THE IMPACT OF THE COMBINATION OF MONETARY AND FISCAL POLICIES ON MACROECONOMIC STABILITY: AN SVAR ANALYSIS OF MENA ECONOMIES (1990-2023) THROUGH THE OUTPUT GAP AND INFLATION

EL KHATTAB YOUNES
PROFESSOR AT HASSAN II UNIVERSITY OF CASABLANCA, FSJES MOHAMMEDIA, LABORATORY OF ECONOMIC AND LOGISTICS PERFORMANCE CASABLANCA, MOROCCO
e-mail: younes.master@hotmail.com

BASSITE IMAD
PHD STUDENT IN ECONOMIC SCIENCES, HASSAN II UNIVERSITY OF CASABLANCA, FSJES MOHAMMEDIA, LABORATORY OF ECONOMIC AND LOGISTICS PERFORMANCE CASABLANCA, MOROCCO
e-mail: imad.bas10@gmail.com

Abstract
This research analyses the influence of fiscal and monetary policies (policy mix) on the macroeconomic stability of four countries in the MENA region (Morocco, Tunisia, Algeria, Saudi Arabia) for the period from 1990 to 2023 using an SVAR model. The observations highlight different dynamics: monetary dominance in Morocco (money supply accounts for 24% of the variance in the output gap), synergy of tools in Tunisia (public spending accounts for 23% of the variance in the output gap within the framework of budgetary systems), and budgetary benefits in Algeria and Saudi Arabia, where public spending has a predominant stabilising function, particularly during oil crises. These results highlight the need to adapt economic policy coordination to the structural specificities of each country, particularly the degree of energy dependence, thus confirming the theoretical framework of Leeper (1991) and Woodford (2001) on policy dominance regimes.
Keywords: *Policy mix, SVAR, monetary dominance, fiscal dominance, MENA, inflation, output gap*

1. Introduction

Since Keynes' pioneering work (1936), the coordination of fiscal and monetary policies – commonly referred to as the policy mix – has been recognised as an essential lever for ensuring macroeconomic stability. In a context marked by recurring external shocks (financial crises, oil price fluctuations, the COVID-19 pandemic), the MENA region (Middle East and North Africa) is a relevant area for analysis, bringing together countries with contrasting economic structures: on the one hand, Morocco and Tunisia, net oil importers vulnerable to external shocks; on the other, Algeria and Saudi Arabia, major hydrocarbon exporters benefiting from budgetary margins linked to oil revenues.

Although Keynes' work highlighted the crucial role of government intervention in stabilising the economy, it does not specifically address the coordination between fiscal and monetary policies, particularly in emerging and developing economies. This theoretical gap raises a key question: to what extent does the configuration of economic policies affect the macroeconomic stability of these nations? This research specifically aims to examine whether certain coordination systems – such as monetary or fiscal dominance – provide greater efficiency depending on the specific structural and institutional characteristics of each economy.

The empirical analysis is based on a structural vector autoregression (SVAR) model with Cholesky identification, which allows us to capture the causal dynamics between variables and assess the dominance of policies through responses to shocks and variance decomposition. The originality of this research lies in the comparison of oil-importing and oil-exporting countries within the same region, which allows for the consideration of structural constraints and differential policy space in terms of economic policy.

2. Literature review

The question of policy mix – i.e. how to coordinate fiscal and monetary policy – dates back to Keynes (1936). According to him, the economy does not always achieve full employment on its own; public spending and central bank action must therefore be combined to support demand and stabilise activity.Hicksbla, Harrod and Meade, as early as 1937, and then Hansen (1953) refined this idea with the IS-LM model: when the LM curve is flat (liquidity trap), the budget works better; when the IS curve is flat, money loses its effectiveness.

In the 1960s, Mundell and Fleming opened the door to international trade: their IS-LM-BP model showed that with a fixed exchange rate, public spending pays off while currency is restrained; with a floating exchange rate, the opposite is true. In short, exchange rate regimes, capital mobility and other structural factors determine who calls the shots.

Tinbergen (1952) argues that each objective must have a corresponding instrument. Mundell then refines this idea: separate roles, yes, but without forgetting to coordinate in the event of a major shock.

Later, Sargent and Wallace (1981) issued a warning: if the budget dominates too much, the central bank ends up financing deficits and loses control over inflation. Conversely, when the central bank sets the price target and the Treasury follows suit, stability is easier to achieve. Leeper (1991) and then Woodford (2001) extended this idea with the fiscal theory of the price level: inflation also depends on the solvency of the state, not just on key interest rates.

The facts confirm these theories. In Brazil, Moreira & Monte (2021) show a dominant currency: rates influence budget balances and prices. In Pakistan, Nasrullah et al. (2023) find that the central bank acts more quickly and for longer on the output gap and inflation, hence the need for fiscal discipline.

In the United States, Blanchard & Perotti (2002) reveal, using an SVAR model, that public spending helps most during a recession, but less so when debt is high. In the BRICS countries, Jawadi, Mallick & Sousa (2016) observe that spending has a Keynesian effect, with currency playing a supporting role: a complementary mix is required.

For certain emerging economies in Europe, Cevik, Dibooglu, and Kutan (2013) warn that activating both levers at the same time can become unsustainable if debt spirals out of control. Davig & Leeper (2006, 2011) show that phases of fiscal dominance often arise during crises, as ravncube points out with regard to Japan.

In the MENA region, the results differ. El-Khattab et al. (2023) report that in Morocco, monetary policy is more effective at controlling prices, while in Egypt, overly expansionary policy fuels inflation and exacerbates external imbalances. In Saudi Arabia, oil revenues provide a fiscal cushion: stimulus measures can be implemented without threatening stability.

In short, the effectiveness of a policy mix depends on the context: fiscal position, state of the cycle and credibility of the central bank. There is no single recipe, but one simple rule remains: coordination yes, prolonged domination no.

3. Methodology

The main objective of this study is to analyse how the interaction between fiscal and monetary policies – in other words, the policy mix – influences macroeconomic stability in several countries in the MENA region, namely Morocco, Algeria, Tunisia and Saudi Arabia, over the period from 1990 to 2023. Two key indicators guide this assessment: the inflation rate, which reflects price pressures, and the output gap, which measures the difference between actual and potential output.

To identify the specific effects of each policy, we use a structural vector autoregression (SVAR) model. This type of model allows us to capture the complex interactions between economic variables and distinguish the economy's responses to external shocks, whether financial,

energy-related or health-related. The choice of SVAR is based on its ability to impose economically sound restrictions, making it particularly relevant in an analysis where there are numerous cross-causalities.

Our approach draws on the methodological contributions of Dungey and Fry (2009) and Favero and Giavazzi (2012). These authors have developed frameworks suitable for studying economic policies in an environment subject to multiple shocks, such as oil price fluctuations, global financial crises and the COVID-19 pandemic. In this sense, the SVAR used here makes it possible to examine, in a single step, the effect of macroeconomic decisions and how they respond to external and internal shocks.

Two main hypotheses guide our investigation:

Hypothesis 1: A proactive monetary policy, combined with a more restrained fiscal policy, promotes macroeconomic stability by limiting output gaps and inflationary pressures. This idea is based on the reasoning developed by Sargent and Wallace (1981).

Hypothesis 2: The effectiveness of the policy mix depends heavily on the structural configuration of each country. In other words, the pre-eminence of one policy – whether fiscal or monetary – influences economic performance, as suggested by the work of Blanchard and Perotti (2002).

The variables used in this analysis are as follows:

Table 1: Variables used in the study, definitions and theoretical justifications.

Source	Variable	Definition	Theoretical justification (Authors)
Developed by the author based on real GDP	Output gap[1] (Y cycle) in %	The difference between actual GDP and potential GDP, measuring cyclical fluctuations.	Ravnik & Zilic (2011): Used to assess the impact of macroeconomic policies on stability. Sen & Kaya (2015): Link to growth and debt.
World Bank	Inflation rate	Annual change in consumer prices (CPI).	S. Ali et al. (2008): Key indicator of monetary policy. Ncube et al. (2012): Interaction with money supply and interest rates.
World Bank	Money supply (% of GDP)	Monetary aggregates relative to GDP, reflecting liquidity.	Tule et al. (2020): Impact on growth via credit. S. Ali et al. (2008): M2 variable as a proxy for monetary policy.
Countryeconomy	Expenditure as % of GDP	Total public expenditure (education, health, etc.) as a percentage of GDP.	Dungey & Fry (2009): Multiplier effect on real GDP. Nasrullah et al. (2023): Link to the output gap and fiscal sustainability.

***Source**: compiled by the author*

Between 1990 and 2023, the database accurately tracks the major economic shocks that have rocked the MENA region. The 1997 Asian crisis, the 2008 financial collapse, and the 2020 global pandemic: each episode is documented. This corpus was selected for the reliability of its sources, its temporal richness, and its relevance to major events.Le modèle à estimer est représenté comme suit :

$$OUT = f(INF, MM, DEP) \quad (1)$$

Where the output gap, inflation rate (INF), money supply (MM), and public expenditure (DEP) are the variables of interest.

The corresponding econometric equation is formulated as follows:

$$Out_t = \alpha_0 + \alpha_1 INF_t + \alpha_2 MM_t + \alpha_3 DEP_t + B\epsilon_t \quad (2)$$

[1] The output gap was calculated by the author using the Hodrick-Prescott (HP) filter in Eviews 12, applying a standard smoothing parameter (λ=100 for annual data) to the real GDP series.

Where α0 is the constant term, α_i are the parameters to be estimated, and Bϵ represents structural shocks.

In its basic form, a VAR model includes a set of *K* endogenous variables.

$$\mathbf{Y_t = (y_{1t}, ..., y_{2t}, ..., y_{kt})} \quad \textbf{(3)}$$

For k=1,…,p, the model can be extended to include the lag structure of endogenous variables within the VAR model framework. The general form of the VAR model with a given number of lags (denoted p) can be written as follows:

$$\boldsymbol{Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_P Y_{t-P} + \mu_t} \quad \textbf{(4)}$$

The vector Y_t represents the endogenous variables of size K×1 at time t, while the matrices $A_i$of size K×K are the coefficients associated with the lags, for i=1, 2,…,p , where p is the number of lags in the model. Finally, μ_t is the vector of innovations (or white noise), with the assumption that E(μ_t)= 0, indicating that the mean of the innovations is zero.

A VAR(p) can be interpreted as a reduced-form model. The Structural Vector Autoregressive (SVAR) model in its structural form is defined as follows:

$$\boldsymbol{A_0 Y_t = A_1 Y_{t-1} + \cdots + A_P Y_{t-P} + B\varepsilon_t} \quad \textbf{(5)}$$

The matrix A_0 represents contemporary effects and is generally non-diagonal, capturing the direct relationships between variables at a given point in time. The term $B\varepsilon_t$ represents the vector of structural shocks, where ε_t is the vector of innovations and *B* is the matrix that links these shocks to the model variables.

Reduced form obtained by multiplying by A_0^{-1}:

$$\boldsymbol{Y_t = A_0^{-1} A_1 Y_{t-1} + \cdots + A_0^{-1} A_P Y_{t-P} + A_0^{-1} B\varepsilon_t} \quad \textbf{(6)}$$

It is assumed that the structural errors ε_t are white noise and that the coefficient matrices A_i for i=1,…,p are structural coefficients that generally differ from their equivalents in the reduced form.

According to Zeileis et al. (2002), the use of the SVAR model allows for the precise identification of structural shocks affecting an economic system. Structural impulse response functions (in particular) provide a dynamic reading of the immediate and delayed reactions of an endogenous variable to a unit shock occurring in another variable, assuming the simultaneous absence of other disturbances. This approach sheds light on the mechanisms of shock transmission over time. Furthermore, the decomposition of the variance of structural forecast errors complements this analysis by quantifying the share of uncertainty of each variable attributable to its own shocks or those of others. In other words, it breaks down the variance of the forecast error according to the different sources of endogenous disturbance within the VAR model.

By imposing restrictions on the matrices, given the reduced form of the Vector Moving Average (VMA) representation obtained by inverting a stationary VAR representation:

$$\mathbf{Y_t = A^{-1}(L)\,\varepsilon_t} \quad \textbf{(7)}$$

Where Y_t is the vector of variables included in the model, $A^{-1}(L)$ is the inverted dynamic coefficient matrix, and ε_t represents the error terms. We define $A^{-1}(L)=\phi(L)$ and obtain a process expressed as a linear combination of past innovations, according to Wold's composition:

$$\boldsymbol{Y_t = \phi(L)u_t = \sum_{h=0}^{\infty} \phi u_{t-h}} \quad \text{Ou} \quad \boldsymbol{\phi_0 = Im} \quad \textbf{(8)}$$

However, to recover the relevant and unobservable shocks ε_t from the observable innovations of the reduced form, an SVAR representation must be considered, and a set of restrictions must be imposed. The SVAR model is defined by :

$$\sum_{i=1}^{P} A_i y_{t-i} = A_0 \varepsilon_t \quad (9)$$

Where A_0 is the matrix of contemporary effects of size m×m, A_1 is the matrix of delayed effects of size m×m, B is the matrix of structural shocks (short-term response matrix).

The structural equation system links the residuals μ_t to the shocks ε_t, and restrictions must be imposed to identify them uniquely. The residuals of the reduced form can be recovered from the SVAR model by $u_t = A^{-1}B_{\varepsilon_t}$ and their variance-covariance matrix by $u_t = A^{-1}BB^T A^{-T}$, and this still depends on the restrictions imposed.

A triangular factorisation $cholesky$:

As part of this research, a four-variable SVAR model was deployed to thoroughly examine the impact of economic policy on macroeconomic stability. The approach adopted is based on a marked theoretical duality, contrasting two economic governance regimes: on the one hand, monetary dominance, in which the central bank and its tools take precedence over fiscal choices; on the other, fiscal dominance, where fiscal policy takes precedence. The model is structured around four key endogenous variables, chosen for their ability to capture structural dynamics: the output gap, inflation (INF), money supply (MM) and public expenditure (DEP).

3.1. Hierarchy of economic policies: monetary dominance vs. fiscal dominance

In a monetary dominance regime, the central bank plays a major role by adjusting the money supply (MS) in order to influence aggregate demand and the output gap upstream. This mechanism operates through interest rate and credit channels. Fiscal policy is relegated to the background. This hierarchical positioning is captured by an SVAR model structured using a Cholesky decomposition, where the order of variables – output gap, inflation, money supply, then public spending – is not neutral. This configuration explicitly illustrates the primacy given to monetary intervention in the management of macroeconomic imbalances. It reflects an economic architecture in which monetary policy, at the forefront, is the preferred tool for stabilisation, relegating fiscal adjustments to a supporting role.

In a regime of fiscal dominance, monetary policy aligns itself with fiscal imperatives. When under constraint, the central bank adapts its policy to support public finances, an adjustment that reduces its effectiveness in containing inflationary pressures. If the order of variables in the SVAR remains unchanged, the interpretation differs: fiscal shocks dominate macroeconomic dynamics, revealing the driving role of fiscal decisions and the reactive nature of monetary policy.

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 \\ a_{41} & a_{42} & a_{43} & 1 \end{bmatrix} \begin{bmatrix} OUT_t \\ INF_t \\ MM_t \\ DEP_t \end{bmatrix} = \begin{bmatrix} c_0 \\ c_1 \\ c_2 \\ c_3 \end{bmatrix} + \begin{bmatrix} b_{11} & b_{12} & b_{13} & b_{14} \\ b_{21} & b_{22} & b_{23} & b_{24} \\ b_{31} & b_{32} & b_{33} & b_{34} \\ b_{41} & b_{42} & b_{43} & b_{44} \end{bmatrix} \begin{bmatrix} OUT_{t-1} \\ INF_{t-1} \\ MM_{t-1} \\ DEP_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_t^{OUT} \\ \varepsilon_t^{INF} \\ \varepsilon_t^{MM} \\ \varepsilon_t^{DEP} \end{bmatrix} \quad (10)$$

This SVAR model can be written simply as follows:

$$Ay_t = \lambda \sum_{i=1}^{p} B_i y_{t-1} + u_t \quad (11)$$

4. Results and discussion

The structural VAR model generates two major results. The first is the impulse response graphs, while the second concerns the decomposition of variance errors. Before analysing the impulse response, graphs and interpreting the decomposition of variance errors for each country, a series of preliminary tests was carried out.

4.1. Unit root test results

Table 2 presents the results of the augmented Dickey-Fuller (ADF) unit root test applied to the model variables for the four countries studied: Morocco, Algeria, Tunisia and Saudi Arabia. The output gap variable appears stationary at level I(0) in all countries. However, other variables, namely inflation, money supply and public expenditure, appear non-stationary at level but become stationary after the first differentiation I(1), with the exception of public expenditure in Saudi Arabia, which is stationary at level. These results confirm that the series are not all integrated in the same order, which makes Johansen's cointegration test, which requires the integration of variables of the same order, unfeasible.

4.2. VAR order

The information criteria (AIC, SC, HQ, FPE, LR) show that the optimal order of lags varies across countries and regimes. For Morocco and Tunisia, order 1 is clearly preferred in both regimes. In Algeria, order 1 is also dominant in the fiscal regime, while in the monetary regime, the criteria are split between orders 1 and 2. For Saudi Arabia, order 2 is systematically retained, indicating a more persistent economic dynamic. These results, presented in Table 3, highlight different temporal structures across economies. Adjusting the lag for each country improves the quality and accuracy of VAR estimates.

4.3. Diagnostic tests

In order to validate the robustness of the VAR estimates, diagnostic tests were applied to each country/regime model. The results of the LM autocorrelation test indicate p-values well above 5%, suggesting the absence of autocorrelation of residuals in all models, with the exception of Morocco in budgetary dominance ($p = 0.22$), where vigilance remains necessary. The White test reveals the absence of heteroscedasticity for all cases ($p > 0.26$), confirming the constancy of the variance of errors. As for the Jarque-Bera normality test, the joint probabilities are generally high (particularly for Tunisia and Saudi Arabia), indicating that the residuals approximately follow a normal distribution. These results, presented in Table 4, support the validity of the estimated VAR models, both structurally and statistically, reinforcing the credibility of the dynamic analyses conducted.

The graphs provided (Figure 2) clearly show that all the inverted roots of the AR polynomial lie within the unit circle, thereby confirming the stability of the model. This condition is essential: without stability, it is impossible to consider an estimate or forecast to be reliable. Without the presence of roots outside the circle, any risk of unstable or divergent trajectories is eliminated. Thus, the selected autoregressive model proves to be appropriate for rigorous and robust time series analysis.

4.4. Impulse response functions

4.4.1. Responses to monetary and fiscal policy shocks in Morocco

- **In a situation of monetary dominance**

The output gap can be affected by a shock to inflation (DINF) or money supply (DMM). As Sargent and Wallace (1981) pointed out, an increase in inflation could prompt monetary authorities to reduce demand, which could widen the output gap in the short term. Conversely, an expansionary monetary policy that increases the money supply stimulates demand and narrows the output gap, according to Keynesian analysis (Keynes, 1939). Similarly, a boost in public spending

(PSI) can stimulate the economy by amplifying aggregate demand, which helps to reduce the output gap. In addition, the output gap also has an impact on inflation: a negative gap (recession) leads to downward pressure on prices, a mechanism consistent with the fiscal theory of the price level (FTPL) developed by Leeper (1991), Sims (1994) and Woodford (1995, 2001).

Monetary and fiscal shocks also have a direct influence on inflation. According to research by Sargent and Wallace (1981) on the non-neutral consequences of monetary policy, an expansion of the money supply can lead to inflationary pressures. Similarly, an increase in public spending, while it may stimulate aggregate demand, can also cause inflation. This phenomenon is studied in the context of the FTPL. Conversely, the output gap has an impact on economic policies: in the event of a recession, the central bank may implement a monetary expansion policy (Sims, 1994), while the government could modify public spending to stimulate the economy, in line with Keynesian recommendations. Consequently, a feedback system is created by the interactions between inflation, money supply, public spending and the output gap, as formalised by Woodford (2001) and others in their integrated economic policy models.

- **In a situation of budgetary dominance**

An increase in inflation can initially widen the output gap by slowing economic activity, in line with Keynesian analysis (Keynes, 1939), where rising prices reduce purchasing power and dampen aggregate demand. However, a positive output gap (excess demand) can also generate inflation, as companies facing saturated capacity raise their prices. An expansion of public spending or the money supply temporarily reduces the output gap by stimulating demand (Keynesian effect), but this impact diminishes over time, as Sargent and Wallace (1981) point out: without structural adjustments, the effects of stimulus become neutral in the long term. Furthermore, a positive monetary shock leads to persistent inflation, as excess liquidity fuels demand (monetarist theory).

The work of Leeper (1991), Sims (1994) and Woodford (1995, 2001) highlights the persistence of inflation after a monetary or fiscal shock, linked to agents' expectations. For example, an increase in public spending can increase inflation if actors anticipate an accommodative monetary regime (where the central bank finances deficits). Conversely, inflation can also cause an increase in public spending via automatic indexation mechanisms (such as social transfers). These dynamics reflect the interdependence between fiscal and monetary policy, where the credibility of institutions is crucial to avoiding inflationary spirals, a central point in models of 'fiscal dominance' (Leeper) or multiple equilibria (Woodford). Thus, the results can be explained by the synthesis between Keynesianism (short-term effects) and modern approaches based on rational expectations (long-term effects).

4.4.2. Responses to monetary and fiscal policy shocks in Tunisia

- **In a situation of monetary dominance**

Initially, an inflationary shock causes the output gap to widen, then narrow, indicating that inflation is temporarily encouraging output until the economy adjusts to inflationary pressures. Furthermore, a shock to the money supply or government spending initially increases the output gap, illustrating the positive impact of an expansive monetary policy or government spending, although this impact tends to diminish over time. On the other hand, an impact on output temporarily reduces inflation since the increase in supply alleviates the pressure on prices.

a disturbance in the money supply or in government spending stimulates inflation, in line with the Keynesian process whereby rising demand leads to higher prices. Depending on economic fluctuations, the money supply may change slightly: it may increase in the presence of a positive output gap or to support greater government spending. Ultimately, higher inflation can lead to an increase in government spending, indicating that the authorities are responding to inflation by implementing support measures such as subsidies or tax breaks.

- **In a situation of budgetary dominance**

Keynes' theories (Keynes, 1936) offer a partial explanation of the results, arguing that an increase in public spending acts as a direct lever on aggregate demand, causing a significant expansion in the output gap. This concept manifests itself through the idea of a fiscal multiplier, where state intervention compensates for deficiencies in private sector demand. Furthermore, the observed effect of the money supply on the output gap, but finally, the bidirectional link between the output gap and inflation, is consistent with the Phillips curve, which indicates that an overheating economy (a positive output gap) leads to inflationary pressures.

The policy mix models of Leeper (1991), Sims (1994) and Woodford (1995, 2001) can also shed light on the relationship between fiscal and monetary policy and inflation. These writers show that the effectiveness of public spending depends on the monetary system in force: if the central bank adopts a passive (accommodating) strategy, fiscal policy exerts a more significant influence on real activity, which explains its importance in our conclusions. However, the less pronounced influence of the money supply on potential gross domestic product, but more marked on inflation, reflects a dynamic monetary policy, in line with the Woodford model where the central bank's main objective is to maintain price stability. Finally, the reaction of public spending to inflation or a negative output gap is in line with a cyclical stabilisation logic, consistent with modern economic policy approaches incorporating reactive fiscal rules.

4.4.3. Responses to monetary and fiscal policy shocks in Algeria

- **In a situation of monetary dominance**

A rise in inflation can initially widen the output gap by influencing production choices, while an increase in government spending or the amount of money in circulation can narrow the gap by boosting the economy and aggregate demand. However, inflation is also affected by the output gap, since a significant deviation from potential output can put pressure on prices. For example, an increase in government spending or in the money supply could generate inflationary pressure, particularly if the economy is operating close to its optimal capacity, in line with the classical theory of the volume of money.

In a context of inflationary pressures, governments and central banking institutions have the opportunity to modify their policy strategies. Fiscal authorities can reduce public spending in order to control inflation, while the central bank has the ability to adjust the quantity of money in circulation, notably by raising interest rates, in order to maintain economic equilibrium. An inflationary shock can therefore trigger a chain reaction, such as monetary or fiscal adjustment, to control inflation and rectify production imbalances.

- **In a situation of budgetary dominance**

An adverse impact on output initially reduces inflation, indicating an inverse correlation between the output gap and inflation. This conclusion stems from Keynesian theory, which states that a reduction in aggregate demand (via a negative output gap) puts downward pressure on prices. As a result, government authorities could adjust public spending (DDEP) slightly upwards in order to boost the economy, in line with Keynesian stabilisation strategies. In addition, the money supply (MMD) seems to be changing gradually, illustrating a monetary policy that is accommodating to the expansion, as suggested by monetarist theory. On the other hand, an inflationary shock has a negative impact on output, which corresponds to the classic effect of inflation on demand: higher prices reduce purchasing power and curb investment, in line with the analysis of stagflation (a combination of stagnation and inflation).

Increased government spending directly stimulates production by boosting aggregate demand, which is in line with the Keynesian multiplier principle. Nevertheless, this expansionary dynamic can also create inflationary pressures in the medium term, in line with the Phillips curve,

which associates strong demand with rising prices. In addition, an increase in the money supply favours production in the short term (thanks to a reduction in interest rates and easier access to credit, as indicated by the IS-LM theory), but its long-term impact depends on the adjustment of inflation expectations (rational expectations theory). Finally, inflation can lead governments to modify public spending and the quantity of money in circulation, illustrating a mixed policy strategy designed to stabilise the economy.

4.4.4. Responses to monetary and fiscal policy shocks in Saudi Arabia

- **In a situation of monetary dominance**

Increased government spending directly stimulates production by boosting aggregate demand, which is in line with the Keynesian multiplier principle. Nevertheless, this expansionary dynamic can also create inflationary pressures in the medium term, in line with the Phillips curve, which associates strong demand with rising prices. In addition, an increase in the money supply favours production in the short term (thanks to a reduction in interest rates and easier access to credit, as indicated by the IS-LM theory), but its long-term impact depends on the adjustment of inflation expectations (rational expectations theory). Finally, inflation can lead governments to modify public spending and the quantity of money in circulation, illustrating a mixed policy strategy designed to stabilise the economy.

The inverse interaction between the output gap and inflation, as well as the tightening of the money supply in response to inflation, are key elements of contemporary economic policy models (Leeper, 1991; Sims, 1994; Woodford, 1995, 2001). This research highlights the crucial role of expectations and policy credibility: a central bank that consistently responds to inflation by restricting the money supply (negative feedback) is able to set expectations and ensure price stability. Finally, the positive link between public spending and the money supply suggests the danger of fiscal dominance (Sims, 1994), where monetary policy is forced to cover budget deficits, which could jeopardise macroeconomic stability in the long term.

- **In a situation of budgetary dominance**

There are several economic theories that can explain these results. As Keynes (1939) explained, an increase in government spending encourages aggregate demand, which explains the stimulating impact on the output gap. However, the limited effect on inflation indicates a fiscal stabilising function, in line with neo-Keynesian theories where nominal rigidities dampen inflationary pressures. The short-term effect of the output gap on the money supply, according to the adaptive expectations of Sargent and Wallace (1981), suggests that the initial expansion of monetary policy may stimulate the economy before leading to inflation. This could then lead to a tightening of monetary policy and a subsequent reduction in productivity.

The interactions between fiscal and monetary policy are clarified by the work of Leeper (1991) and Sims (1994), who show that the credibility of policies influences their effects. The weak response of public spending to the money supply indicates a degree of fiscal independence, consistent with a regime of 'monetary dominance' (Woodford, 1995, 2001). Furthermore, the rapid stabilisation of inflation after an output gap shock points to the idea of active inflation targeting policies, where the authorities react to imbalances to anchor expectations, thereby limiting the persistent effects on prices.

4.5. Analysis of error variance decomposition

4.5.1. Analysis of the variance decomposition of errors in Morocco

- **In a situation of monetary dominance**

The results of the variance decomposition show that the Output Gap is initially dominated by its own shocks (100% in period 1), but its evolution is rapidly shaped by the money supply (20.6% in period 2, stabilising at around 24%), supporting the major role of monetary policy in regulating economic activity. Inflation also has a growing impact (13.6% in period 10), reflecting feedback

loops between prices and output, while public spending has a moderate impact (11% in period 10), suggesting the limited effectiveness of fiscal policy in stabilising the output gap. These results indicate that monetary policy is the preferred instrument for correcting output imbalances in the short to medium term.

Inflation has a high initial inertia of 99.5% in period 1, but gradually becomes sensitive to the Output Gap of 9.6% in period 10, confirming the existence of a demand transmission channel. While public spending makes an increasing contribution in period 10, which should be read as an inflationary signal associated with fiscal stimulus, particularly at full employment, the direct impact of the money supply is negligible at 1.4%, which could be explained by transmission lags or the dominant effect of other structural factors. Ultimately, while monetary policy is a determining factor in the Output Gap, its influence on inflation is via its effect on economic activity, while fiscal policy appears to play a secondary but not negligible role in price dynamics.

- **In a situation of budgetary dominance**

The results of the variance decomposition highlight the adjustment dynamics between the main macroeconomic variables considered. The output gap, OUT, is initially dominated by its own shocks, 100% in period 1, reflecting strong short-term inertia. However, the influence of the money supply, DMM, quickly becomes significant: it explains 27.7% of the variance in period 2, 32% in period 3 and 42.5% in period 4. On average, monetary policy plays a significant role in regulating cyclical fluctuations in economic activity in Morocco. Indeed, inflation, DINF, contributes more and more to the variation of OUT, reaching 13.6% in period 10, highlighting second-order effects between prices and real activity.

As for inflation, the data shows high persistence from the outset, with almost 99.5% of its variance attributed to its own disturbances in the first period. However, the contribution of the Output Gap grows gradually (9.6% in period 10), attesting to a link between output imbalances and inflationary pressures in the medium term. Although public spending has a modest impact (6% in period 4), its influence remains fairly small compared with that of economic activity. Although the money supply has a significant impact on the Output Gap, its influence on inflation is rather marginal (<1.5%). This could be attributed to longer transmission times or to the preponderance of other structural factors.

4.5.2. Analysis of the variance decomposition of errors in Tunisia

- **In a situation of monetary dominance**

Initially, the Output Gap (OUT) is mainly influenced by its internal dynamics. However, its evolution highlights an increasing sensitivity to fiscal policies, particularly public expenditure (DDEP), whose impact increases from 10% to over 12% after a few intervals. This highlights the crucial importance of fiscal policies in boosting or regulating aggregate demand and rectifying production imbalances. However, monetary policy is the main driver of inflation (DINF): the money supply (DMM) is responsible for around 24% of its variance from the third period onwards, confirming that regulating the money supply is crucial for maintaining price stability.

These results illustrate the complementary nature of economic policies. While public spending acts directly on the Output Gap to support economic activity, the money supply remains the preferred tool for controlling inflation. However, the interactions between these variables (such as the moderate influence of inflation on public spending or of the money supply on the Output Gap) show that a coordinated policy mix is essential to balance growth and price stability. An expansionary fiscal policy may thus require monetary adjustment to avoid inflationary pressures, and vice versa.

- **In a situation of budgetary dominance**

The output gap reflects the gap between actual output and economic potential. In the short term, it is mainly influenced by its own dynamics, but the effect of public spending (DDEP) becomes significant in the medium term (23.2% in period 10), confirming the stimulating role of

fiscal policy. By contrast, money supply (DMM) and inflation (DINF) have a marginal impact, suggesting that monetary policy acts with a longer lag. Inflation is initially self-sustaining, but the output gap contributes gradually (10.6% in period 10), in line with the theory that an overheating economy accelerates prices. Monetary and fiscal policies have an indirect influence, which underlines their complementary role in stabilising the economy.

Public spending (DDEP) reacts to the output gap, illustrating a counter-cyclical approach (rise in recession, fall in expansion). The money supply (DMM), although initially determined by internal factors, gradually adjusts in line with inflation and the output gap, reflecting the responsiveness of central banks to economic imbalances. An inflationary shock can thus trigger monetary tightening, while a negative output gap justifies easing. These mechanisms show that fiscal and monetary policies, although distinct, must be coordinated to maximise their effectiveness in terms of growth and price stability.

4.5.3. Analysis of the variance decomposition of errors in Algeria

- **In a situation of monetary dominance**

A study of the variance of the output gap (OUT) shows that government spending (DDEP) has a stabilising effect on the economy. Initially, the output gap is mainly influenced by its own shocks (100% during the first period), but the effect of government spending is significant from the second period onwards (from 8.16% to 9.11%), indicating that an expansive fiscal policy helps to reduce the output gap by boosting demand. However, inflation (DINF) is mainly influenced by its own shocks (99.92% in period 1), but the importance of the money supply (DMM) and public spending increases gradually (reaching up to 22.01%). This suggests that expansionary monetary policy measures (increase in DMM) or fiscal stimulus (increase in DDEP) may intensify inflationary pressures in the medium term.

Monetary policy (MMD) appears to be reactive to economic variations: it is largely determined by the output gap and inflation, indicating that it changes according to cyclical imbalances. For example, an increase in the money supply may be intended to stimulate the economy when the output gap is small, or to offset high inflation. Public spending (DDEP) plays a stabilising role, especially in the face of a high output gap (up to 39% impact of OUT). However, their impact on inflation restricts their use on their own. It is therefore crucial to adopt a balanced policy mix to combine support for growth and inflation control.

- **In a situation of budgetary dominance**

Examination of the variance decomposition indicates that the output gap is mostly attributed to its own initial shocks. However, the effect of the money supply (DMM) becomes noticeable from period 2, suggesting an increasing importance of monetary policy in the behaviour of the output gap. This can be attributed to the impact of interest rates and credit on aggregate demand. However, inflation is mainly determined by its own dynamics, even if public spending (DDEP) and the money supply gradually play a role in its fluctuations, indicating the effect of fiscal and monetary policies on inflationary pressures.

In addition, public spending shows a high sensitivity to the output gap, meaning that fiscal decision-makers modify their strategies in response to economic variations. Thus, the money supply reacts to both inflation and the output gap, proving that the central bank modifies its strategy in response to economic imbalances. These results highlight the importance of the policy mix: monetary policy plays a dominant role on the output gap and inflation, while fiscal policy responds to output shocks while influencing inflation in the long run.

4.5.4. Analysis of error variance decomposition in Saudi Arabia

- **In a situation of monetary dominance**

The output gap is mainly influenced by its own initial shocks (100% in the first quarter), reflecting its independence in the short term. However, over an extended period, other factors such as inflation (DINF), the money supply (DMM) and government spending (DEP) contribute marginally. This indicates that the impact of economic policies on the output gap is limited in the short term, but that this influence tends to strengthen over time. Inflation is largely self-determined (99% initially), but the output gap becomes an important factor (8% from the second period onwards), meaning that changes in growth have an impact on prices. Inflation is influenced in a secondary but nonetheless perceptible way by monetary policy (quantity of money) and fiscal policy (public spending).

The money supply (MMD) is initially determined by central bank decisions, but the output gap has an increasingly important impact (50% in period 2), demonstrating that economic conditions influence monetary changes. Public expenditure (PED) is partially under the control of political elements, while also being sensitive to the output gap and monetary supply, highlighting an interdependent relationship between fiscal policy and economic conditions. Overall, these conclusions support the idea of coordinating fiscal and monetary policies, with particular emphasis on targeting the output gap to maintain stable inflation and growth. Proactive management is crucial during periods of shocks, when internal variations in variables are predominant, but their interaction can exacerbate or moderate macroeconomic imbalances.

- **In a situation of budgetary dominance**

The output gap is mainly determined by its own dynamics, as shown by the variance decomposition, where it explains more than 97% of its short- and medium-term fluctuations. Other variables, such as inflation, public spending and the money supply, have a negligible impact (less than 1%). This suggests that output gaps are influenced more by factors internal to the real economy, such as business cycles, than by monetary or fiscal policies. On the other hand, inflation remains largely explained by itself (77-84%), but the output gap is making an increasing contribution (7-14%), reflecting a link between economic imbalances and inflationary pressures. Public spending also plays a moderate role (4-5%), while the money supply has a limited effect (2-3%).

The output gap has a considerable influence on government expenditure (DDEP), accounting for almost 50% of its fluctuation, demonstrating that budgetary decisions are adjusted in line with economic changes. However, their impact on inflation remains limited. As for the money supply (DMM), it shows a sensitivity to the output gap (up to 67%), which suggests that monetary policy is modulated according to economic conditions. The effect of inflation on the volume of money in circulation (8-9%) also points to a response by monetary authorities to inflationary pressures. These observations suggest that economic policies appear more frequently as responses to disturbances (output gap, inflation) rather than as short-term stabilising factors.

5. Conclusion

The aim of this study was to empirically assess the impact of the policy mix on macroeconomic stability, as measured by fluctuations in inflation and the output gap, in four MENA countries with contrasting profiles: Morocco, Tunisia (oil importers), Algeria and Saudi Arabia (oil exporters), over the period 1990-2023. Using SVAR modelling under Cholesky identification, we tested two hypotheses: (1) the superiority of an active monetary policy accompanied by a passive fiscal policy to stabilise the economy, and (2) the structural role of political dominance according to economic characteristics.

The results show a marked divergence depending on the country's economic and energy structure :

In Morocco, the results confirm the monetary dominance, with a strong reactivity of the output gap to the money supply and a more marginal effect of public spending. This reflects the effectiveness of a proactive monetary policy in stabilising economic activity, even in an energy-importing country subject to external shocks. In a situation of fiscal dominance, monetary policy remains the determining factor, which corroborates hypothesis 1.

In Tunisia, the different policies complement each other. Under monetary dominance, money supply has an impact on inflation, while government spending mainly influences the output gap. In a context of budget constraint, the impact of government spending on the economy is accentuated, indicating a dynamic fiscal system. However, monetary policy continues to have an indirect impact on prices, which partly supports hypothesis 2.

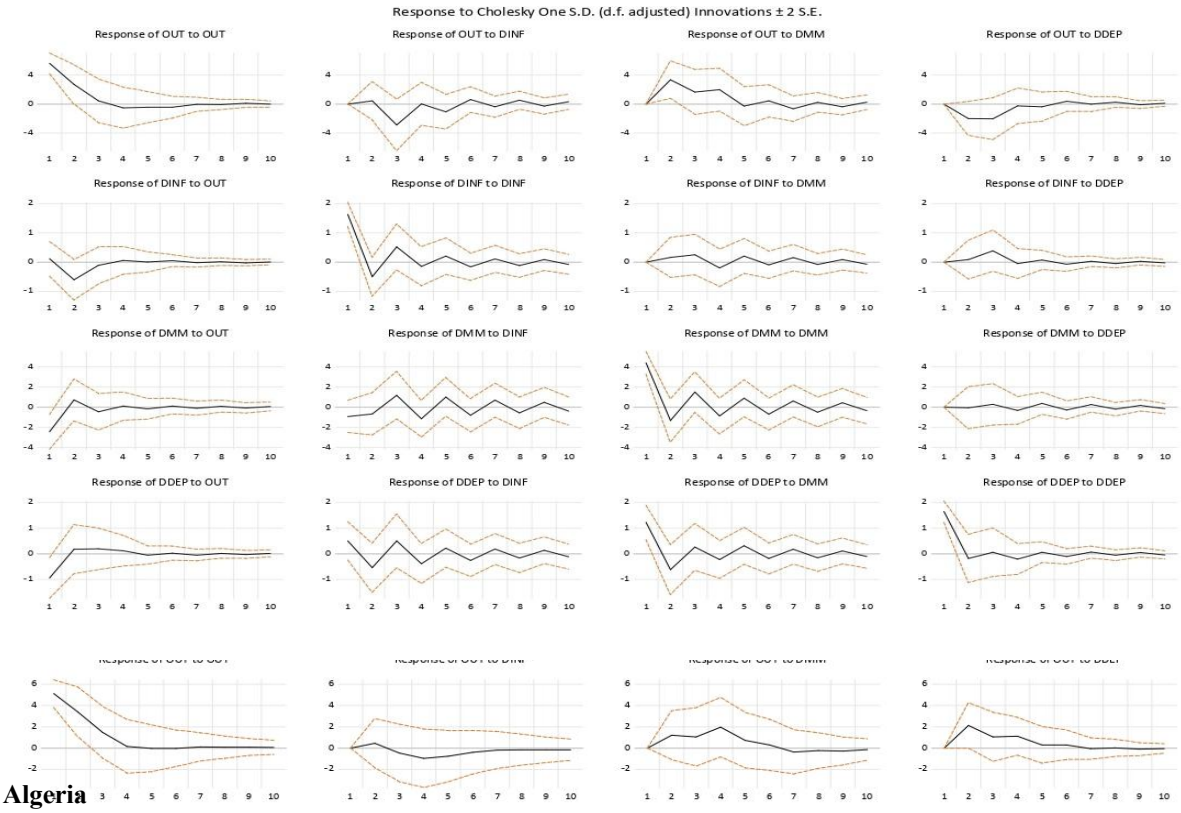
In Algeria, an oil exporter, the results show a balanced influence of the two policies, but with a budgetary pre-eminence in economic dynamics. Public spending has a significant impact on output and inflation, particularly in a context of high oil prices. Monetary policy is more accommodating than proactive, illustrating a regime close to fiscal dominance, in line with hypothesis 2.

In Saudi Arabia, also an exporter, the analysis reveals a pattern similar to that of Algeria, with a highly inertial output gap and a dominance of internal dynamics. Fiscal policy, although reactive to the economic situation, plays a moderate role in inflation. However, monetary policy appears to be influenced more by economic conditions than by policy, reflecting a form of passive monetary adjustment in the face of a predominantly fiscal policy. This fully validates hypothesis 2.

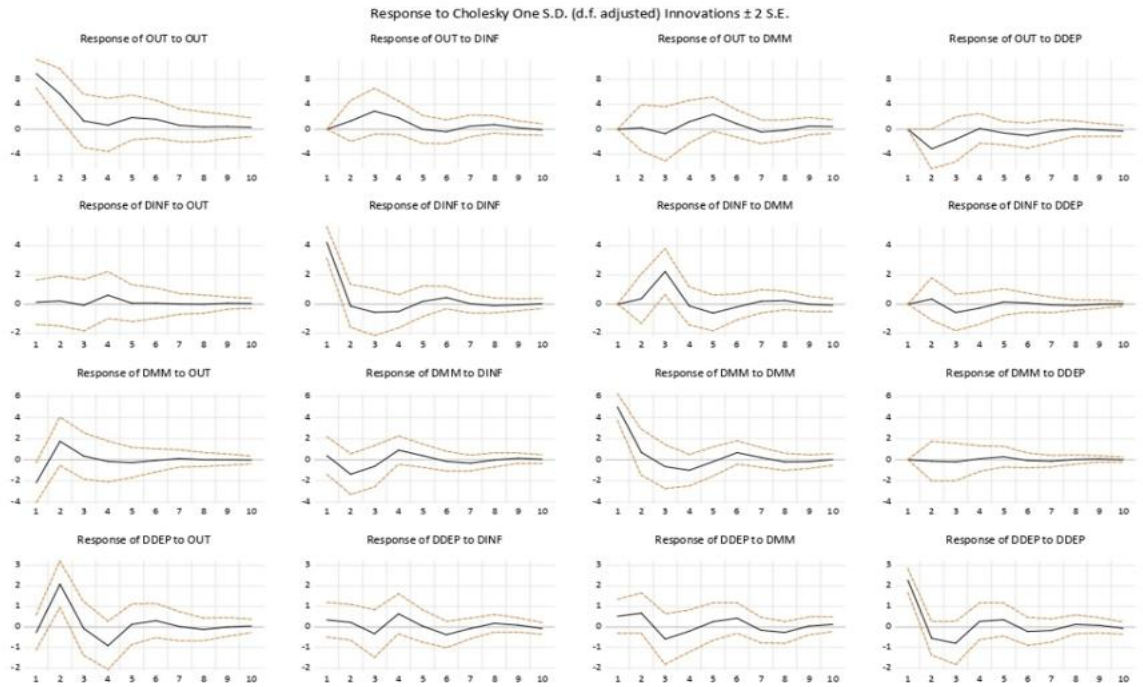
The results highlight the importance of optimal coordination of the policy mix, adapted to structural constraints and energy dependency. A monetary policy based on price stability, coupled with a counter-cyclical fiscal policy, appears optimal in the face of external shocks. These findings confirm the contributions of Leeper (1991), Sims (1994) and Woodford (2001).

Figure 1: Impulse responses of the SVAR model under monetary dominance

Morocco



Algeria



Saudi Arabia

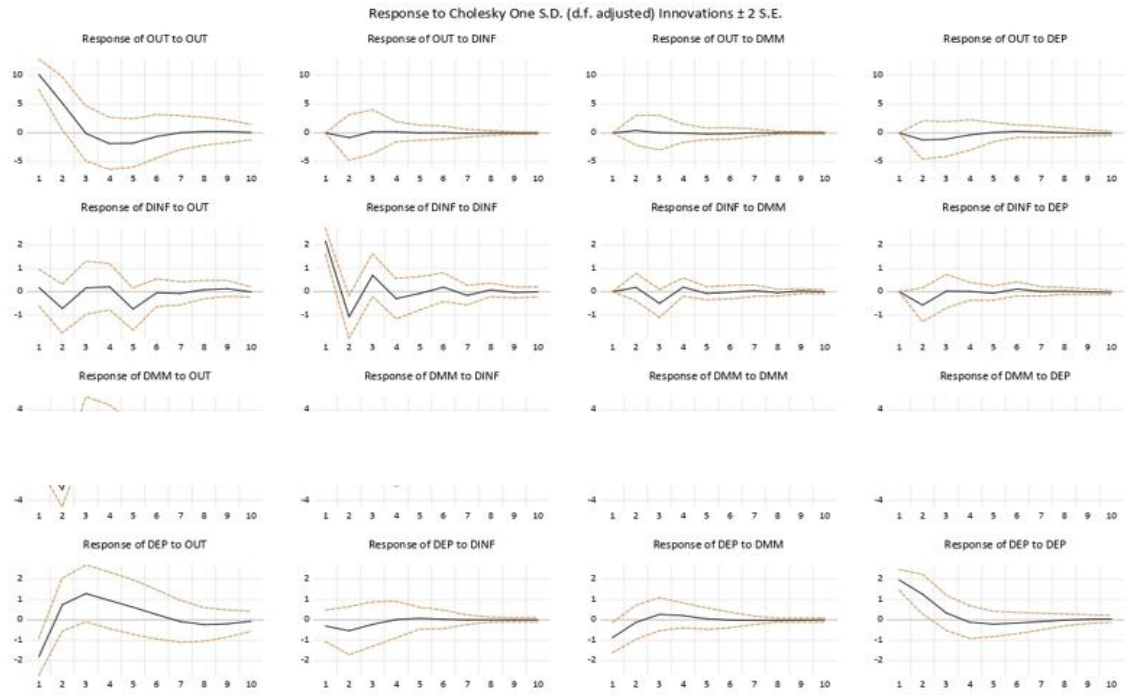
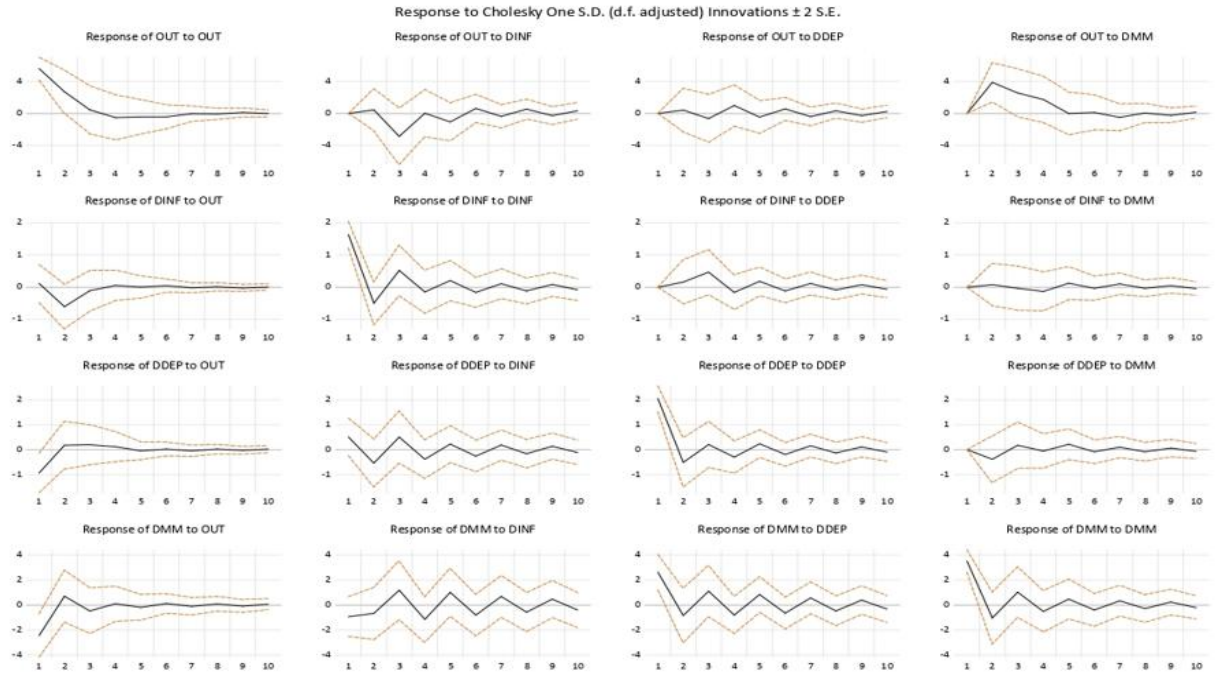
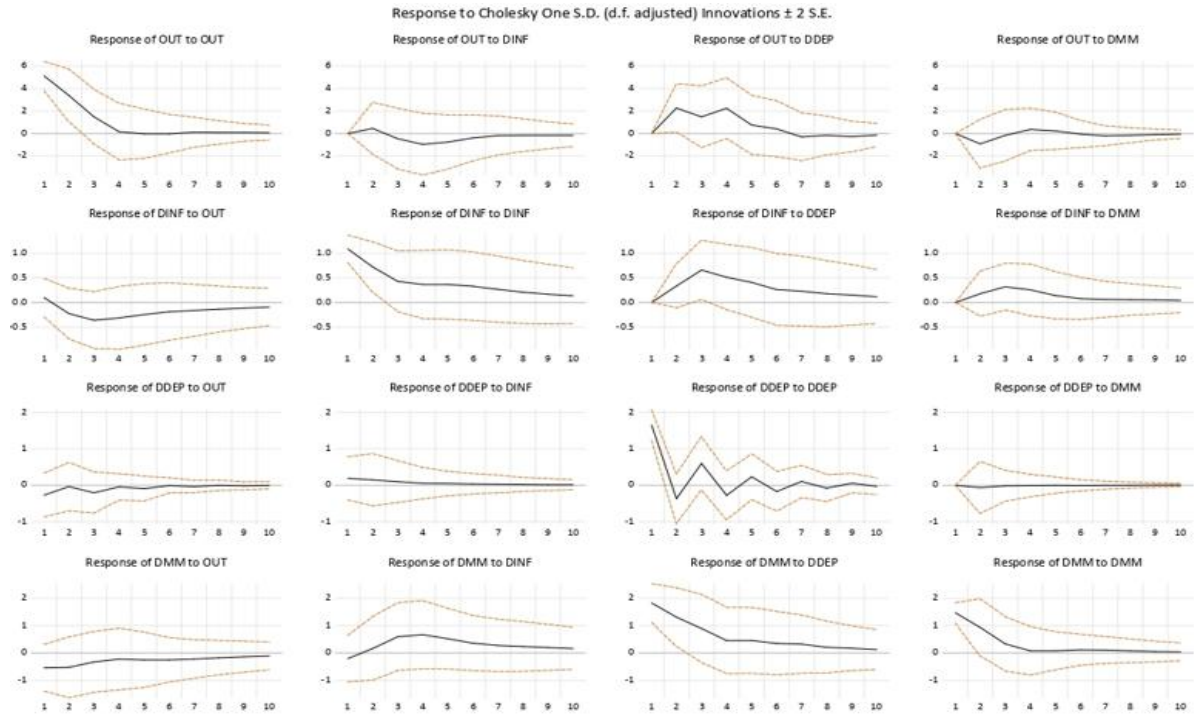


Figure 2: Impulse responses of the SVAR model under fiscal dominance

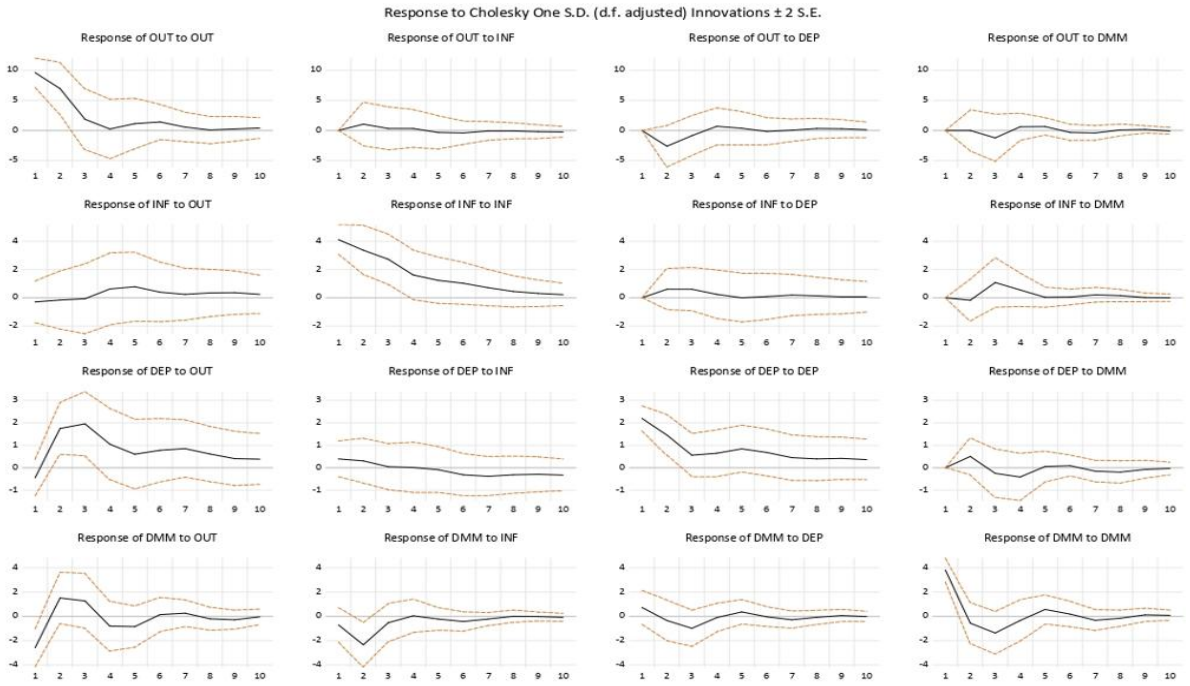
Morocco


Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.
Response of OUT to OUT
Response of OUT to DINF
Response of OUT to DDEP
Response of OUT to DMM
Response of DINF to OUT
Response of DINF to DINF
Response of DINF to DDEP
Response of DINF to DMM
Response of DDEP to OUT
Response of DDEP to DINF
Response of DDEP to DDEP
Response of DDEP to DMM
Response of DMM to OUT
Response of DMM to DINF
Response of DMM to DDEP
Response of DMM to DMM

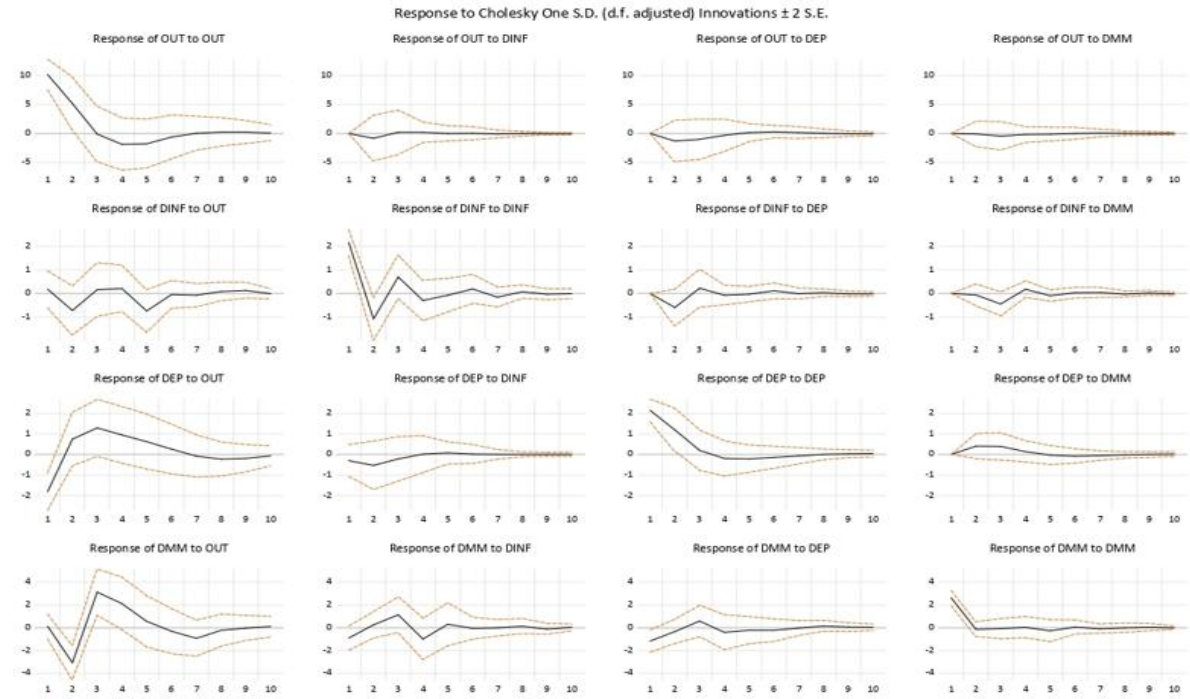
Tunisia


Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.
Response of OUT to OUT
Response of OUT to DINF
Response of OUT to DDEP
Response of OUT to DMM
Response of DINF to OUT
Response of DINF to DINF
Response of DINF to DDEP
Response of DINF to DMM
Response of DDEP to OUT
Response of DDEP to DINF
Response of DDEP to DDEP
Response of DDEP to DMM
Response of DMM to OUT
Response of DMM to DINF
Response of DMM to DDEP
Response of DMM to DMM

Algeria



Saudi Arabia



Appendix

Table 2: Results of unit root tests

Country	Variables	Unit root test		
		Statistique	**P_value**	Conclusion
Morocco	OUT			**I(0)**
	INF	-7.98	-1.95	**I(1)**
	MM	-2.51	-1.95	**I(1)**
	DEP	-7.59	-1.95	**I(1)**
Algeria	OUT			**I(0)**
	INF	-5.75	-1.95	**I(1)**
	MM	-6.05	-1.95	**I(1)**
	DEP	-5.88	-1.95	**I(1)**
Tunisia	OUT			**I(0)**
	INF	-2.65	-1.95	**I(1)**
	MM	-3.36	-1.95	**I(1)**
	DEP	-2.77	-1.95	**I(1)**
Saudi Arabia	OUT			**I(0)**
	INF	-9.63	-1.95	**I(1)**
	MM	-6.21	-1.95	**I(1)**
	DEP			**I(0)**

Table 3: Choice of the number of lags in a VAR model

Country	Lag	LogL	LR	FPE	AIC	SC	HQ
Monetary dominance							
Morocco	0	-311.5442	NA	8154.074	20.35769	20.54272	20.41801*
	1	**-295.2257**	**27.37308***	**8078.793***	**20.33714***	**21.26229***	20.63872
	2	-284.7100	14.92551	12188.21	20.69096	22.35624	21.23380
Algeria	0	-377.3448	NA	568905.4	24.60289	24.78792*	24.66320*
	1	-359.9641	29.15462*	526324.5	24.51381	25.43897	24.81539
	2	**-342.6652**	**24.55325**	**512612.2***	**24.43002***	**26.09529***	24.97285
Tunisia	0	-283.5010	NA	1335.461	18.54845	18.73348	18.60877
	1	**-242.0039**	**69.60805***	**260.6908***	**16.90348***	**17.82863***	**17.20505***
	2	-235.3196	9.487301	503.5850	17.50449	19.16977	18.04733
Saudi Arabia	0	-358.4248	NA	167849.9	23.38224	23.56727	23.44256
	1	-329.3991	48.68820	73257.62	22.54188	23.46703*	22.84346
	2	**-303.9583**	**36.10950***	**42194.91***	**21.93280***	23.59807	**22.47563***

Country	Lag	LogL	LR	FPE	AIC	SC	HQ
Fiscal dominance							
Morocco	0	-311.5442	NA	8154.074	20.35769	**20.54272***	**20.41801***
	1	**-295.2257**	**27.37308***	**8078.793***	**20.33714***	21.26229	20.63872
	2	-284.7100	14.92551	12188.21	20.69096	22.35624	21.23380
Algeria	0	-403.2159	NA	3019414	26.27199	26.45702	26.33231
	1	**-350.5767**	**88.29801***	**287228.1***	**23.90817***	**24.83333***	**24.20975***
	2	-334.6321	22.63102	305286.9	23.91175	25.57702	24.45459
Tunisia	0	-283.5010	NA	1335.461	18.54845	18.73348	18.60877
	1	**-242.0039**	**69.60805***	**260.6908***	**16.90348***	**17.82863***	**17.20505***
	2	-235.3196	9.487301	503.5850	17.50449	19.16977	18.04733
Saudi Arabia	0	-358.4248	NA	167849.9	23.38224	23.56727	23.44256
	1	-329.3991	48.68820	73257.62	22.54188	**23.46703***	22.84346

	2	**-303.9583**	**36.10950***	**42194.91***	**21.93280***	23.59807	**22.47563***

Table 4: Diagnostic tests for VAR models

Pays	Autocorrélation (LM test)*p-valeur max*	Hétéroscédasticité (White)*Prob. du test joint*	Normalité des Résidus (JB)*Prob. jointe*
Monetary dominance			
Morocco	0.82	0.5174	0.09
Algeria	0.94	0.5120	0.079
Tunisia	0.99	0.7991	0.512
Saudi Arabia	0.87	0.2695	0.8511
Fiscal dominance			
Morocco	0.22	0.5174	0.194
Algeria	0.29	0.5120	0.094
Tunisia	0.73	0.7991	0.6122
Saudi Arabia	0.22	0.2695	0.8511

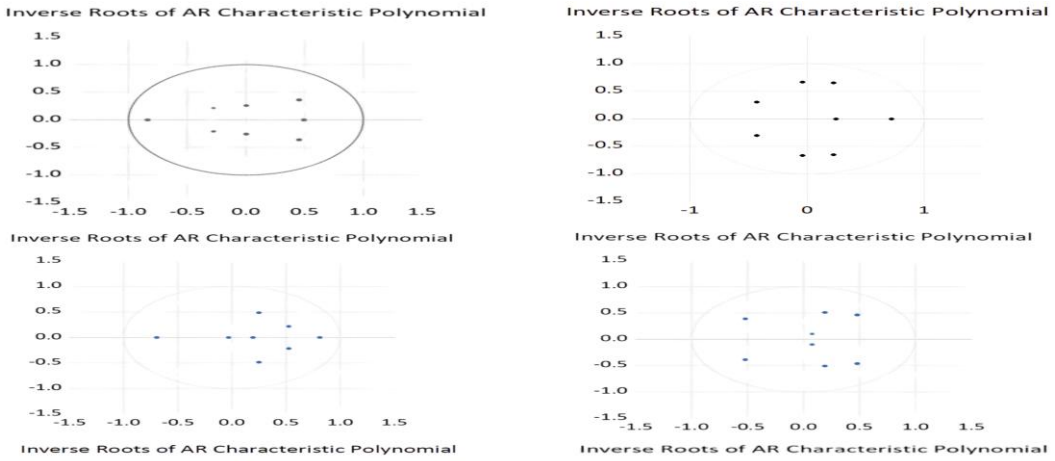


Table 5: Variance decomposition of the SVAR model under monetary dominance

Morocco

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DMM (%)	DDEP (%)
1	5.626961	100.00	0.00	0.00	0.00
2	7.373490	71.66	0.37	20.62	7.36
3	8.351949	56.12	12.20	20.02	11.67
4	8.602687	53.26	11.50	24.15	11.09
5	8.693441	52.41	12.78	23.77	11.04
6	8.744517	52.07	13.11	23.73	11.09
7	8.776264	51.70	13.19	24.10	11.01
8	8.798426	51.44	13.48	24.04	11.03
9	8.812094	51.30	13.55	24.15	11.01
10	8.821529	51.19	13.64	24.18	11.00

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DMM (%)	DDEP (%)
1	1.636083	0.49	99.51	0.00	0.00
2	1.821679	11.27	87.70	0.81	0.21
3	1.954076	10.11	83.27	2.43	4.19
4	1.970344	10.03	82.42	3.36	4.18
5	1.993624	9.80	81.58	4.41	4.21
6	2.003730	9.76	81.37	4.57	4.30
7	2.013013	9.68	80.94	5.10	4.28
8	2.018426	9.63	80.84	5.21	4.31
9	2.022523	9.61	80.69	5.38	4.32

10	2.025198	9.58	80.62	5.47	4.32

Tunisia

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DMM (%)	DDEP (%)
1	5.1136	100.00	0.00	0.00	0.00
2	6.6140	85.85	0.48	3.30	10.36
3	6.9545	82.19	0.86	5.28	11.68
4	7.3765	73.10	2.42	11.83	12.65
5	7.4574	71.52	3.40	12.55	12.52
6	7.4791	71.11	3.64	12.63	12.62
7	7.4906	70.91	3.69	12.82	12.58
8	7.4963	70.82	3.72	12.90	12.56
9	7.5047	70.68	3.76	13.01	12.55
10	7.5079	70.62	3.80	13.03	12.55

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DMM (%)	DDEP (%)
1	1.0898	0.80	99.20	0.00	0.00
2	1.3782	3.20	89.23	7.30	0.28
3	1.6578	6.93	68.34	23.55	1.18
4	1.8181	8.71	60.81	29.04	1.45
5	1.9187	9.44	58.19	30.52	1.86
6	1.9750	9.80	57.71	30.46	2.03
7	2.0138	10.08	57.29	30.46	2.17
8	2.0376	10.30	57.00	30.47	2.22
9	2.0540	10.46	56.75	30.53	2.26
10	2.0641	10.56	56.63	30.53	2.28

Algeria :

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DMM (%)	DDEP (%)
1	8.9150	100.00	0.00	0.00	0.00
2	11.0972	90.42	1.38	0.04	8.16
3	11.6815	82.90	7.32	0.43	9.35
4	11.9017	80.17	9.38	1.43	9.02
5	12.3004	77.37	8.78	5.15	8.69
6	12.4824	76.75	8.64	5.49	9.12
7	12.5195	76.54	8.75	5.57	9.14
8	12.5486	76.27	9.07	5.56	9.10
9	12.5672	76.14	9.07	5.70	9.09
10	12.5814	76.03	9.06	5.80	9.11

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DMM (%)	DDEP (%)
1	4.2427	0.08	99.92	0.00	0.00
2	4.2792	0.33	98.32	0.70	0.64
3	4.8904	0.28	76.58	21.24	1.90
4	4.9641	1.79	75.37	20.67	2.17
5	5.0074	1.77	74.21	21.81	2.21
6	5.0317	1.77	74.27	21.74	2.22
7	5.0355	1.77	74.16	21.85	2.23
8	5.0431	1.76	73.98	22.01	2.25
9	5.0438	1.78	73.97	22.01	2.25
10	5.0447	1.78	73.95	22.02	2.25

Saudi Arabia

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DMM (%)	DEP (%)
1	10.1815	100.00	0.00	0.00	0.00
2	11.5138	98.27	0.47	0.16	1.10

3	11.5656	97.40	0.50	0.16	1.94
4	11.7163	97.34	0.52	0.15	1.98
5	11.8457	97.37	0.51	0.17	1.95
6	11.8642	97.30	0.51	0.18	2.01
7	11.8662	97.27	0.52	0.18	2.03
8	11.8695	97.27	0.52	0.18	2.04
9	11.8727	97.27	0.52	0.18	2.03
10	11.8734	97.27	0.52	0.18	2.04

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DMM (%)	DEP (%)
1	2.1698	0.69	99.31	0.00	0.00
2	2.5914	7.99	86.80	0.52	4.70
3	2.7340	7.53	84.51	3.73	4.23
4	2.7654	7.97	83.74	4.15	4.14
5	2.8644	14.05	78.12	3.92	3.90
6	2.8737	13.98	78.07	3.90	4.05
7	2.8789	14.00	78.05	3.91	4.04
8	2.8817	14.06	77.97	3.92	4.04
9	2.8852	14.25	77.79	3.92	4.03
10	2.8853	14.25	77.79	3.92	4.04

Table 5: Variance decomposition of the SVAR model under budget dominance

Morocco

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DDEP (%)	DMM (%)
1	5.6270	100.00	0.00	0.00	0.00
2	7.3735	71.66	0.37	0.30	27.68
3	8.3519	56.12	12.20	0.81	30.87
4	8.6027	53.26	11.50	2.05	33.19
5	8.6934	52.41	12.78	2.30	32.50
6	8.7445	52.07	13.11	2.67	32.14
7	8.7763	51.70	13.19	2.86	32.25
8	8.7984	51.44	13.48	2.99	32.09
9	8.8121	51.30	13.55	3.10	32.06
10	8.8215	51.19	13.64	3.16	32.02

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DDEP (%)	DMM (%)
1	1.6361	0.49	99.51	0.00	0.00
2	1.8217	11.27	87.70	0.83	0.20
3	1.9541	10.11	83.27	6.42	0.19
4	1.9703	10.03	82.42	6.94	0.60
5	1.9936	9.80	81.58	7.62	1.00
6	2.0037	9.76	81.37	7.85	1.01
7	2.0130	9.68	80.94	8.11	1.27
8	2.0184	9.63	80.84	8.24	1.29
9	2.0225	9.61	80.69	8.35	1.35
10	2.0252	9.58	80.62	8.42	1.38

Tunisia

Time	Standard deviation (S.E.)	OUT (%)	DINF (%)	DDEP (%)	DMM (%)
1	5.1136	100.00	0.00	0.00	0.00
2	6.6140	85.85	0.48	11.79	1.87
3	6.9545	82.19	0.86	15.20	1.75
4	7.3765	73.10	2.42	22.67	1.81
5	7.4574	71.52	3.40	23.21	1.87
6	7.4791	71.11	3.64	23.39	1.86

7	7.4906	70.91	3.69	23.47	1.93
8	7.4963	70.82	3.72	23.49	1.97
9	7.5047	70.68	3.76	23.58	1.98
10	7.5079	70.62	3.80	23.59	1.99
10	2.0641	10.56	56.63	27.30	5.51
Time	Standard deviation (S.E.)	**OUT (%)**	**DINF (%)**	**DDEP (%)**	**DMM (%)**
1	1.0898	0.80	99.20	0.00	0.00
2	1.3782	3.20	89.23	5.93	1.65
3	1.6578	6.93	68.34	19.89	4.84
4	1.8181	8.71	60.81	24.52	5.96
6	1.9750	9.80	57.71	26.76	5.73
7	2.0138	10.08	57.29	27.03	5.61
8	2.0376	10.30	57.00	27.14	5.56
9	2.0540	10.46	56.75	27.26	5.53
10	2.0641	10.56	56.63	27.30	5.51

Algeria :

Time	**Standard deviation (S.E.)**	**OUT (%)**	**DINF (%)**	**DMM (%)**	**DDEP (%)**
1	8.9150	100.00	0.00	0.00	0.00
2	11.0972	90.42	1.38	0.04	8.16
3	11.6815	82.90	7.32	0.43	9.35
4	11.9017	80.17	9.38	1.43	9.02
5	12.3004	77.37	8.78	5.15	8.69
6	12.4824	76.75	8.64	5.49	9.12
7	12.5195	76.54	8.75	5.57	9.14
8	12.5486	76.27	9.07	5.56	9.10
9	12.5672	76.14	9.07	5.70	9.09
10	12.5814	76.03	9.06	5.80	9.11

Time	**Standard deviation (S.E.)**	**OUT (%)**	**DINF (%)**	**DMM (%)**	**DDEP (%)**
1	4.2427	0.08	99.92	0.00	0.00
2	4.2792	0.33	98.32	0.70	0.64
3	4.8904	0.28	76.58	21.24	1.90
4	4.9641	1.79	75.37	20.67	2.17
5	5.0074	1.77	74.21	21.81	2.21
6	5.0317	1.77	74.27	21.74	2.22
7	5.0355	1.77	74.16	21.85	2.23
8	5.0431	1.76	73.98	22.01	2.25
9	5.0438	1.78	73.97	22.01	2.25
10	5.0447	1.78	73.95	22.02	2.25

Saudi Arabia

Time	**Standard deviation (S.E.)**	**OUT (%)**	**DINF (%)**	**DEP (%)**	**DMM (%)**
1	10.1815	100.00	0.00	0.00	0.00
2	11.5138	98.27	0.47	1.25	0.00
3	11.5656	97.40	0.50	1.97	0.13
4	11.7163	97.34	0.52	1.99	0.15
5	11.8457	97.37	0.51	1.97	0.15
6	11.8642	97.30	0.51	2.04	0.15
7	11.8662	97.27	0.52	2.05	0.16
8	11.8695	97.27	0.52	2.05	0.16
9	11.8727	97.27	0.52	2.05	0.16

10	11.8734	97.27	0.52	2.06	0.16
Time	Standard deviation (S.E.)	**OUT (%)**	**DINF (%)**	**DEP (%)**	**DMM (%)**
1	2.1698	0.69	99.31	0.00	0.00
2	2.5914	7.99	86.80	5.17	0.05
3	2.7340	7.53	84.51	5.34	2.63
4	2.7654	7.97	83.74	5.27	3.01
5	2.8644	14.05	78.12	4.92	2.91
6	2.8737	13.98	78.07	5.05	2.90
7	2.8789	14.00	78.05	5.04	2.91
8	2.8817	14.06	77.97	5.05	2.92
9	2.8852	14.25	77.79	5.04	2.92
10	2.8853	14.25	77.79	5.04	2.92

6. Reference

- Alesina, A., & Perotti, R. (1997). Fiscal adjustments in OECD countries. *IMF Staff Papers*, *44*(2), 210-248.
- Ali, S., Irum, S., & Ali, A. (2008). Whether fiscal stance or monetary policy is effective for economic growth in case of South Asian countries? *The Pakistan Development Review*, *47*(4), 791–799.
- Bernanke, B. S., & Blinder, A. S. (1992). The federal funds rate and the channels of monetary transmission. *American Economic Review*, *82*(4), 901-921.
- Bianchi, F., & Melosi, L. (2017). Escaping the Great Recession. *American Economic Review*, *107*(4), 1030-1058.
- Blanchard, O., & Perotti, R. (2002). An empirical characterization of the dynamic effects of changes in government spending and taxes on output. *Quarterly Journal of Economics*, *117*(4), 1329-1368.
- Cochrane, J. H. (2011). Inflation and debt. *National Affairs*, *9*, 56-78.
- Cevik, E. I., Dibooglu, S., & Kutan, A. M. (2013). Measuring financial stress in transition economies. *Journal of Financial Stability*, *9*(4), 597-611.
- Davig, T., & Leeper, E. M. (2011). Monetary–fiscal policy interactions and fiscal stimulus. *European Economic Review*, *55*(2), 211-227.
- Dornbusch, R. (1976). Expectations and exchange rate dynamics. *Journal of Political Economy*, *84*(6), 1161-1176.
- Dungey, M., & Fry, R. (2009). The identification of fiscal and monetary policy in a structural VAR. *Economic Modelling*, *26*(6), 1147–1160.
- Eichengreen, B. (2011). *Exorbitant privilege: The rise and fall of the dollar and the future of the international monetary system*. Oxford University Press.
- El Khattab, Y., El Yamani, R., & Hefnaoui, A. (2023, December). Assessing the effectiveness of the fiscal-monetary policy mix: Evidence from Morocco, Egypt and Saudi Arabia. *Economic Research Forum (ERF)*.
- Favero, C., & Giavazzi, F. (2012). Measuring tax multipliers: The narrative method in fiscal VARs. *American Economic Journal: Economic Policy*, *4*(2), 69-94.
- Fleming, J. M. (1962). Domestic financial policies under fixed and floating exchange rates. *IMF Staff Papers*, *9*(3), 369-380.
- Friedman, M. (1968). The role of monetary policy. *American Economic Review*, *58*(1), 1-17.
- Hicks, J. R. (1937). Mr. Keynes and the "Classics"; A Suggested Interpretation. *Econometrica*, *5*(2), 147–159.
- Harrod, R. F. (1937). The theory of capital. *Economic Journal*, *47*(188), 259–278.
- Hansen, A. H. (1953). A Guide to Keynes. *McGraw-Hill*.

- Jawadi, F., Mallick, S. K., & Sousa, R. M. (2016). Fiscal and monetary policies in the BRICS: A panel VAR approach. *Economic Modelling*, *58*, 535-542.
- Keynes, J. M. (1936). *The general theory of employment, interest, and money*. Macmillan.
- Leeper, E. M. (1991). Equilibria under 'active' and 'passive' monetary and fiscal policies. *Journal of Monetary Economics*, *27*(1), 129-147.
- Meade, J. E. (1937). Theoretical analysis of the mechanism of income adjustment in a closed economy. *Review of Economic Studies*, *4*(1), 1–16.
- Moreira, R. R., & Monte, E. Z. (2021). Monetary and fiscal policies interaction in a large emerging economy: Which is the leader policy? *International Journal of Economics and Finance*, *13*(11), 81-91.
- Mundell, R. A. (1963). Capital mobility and stabilization policy under fixed and flexible exchange rates. *Canadian Journal of Economics and Political Science/Revue canadienne de économiques et science politique*, *29*(4), 475-485.
- Nasrullah, M. J., Saghir, G., Iqbal, M. S., & Hussain, P. (2023). Macroeconomic stability and optimal policy mix. *IRASD Journal of Economics*, *5*(3), 725–745.
- Oanh, T. T. K. (2024). Fiscal and monetary policies interaction in crisis: An insight into Japan. *SAGE Open*, *14*(1), 1-13.
- Phillips, A. W. (1958). The relation between unemployment and inflation. *Economica*, *25*(100), 283-299.
- Reinhart, C. M., & Rogoff, K. S. (2010). Growth in a time of debt. *American Economic Review*, *100*(2), 573-578.
- Sargent, T. J., & Wallace, N. (1981). Some unpleasant monetarist arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review*, *5*(3), 1-17.
- Sims, C. A. (1992). Interpreting the macroeconomic time series facts: The effects of monetary policy. *European Economic Review*, *36*(5), 975-1000.
- Sims, C. A. (1994). A simple model for the study of the determination of macroeconomic time series. *Econometrica*, *62*(2), 383–413.
- Taylor, J. B. (1993). Discretion versus policy rules. *Carnegie-Rochester Conference Series*, *39*, 195-214.
- Tinbergen, J. (1952). *On the theory of economic policy*.
- Woodford, M. (2001). Fiscal requirements for price stability.
- Woodford, M. (2003). *Interest and prices*. Princeton University Press.
- Zeileis, A., Leisch, F., Hornik, K., & Kleiber, C. (2002). strucchange: An R package for testing for structural change in linear regression models. *Journal of Statistical Software*, *7*(2), 1–38.