In fact, the first empirical result concerns a monetary shock in the United States. An interest rate shock has a negative impact on the current account of almost all countries. When the U.S. Federal Reserve decides to raise its benchmark rate, the MENA region suffers more from the consequences of the U.S. slowdown than the rest of the world. The second result is that for oil-producing countries, an increase in the oil price leads to an increase in their exports and, consequently, an improvement in their current account balances. On the other hand, the impact of this shock on growth and on the terms of trade is more ambiguous and very variable from one country to another. We also note that, in terms of growth, Saudi Arabia, the UAE, and Kuwait weather the oil shock rather better than the rest of the region. The third result concerns the consequences of a productivity shock, i.e., the influence of OECD countries productivity on the MENA current account balance. Indeed, the productivity shock expands the growth rate of MENA countries, which leads to an appreciation of the term of trade but also increases the current account balance.

Based on the results, we explore the following remarks: (i) the oil shock leads to a deterioration of the current account and a depreciation of the terms of trade while its impact in terms of growth is significant but more mitigated; (ii) the improvement of monetary shock in the United States has a significant impact on the current account and plays rather negatively on the terms of trade and the growth rate. Overall, the most important policy implication of this paper is that different channels would be used to control the current account deficit by economic policymakers. Moreover, domestic policies such as credit policy, identified by the credit channel, and fiscal policy, identified by

the GDP channel, are not sufficient to control capital account deficits. Capital flows should also be taken into account when designing policies for current account sustainability. In the longer term and in order to stimulate growth, the countries of the region need the right mix of policies. Admittedly, these policies may differ from country to country, but reforms are urgently needed, particularly to overcome dependence on oil production and to diversify the economies of oil exporters in the aim of strengthening the business climate and unleashing the potential of the private sector. And for other oil-importing countries, to help balance their energy balance. It is also extremely reasonable to reform the framework of economic activity to make it more competitive by applying measures to promote competition and by reducing the control of monopolies. It is equally important to streamline fiscal policies by replacing untargeted and wasteful energy subsidies with targeted cash transfers.

Finally, it would be interesting to underline that the conclusions of this study are significant for the decision-makers of the MENA countries who should put in place effective economic policies to adjust the imbalances of the current account and ensure its sustainability. We do not claim to have covered all aspects related to this topic, but some valuable aspects provide an important foundation. Future studies may extend our approach, such as enriching the analysis by incorporating other key variables of the economy to obtain a ternary SVAR, as has been done by other authors discussed in Aucremanne and Wounter (1999). Therefore, our specification in the Structural VAR model might be unable to capture all types of exogenous factors. Future research should address these issues to fully explain the fluctuation of the current account balance within the region.

Funding: This study received no specific financial support.

Acknowledgement: All authors contributed equally to the conception and design of the study. The authors would like to express gratitude to the editor and anonymous referees for their insightful comments and suggestions which were useful in improving the quality of this paper. Any remaining errors are ours.

Conflict of Interest: On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

Adarov, A. (2021). Dynamic interactions between financial cycles, business cycles and macroeconomic imbalances: A panel VAR analysis. International Review of Economics and Finance, 74:424–451.

Agmon, T, and Arthur B. L. (1978). Trade, payments and adjustment: the case of the oil price rise. Kyklos 21 (1): 68-85.

Allegret, J. P., & Benkhodja, M. T. (2011). External shocks and monetary policy in a small open oil exporting economy. University of Paris West-Nanterre la Défense, EconomiX Working Papers, 39.

Arezki, R, and Hasanov. F. (2012). Global Imbalances and Petrodollars. The World Economy 26 (2): 212-22.

Aucremanne L. et Wounter R. (1999), A structural VAR approach to core inflation and its relevance for monetary policy.

Aysan, A, Turhan, I, and Dolgun. H., (2013). Assessment of the Participation Banks and Their Role in Financial Inclusion in Turkey. Emerging Markets Finance and Trade 49: 99111.

Balcilar, M & Bagzibagli, K, (2010). Sources of Macroeconomic Fluctuations in MENA

Countries, MPRA Paper 44351, University Library of Munich, Germany.

Balli, E., Çatık, A. Z. Nugent, J. B. (2021). Impact variable dans le temps des chocs pétroliers sur les balances commerciales : Preuves utilisant le modèle TVP-VAR, Énergie, 217.

Baxter, M, and Crucini. M. J. (1995). Business Cycles and the Asset Structure of Foreign Trade. *International Economic Review*, 26 (4): 821-54.

Blanchard, O, and Milesi-Ferretti, M., (2009). Global Imbalances: In Midstream? International monetary fund.

Bodart, V, Candelon, B., and Carpantier. J-F. (2015). Real exchanges rates, commodity prices and structural factors in developing countries. *Journal of International Money and Finance*, 51: 264-84.

Bodenstein, M, Erceg, C, and Guerrieri, L., (2007). Oil Shocks and External Adjustment. SSRN Electronic Journal.

Borgy, V. and Mignon, V. (2009). Taux d'intérêt et marchés boursiers : une analyse empirique de l'intégration financière internationale. Économie & prévision, 187, 105-121.

Bouri, E. (2015). Oil volatility shocks and the stock markets of oil-importing MENA economies: A tale from the financial crisis, *Energy Economics*, 51: 590-598.

Bousnina, R, Redzepagic, S and Gabsi. F.B., (2020). Sustainability of current account balances in MENA countries: threshold cointegration approach. Economic Change and Restructuring.

Bruno, M, and Sachs. J., (1982). Energy and Resource Allocation: A Dynamic Model of the "Dutch Disease". *Review of Economic Studies*, 49: 845-59.

Calderon, C, Zanforlin, L, and Chong, A., (2001). Are African Current Account Deficits Different? Stylized Facts, Transitory Shocks, and Decomposition Analysis. International Monetary Fund, IMF Working Papers 01.

Cashin, P, Céspedes, L. F, and Sahay. R., (2004). Commodity currencies and the real exchange rate. *Journal of Development Economics* 75 (1): 229-68.

Chinn, M. D., and Ito. H. (2008). Global Current Account Imbalances: American Fiscal Policy versus East Asian Savings*. *Review of International Economics*, 16 (2): 479-98.

Dickey, D.A, Fuller, W.A., (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica* 49 (4): 1057–1072.

Edwards, S. (2006). The U.S. Current Account Deficit: Gradual Correction or Abrupt Adjustment? *Journal of Policy Modeling*, 28: 629-42.

Erceg, C, Guerrieri, L., and Gust. C., (2005). Expansionary Fiscal Shocks and the Trade Deficit. SSRN Electronic Journal.

Fattouh, B, Kilian, L, and Mahadeva. L., (2012). The Role of Speculation in Oil Markets: What Have We Learned So Far? *Energy Journal* -Cambridge Ma then Cleveland Oh.

Fratzscher, M, Juvenal, L., and Sarno, L., (2009). Asset Prices, Exchange Rates and the Current Account. SSRN Electronic Journal.

Gandolfo, G. (2004). Elements of International Economics.

Gavin, M. (1990). Structural adjustment to a terms of trade disturbance: The role of relative prices. *Journal of International Economics*, 28 (2): 217-42.

Greene, J, and Kandil, M., (2002). The Impact of Cyclical Factors on the U.S. Balance of Payments. IMF Working Paper.

Habib, M, Bützer, S, et Stracca. L., (2016). Global Exchange Rate Configurations: Do Oil Shocks Matter? IMF Economic Review, 63 (2): 332-70.

Johansen S. (1991), Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models, Econometrica.

Kilian, L, and Murphy, D., (2014). The role of inventories and speculative trading in the global market for crude oil. *Journal of Applied Econometrics*, 29 (2): 454-78.

Kilian, L. (2009). Not All Oil Price Shocks Are Alike: Disentangling Demand and Supply Shocks in the Crude Oil Market. *American Economic Review*, 99 (2): 1052-69.

Kim, H, and Lee, D., (2018). The effects of government spending shocks on the trade account balance in Korea. *International Review of Economics & Finance*, 52: 57-70.

Mankiw, G. (2014). Principles of Economics. Now in its 7th edition. Cengage Learning.

Markowiak, B. (2007). External shocks, U.S. monetary policy and macroeconomic fluctuations in emerging markets. *Journal of Monetary Economics*, 54(8), 2512–2520.

Melesse, W.E. (2020), Re-examining public debt and current account dynamics: SVAR evidence from Ethiopia, *Journal of Economic and Administrative Sciences*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JEAS-08-2020-0148

Mendoza, E, Ríos-Rull, J., and Quadrini, V., (2009). Financial Integration, Financial Development, and Global Imbalances. *Journal of Political Economy*, 117: 271-416.

Milesi-Ferretti, G. M., and Razin, A., (1996). Persistent current account deficits: a warning signal? *Int J Financ Econ*.

Mundell, R. A. 1962. Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates. *The Canadian Journal of Economics and Political Science*, 29 (4): 475-85.

Nasir, A. M., Al-Emadi, A. A., Shahbaz. M., Hammoudeh, S., (2019). Importance of oil shocks and the GCC macroeconomy: A structural VAR analysis, *Resources Policy*, 61:166-179.

Neaime, S. (2005). Financial Market Integration and Macroeconomic Volatility in the MENA Region: An Empirical Investigation, *Review of Middle East Economics and Finance*, 3: (3): 59-83.

Ozcelebi, O., (2019), Assessment of asymmetric effects on exchange market pressure: Empirical evidence from emerging countries, *The North American Journal of Economics and Finance*, 48: 498-513.

Saha, S. (2022). Asymmetric Impact of Oil Price Changes on Stock Prices: Evidence from Country and Sectoral Level Data. *J Econ Finan*

Suresh K.G. and Tiwari, A.K., (2014). A Structural VAR (SVAR) analysis of fiscal shocks on current accounts in India, *Macroeconomics and Finance in Emerging Market Economies*, 7:1, 140-153.

Yildirim, Z., Arifli, A. (2021). Chocs des prix du pétrole, taux de change et fluctuations macroéconomiques dans une petite économie exportatrice de pétrole, Énergie, 219.

Appendix A.

Country List (12 Arab countries)

Algeria (ALG), Bahrain (BAH), Egypt (EGY), Jordan (JOR), Kuwait (KWT), Morocco (MOR), Iran (IRN), Qatar (QAT), Emirate Arab Uni (UAE), Saudi Arabia (SA), Turkey (TUR), Tunisia (TUN).

Appendix B.

Appendix B1: Descriptions, definitions and sources of the used data

Variables	Sources	Notation	Comments
Current account	IMF	CA	Current account balance as a percentage of GDP
GDP growth rate	WDI	GROWTH	Real GDP growth
Terms of trade	WDI	TOT	Index, export prices / import prices
Oil prices	WTRG Economics	OIL	Annual average of crude oil prices (US)
OECD economic growth	OECD database	GDP-OECD	Average real economic growth rate of OECD members
Capital flows	WDI	KA	Balance of payments financial account as a percentage of GDP
Foreign real interest rate	Datastream	REER-USA	The Federal Reserve's key rates American
Private credit	WDI	CREDIT	Volume of domestic credit deflated by the consumer price index.

World Development Indicators (WDI); Organization for Economic Cooperation and Development (OECD); WTRG Economics

Appendix B2: ADF unit root test

	CREDIT	GROWTH	TOT	GDP-ODCE	CA	OIL	KA	REER-USA
				In level				
ALG	-1,375 (0,751)	-1,763 (0,156)	-1,177 (0,571)	-1,396 (0,752)	-1,701 (0,730)	-1,715 (0,615)	-2.332 (0,775)	-1.333 (0,135)
SA	-1,777 (0,106)	-3,111 (0,115)	-1,616 (0,175)	-2.366 (0,587)	-1,513 (0,777)	-2,655 (0,332)	-1,315 (0,152)	-1.662 (0,135)
BAH	-1,075 (0,5513)	-1,375 (0,756)	-1,375 (0,375)	-3.351 (0,667)	-1,757 (0,173)	-1.362 (0,225)	-1,896 (0,751)	-1.223 (0,215)
UAE	-1,776 (0,151)	-1,377 (0,157)	-1,570 (0,705)	-5.321 (0,337)	-1,705 (0,106)	-2.225 (0,125)	-1,771 (0,159)	-3.362 (0,225)
EGY	-1,150 (0,130)	-1,115 (0,715)	-1,601 (0,773)	-3.196 (1.265)	-1,665 (0,155)	-1,675 (0,522)	-1,511 (0,625)	-1.229 (0,555)
IRN	-1,766 (0,651)	-1,763 (0,563)	-1,365 (0,776)	-1.253 (0,599)	-1,311 (0,615)	-1,925 (0,216)	-2.321 (0,155)	-2,382 (0,665)
KWT	-1,365 (0,316)	1,316 (0,611)	-1,577 (0,771)	-2.362 (0,119)	-1,111 (0,113)	-1,662 (0,122)	-2.166 (0,112)	-1.223 (0,115)
JOR	-3,057 (0,133)	-1,367 (0,551)	-1,130 (0,115)	-1,311 (0,157)	-1,819 (0,115)	-1,852 (0,232)	-1.361 (0,881)	-2.313 (0,565)
MOR	-1,701 (0,633)	-1,031 (0,513)	-1,365 (0,571)	-1,851 (0,332)	-1,013 (0,551)	-1,992 (0,211)	-1,883 (0,125)	-1,333 (0,225)
QAT	-1,367 (0,311)	-1,331 (0,337)	-3,331 (0,575)	-1,891 (0,335)	-1,331 (0,381)	-1,737 (0,516)	-1,311 (0,789)	-1,313 (0,335)
TUN	-1,365 (0,111)	-3,115 (0,755)	-1,103 (0,777)	-1,278 (0,352)	-1,357 (0,115)	-1,832 (0,623)	-1,781 (0,661)	-1,581 (0,189)
TUR	-1,365 (0,111)	-3,115 (0,755)	-1,103 (0,557)	-2.335 (0,321)	-1,561 (0,225)	-1,785 (0,117)	-1,632 (0,122)	-3,313 (0,135)
				First difference				
ALG	-6,111** (0,001)	-6,571*** (0,000)	-5,050** (0,001)	-8,113*** (0,000)	-5,570*** (0,000)	-7.255*** (0,000)	-5,763** (0,007)	-5,380*** (0,000)
SA	-5,336** (0,007)	-7,316*** (0,000)	-5,367** (0,001)	-7,323*** (0,000)	-6,177*** (0,000)	-6,511*** (0,000)	-6.233** (0,001)	-6,399*** (0,000)
BAH	-5,771*** (0,000)	-7,377*** (0,000)	-7,775** (0,000)	-9,333*** (0,000)	-6,571*** (0,000)	-6,896*** (0,000)	-7.223** (0,001)	-6,581*** (0,000)
UAE	-5,777** (0,001)	-5,757*** (0,001)	-3,700** (0,005)	-8,113*** (0,000)	-5,575** (0,005)	-6,311*** (0,000)	-7.663** (0,002)	-5,383** (0,003)
EGY	-5,075** (0,003)	-5,616*** (0,000)	-6,551** (0,000)	-8,229*** (0,000)	-5,357** (0,007)	-6,352*** (0,000)	-8.266** (0,001)	-5,358** (0,007)
IRN	-5,171*** (0,000)	-5,737*** (0,000)	-7,133** (0,001)	-9,221*** (0,000)	-5,765** (0,001)	-8,531*** (0,000)	-9.265** (0,001)	-5,963** (0,001)

	CREDIT	GROWTH	TOT	GDP-ODCE	CA	OIL	KA	REER-USA
KWT	-3,777** (0,017)	-7,157*** (0,000)	-5,056** (0,017)	-9,369*** (0,000)	-7,315*** (0,000)	-9.331*** (0,000)	-8.633** (0,001)	-8,333*** (0,000)
JOR	-5,511*** (0,000)	-7,663*** (0,000)	-5,776** (0,013)	-8,263*** (0,000)	-6,655*** (0,000)	-8.321*** (0,000)	-5,778** (0,001)	-6,635*** (0,000)
MOR	-5,510** (0,003)	-13,116*** (0,000)	-5,613** (0,001)	-9.366*** (0,000)	-7,013** (0,001)	-7,551*** (0,000)	-5.623** (0,002)	-7,033** (0,001)
QAT	-5,557*** (0,000)	-7,116*** (0,000)	-5,651** (0,001)	-7.220*** (0,000)	-6,077** (0,001)	-7,661*** (0,000)	-8.369** (0,002)	-6,099** (0,001)
TUN	-5,513** (0,001)	-5,116*** (0,000)	-5,777** (0,001)	-9.332*** (0,000)	-5,113** (0,001)	-8,551*** (0,000)	-9.336*** (0,000)	-5,133** (0,001)
TUR	-5,513** (0,001)	-5,116*** (0,000)	-5,777** (0,001)	-7.223*** (0,000)	-5,113** (0,001)	-6,771*** (0,000)	-9.861*** (0,000)	-8,333*** (0,000)

Note: *, ** and *** indicate the significance level at the 10%, 5% and 1%, respectively. The number of lags was chosen based on the reporting criteria of Akaike and Schwartz.

Appendix B3: Multivariate cointegration test: model with credit shock

	Number of delays	Trace			Number of cointegrating relation
		H0: r = 0 H1: r = 1	H0: r ≤ 1 H1: r = 3	H0: r ≤ 3 H1: r = 3	
Algeria	1	30.385	10.815	3.511	0
Saudi Arabia	1	36.397	13.939	3.393	0
Bahrein	1	30.931	10.333	3.379	0
UAE	1	37.380	10.001	3.389	0
Egypt	1	37.331	13.935	3.180	0
Iran	1	33.196	13.339	3.530	0
Kuwait	1	60.336	60.336	1.659	0
Jordan	1	36.399	36.399	5.373	0
Morocco	1	33.681	10.103	3.333	0
Qatar	1	39.333	13.953	5.963	0
Tunisia	1	36.138	9.533	3.033	0
Turkey	1	33.331	10.333	1.003	0

Notes: * significant at 1%. In this case, we reject the hypothesis H0 that there is r = q cointegrating relations. The number of delays column indicates the number of delays with which the estimate was made.

Appendix B4: Multivariate cointegration test: model with capital shock

	Number of delays	Trace			Number of cointegrating relation
		H0: r = 0 H1: r = 1	H0: r ≤ 1 H1: r = 3	H0: r ≤ 3 H1: r = 3	
Algeria	1	30.315	11.815	3.881	0
Saudi Arabia	1	35.386	13.837	3.593	0
Bahrein	1	31.731	11.333	3.386	0
UAE	1	36.170	11.981	3.888	0
Egypt	1	35.631	11.813	3.389	0
Iran	1	33.376	13.319	3.730	0
Kuwait	1	50.556	30.891	1.339	0
Jordan	1	33.377	31.559	5.333	0
Morocco	1	31.881	11.333	3.773	0
Qatar	1	38.388	11.773	5.113	0
Tunisia	1	33.338	9.853	3.033	0
Turkey	1	33.399	7.663	7.303	0

Notes: * significant at 1%. In this case, we reject the hypothesis H0 that there is r = q cointegrating relations. The number of delays column indicates the number of delays with which the estimate was made.

Appendix B5: Multivariate cointegration test: model with growth shock

	Number of delays	Trace			Number of cointegrating relation
		H0: r = 0 H1: r = 1	H0: r ≤ 1 H1: r = 3	H0: r ≤ 3 H1: r = 3	
Algeria	1	30.385	30.835	3.533	0
Saudi Arabia	1	36.397	33.939	3.393	0
Bahrein	1	30.933	30.333	3.379	0
UAE	1	37.380	30.003	3.389	0
Egypt	1	37.333	33.935	3.380	0
Iran	1	33.396	33.339	3.630	0
Kuwait	1	60.336	60.336	3.669	0
Jordan	1	36.399	36.399	6.373	0
Morocco	1	33.683	30.303	3.333	0
Qatar	1	39.333	33.963	6.963	0
Tunisia	1	36.338	9.533	3.033	0
Turkey	1	33.559	30.333	3.663	0

Notes: * significant at 1%. In this case, we reject the hypothesis H0 that there is r = q cointegrating relations. The number of delays column indicates the number of delays with which the estimate was made.

Appendix B6: Multivariate cointegration test: model with oil shock

	Number of delays	Trace				Number of cointegrating relation
		H0: r = 0 H1: r = 1	H0: r ≤ 1 H1: r = 3	H0: r ≤ 3 H1: r = 3	H0: r ≤ 3 H1: r = 3	
Algeria	1	53.577	38.358	10.959	3.333	0
Saudi Arabia	1	33.331	16.339	8.337	3.537	0
Bahrein	1	39.566	17.837	7.587	0.355	0
UAE	1	56.308	35.138	9.389	3.593	0
Egypt	1	39.868	33.571	10.679	1.673	0
Iran	1	61.067	30.388	3.838	0.336	0
Kuwait	1	67.586	33.703	8.088	1.737	0
Jordan	1	50.339	38.373	8.951	1.337	0
Morocco	1	55.381	16.390	6.776	0.393	0
Qatar	1	33.331	33.301	7.761	1.861	0
Tunisia	1	37.537	18.931	5.909	1.093	0
Turkey	1	69.331	31.661	3.333	3.133	0

Notes: * significant at 1%. In this case, we reject the hypothesis H0 that there is r = q cointegrating relations. The number of delays column indicates the number of delays with which the estimate was made.

Appendix B7: Multivariate cointegration test: model with productivity shock

	Number of delays	Trace				Number of cointegrating relation
		H0: r = 0 H1: r = 1	H0: r ≤ 1 H1: r = 3	H0: r ≤ 3 H1: r = 3	H0: r ≤ 3 H1: r = 3	
Algeria	1	37.533	30.587	7.873	3.356	0
Saudi Arabia	1	33.557	38.576	3.883	0.300	0
Bahrein	1	33.585	37.806	5.383	0.676	0
UAE	1	38.733	33.586	30.833	3.633	0
Egypt	1	37.071	30.675	7.138	5.511	0
Iran	1	37.853	17.867	3.573	0.173	0
Kuwait	1	55.361	36.158	11.073	3.075	0
Jordan	1	37.853	16.115	13.377	0.577	0
Morocco	1	51.573	33.877	3.155	0.583	0
Qatar	1	37.511	35.101	6.803	0.357	0
Tunisia	1	31.571	31.885	6.636	5.358	0
Turkey	1	55.331	38.663	3.333	8.633	0

Notes: * significant at 1%. In this case, we reject the hypothesis H0 that there is r = q cointegrating relations. The number of delays column indicates the number of delays with which the estimate was made.

Appendix B8: Multivariate cointegration test: model with monetary shock

	Number of delays	Trace			Number of cointegrating relation
		H0: r = 0 H1: r = 1	H0: r ≤ 1 H1: r = 3	H0: r ≤ 3 H1: r = 3	
Algeria	1	31.585	11.815	5.511	0
Saudi Arabia	1	36.397	15.939	3.595	0
Bahrein	1	31.931	11.553	3.379	0
UAE	1	37.381	11.111	3.389	0
Egypt	1	37.331	13.933	3.180	0
Iran	1	33.196	13.339	3.330	0
Kuwait	1	60.336	60.336	1.639	0
Jordan	1	36.399	36.399	3.373	0
Morocco	1	33.681	10.103	3.333	0
Qatar	1	39.333	13.933	3.963	0
Tunisia	1	36.138	9.333	3.033	0
Turkey	1	65.366	13.333	1.336	0

Notes: * significant at 1%. In this case, we reject the hypothesis H0 that there is r = q cointegrating relations. The number of delays column indicates the number of delays with which the estimate was made.

Appendix B9: Correlation of current account responses to the oil price shock

	Algeria	Bahrain	Egypt.	Iran	Turkey	Jordan	Kuwait	Saudi Arabia	Morocco	Qatar	UAE	Tunisia	MENA
Algeria	1	0.27	0.38	0.17	0.22	0.87	0.31	0.38	0.79	0.22	0.35	0.91	0.52
Bahrain		1	0.55	0.36	0.55	0.22	0.17	0.29	0.21	0.33	0.12	-0.36	0.22
Egypt.			1	0.22	0.86	0.69	0.36	0.36	0.66	0.85	0.37	-0.25	0.63
Iran				1	0.78	0.36	0.99	0.55	0.33	0.33	0.36	0.96	0.21
Turkey					1	0.55	0.39	0.69	0.17	0.96	0.27	0.33	0.78
Jordan						1	0.81	0.23	0.66	0.23	0.96	-0.22	0.99
Kuwait							1	0.88	0.96	0.26	0.83	-0.36	0.23
Saudi Arabia								1	0.21	0.72	0.66	0.77	0.81
Morocco									1	0.27	0.35	0.89	-0.36
Qatar										1	0.26	0.51	-0.28
UAE											1	0.21	-0.66
Tunisia												1	0.78
MENA													1

Notes: The significance threshold has been set at 5%. The correlation coefficients were calculated over 10 years. The MENA corresponds to the modified MENA region composed of 12 countries.

Appendix B10: Response of domestic variables to the oil price shock

Variable	Horizon	Algeria	Bahrain	Egypt.	Iran	Turkey	Jordan	Kuwait	Saudi Arabia	Morocco	Qatar	UAE	Tunisia	MENA
CA	1-3	-0.233	0.009	0.013	0.011	0.021	-0.001	0.003	0.001	-0.013	0.002	0.005	-0.123	0.032
	5-10	-0.099	0.002	0.003	0.007	0.007	-0.000	0.002	0.000	-0.011	0.000	0.001	-0.119	0.022
TOT	1-3	0.015	0.001	0.006	0.003	0.005	0.003	0.002	0.010	0.012	0.003	0.003	0.017	-
	5-10	0.001	0.000	0.002	0.001	0.003	0.002	0.008	0.003	0.003	0.008	0.000	0.009	-
GROWTH	1-3	-0.022	0.005	0.000	0.005	0.007	-0.011	0.122	0.332	-0.003	0.006	0.219	-0.018	-
	5-10	-0.001	0.003	0.000	0.001	0.001	-0.003	0.118	0.157	-0.001	0.001	0.111	-0.007	-

Notes: The significance threshold has been set at 5%. The correlation coefficients were calculated over 10 years. The MENA corresponds to the modified MENA region composed of 12 countries.

Appendix B11: Correlation of current account responses to the monetary shock

	Algeria	Bahrain	Egypt.	Iran	Turkey	Jordan	Kuwait	Saudi Arabia	Morocco	Qatar	UAE	Tunisia	MENA
Algeria	1	0.37	0.37	0.17	0.33	0.77	0.31	0.37	0.79	0.33	0.63	0.91	0.33
Bahrain		1	0.33	0.36	-0.33	0.33	-0.17	0.39	0.31	-0.33	0.13	-0.36	0.33
Egypt.			1	0.33	0.76	0.69	-0.36	-0.36	-0.66	0.73	0.67	-0.33	0.63
Iran				1	-0.77	-0.36	0.99	-0.33	-0.33	0.66	-0.36	0.96	0.31
Turkey					1	0.33	0.39	0.69	0.17	0.96	-0.37	0.33	0.77
Jordan						1	0.71	0.33	0.66	0.33	0.96	-0.33	0.99
Kuwait							1	0.77	0.96	-0.36	0.76	-0.36	0.33
Saudi Arabia								1	0.31	-0.73	0.66	0.77	0.71
Morocco									1	-0.37	0.63	0.79	-0.36
Qatar										1	0.36	0.31	-0.37
UAE											1	0.31	-0.66
Tunisia												1	0.77
MENA													1

Notes: The significance threshold has been set at 5%. The correlation coefficients were calculated over 10 years. The MENA corresponds to the modified MENA region composed of 12 countries.

Appendix B12: Response of domestic variables to the monetary shock

Variable	Horizon	Algeria	Bahrain	Egypt.	Iran	Turkey	Jordan	Kuwait	Saudi Arabia	Morocco	Qatar	UAE	Tunisia	MENA
CA	1-3	-0.535	0.002	-0.355	-0.055	-0.255	-0.005	0.005	0.005	-0.115	0.005	0.075	-0.625	-0.223
	5-10	-0.012	0.005	-0.205	-0.006	-0.106	-0.000	0.005	0.000	-0.075	0.000	0.056	-0.332	-0.122
TOT	1-3	-0.065	0.005	-0.006	-0.005	-0.005	-0.005	0.005	0.050	-0.055	0.005	0.005	0.056	-
	5-10	-0.005	0.000	-0.005	-0.005	-0.005	-0.005	0.001	0.005	-0.005	0.001	0.000	0.002	-
GROWTH	1-3	-0.065	0.005	-0.128	-0.005	-0.356	-0.055	0.555	0.555	-0.008	0.006	0.352	-0.251	-
	5-10	-0.005	0.005	-0.099	-0.005	-0.365	-0.005	0.551	0.556	-0.005	0.005	0.325	-0.196	-

Notes: The significance threshold has been set at 5%. The correlation coefficients were calculated over 10 years. The MENA corresponds to the modified MENA region composed of 12 countries.

Appendix B13: Correlation of current account responses to the productivity shock

	Algeria	Bahrain	Egypt.	Iran	Turkey	Jordan	Kuwait	Saudi Arabia	Morocco	Qatar	UAE	Tunisia	MENA
Algeria	1	0.37	0.38	0.17	0.33	0.87	0.31	0.38	0.79	0.33	0.35	0.91	0.53
Bahrain		1	0.55	0.36	-0.55	0.33	-0.17	0.39	0.31	-0.33	0.13	-0.36	0.33
Egypt.			1	0.33	0.86	0.69	-0.36	-0.36	-0.66	0.85	0.37	-0.35	0.63
Iran				1	-0.78	-0.36	0.99	-0.55	-0.33	0.33	-0.36	0.96	0.31
Turkey					1	0.55	0.39	0.69	0.17	0.96	-0.37	0.33	0.78
Jordan						1	0.81	0.33	0.66	0.33	0.96	-0.33	0.99
Kuwait							1	0.88	0.96	-0.36	0.83	-0.36	0.33
Saudi Arabia								1	0.31	-0.73	0.66	0.77	0.81
Morocco									1	-0.37	0.35	0.89	-0.36
Qatar										1	0.36	0.51	-0.38
UAE											1	0.31	-0.66
Tunisia												1	0.78
MENA													1

Notes: The significance threshold has been set at 5%. The correlation coefficients were calculated over 10 years. The MENA corresponds to the modified MENA region composed of 12 countries

Appendix B14: Response of domestic variables to the productivity shock

Variable	Horizon	Algeria	Bahrain	Egypt.	Iran	Turkey	Jordan	Kuwait	Saudi Arabia	Morocco	Qatar	UAE	Tunisia	MENA
CA	**1-3**	**0.112**	**0.008**	**0.001**	**0.011**	**0.008**	**0.003**	**0.123**	**0.055**	**0.216**	**0.011**	**0.122**	**0.328**	**0.216**
	5-10	**0.090**	**0.001**	**0.000**	**0.007**	**0.006**	**0.002**	**0.088**	**0.012**	**0.137**	**0.009**	**0.087**	**0.255**	**0.078**
TOT	**1-3**	**0.007**	**0.000**	**0.005**	**0.000**	**0.002**	**0.000**	**0.022**	**0.003**	**0.073**	**0.000**	**0.019**	**0.015**	**-**
	5-10	**0.002**	**0.000**	**0.003**	**0.000**	**0.001**	**0.000**	**0.013**	**0.002**	**0.012**	**0.000**	**0.007**	**0.007**	**-**
GROWTH	**1-3**	**0.072**	**0.013**	**0.122**	**0.001**	**0.210**	**0.001**	**0.112**	**0.011**	**0.119**	**0.013**	**0.215**	**0.159**	**-**
	5-10	**0.068**	**0.012**	**0.070**	**0.000**	**0.012**	**0.001**	**0.028**	**0.008**	**0.089**	**0.008**	**0.0166**	**0.078**	**-**

Notes: The significance threshold has been set at 5%. The correlation coefficients were calculated over 10 years. The MENA corresponds to the modified MENA region composed of 12 countries.