

Analysis of interactions between fiscal and monetary policy in Algeria

تدليل التفاعلات بين السياسة الجبائية والنقدية في الجزائر

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Abstract:

Fiscal policy can impact the conduct of monetary policy through multiple channels. Indeed, the increase in public spending short-term demand, while long-term investments act on the production path of the economy and, ultimately, on the trajectory future of inflation. For its part, monetary policy, through the interest rates, would also affect the refinancing costs of the Treasury public, and hence on the level of the budget deficit and to some extent on the sustainability of the public debt.

keyword : Fiscal Policy; Monetary Policy; interactions ; model DSGE

JEL classification code : C5 ,H30 , E5

ملخص:

يمكن أن تؤثر السياسة المالية على إدارة السياسة النقدية من خلال قنوات متعددة، و في الواقع ، فإن الزيادة في الطلب العام على الإنفاق على المدى القصير ، من شأنه ان يشجع الاستثمارات طويلة الأجل التي تعمل على نمو الاقتصاد ، الى جانب ، تأثيرها على التضخم. و من جانبها ، ستؤثر السياسة النقدية ، من خلال أسعار الفائدة ، أيضاً على تكاليف إعادة تمويل الخزينة ، وبالتالي على مستوى العجز في الميزانية وإلى حد ما على استدامة الدين العام

الكلمات المفتاحية : السياسة المالية ; السياسة النقدية; التفاعلات; نماذج التوازن العام

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1. Introduction :

Interactions between fiscal policy and emerging monetary policy since the Government and the Central Bank are targeting the same objectives and use instruments that affect the economy through the same channel. Indeed, from a Keynesian point of view, the existence of distortions and rigidities within of the economy, as well as the imperfections that can be accentuated within of the financial market, contribute significantly to Ricardian economic agents. In this context, fiscal policy consolidates its effectiveness in stimulating demand through the mechanism multiplier by increasing spending or acting on revenue. at the same time, with the strengthening of the independence of central banks and sophistication of financial products, changes in the key interest rate may influence the financing conditions of economic agents, act on the medium-term expectations and to orient the value of the local currency in a flexible exchange rate regime. the interrogations related to the interactions arise with all the more acuteness when public authorities face dilemmas of economic policies. To the extent that Governments are more oriented towards the stabilization of growth cycle and job creation, their efforts are becoming more stimulation of production. On the side of the Central Bank, with the abandonment inflation-growth arbitrage, price stability has emerged as the

main mission of the issuing institutions. therefore, monetary policy is refocused on maintaining the purchasing power of economic agents and the anchoring of expectations. this is how the economic work concerning this theme developed in two directions: the first concerns the "Policy mix" or optimal mix of fiscal policy and policy monetary. These reflections are particularly interested in the model that adopt the Government and the Central Bank in economic policy in order to successfully achieve the goals they have set for themselves, increase the efficiency their interventions and thus preserve their credibility. The second current, as to him, has attempted to describe empirically the reactions of each authority following actions undertaken by the other. Since it would be extremely difficult to suggest a universally optimal model of collaboration or combination, the study of the behavior of the political decision-makers makes it possible to give an idea on the model actually adopted and evaluate it accordingly according to the

results. For emerging or developing countries, this theme contains another dimension. Economic policies are more concerned with development

productive structures in the country with a view to reducing unemployment and improving the living conditions of citizens, only by the management of short-term imbalances sometimes necessary to achieve the strategic objectives. As well, the environment for implementing economic policies is not similar advanced countries because institutional rigidities and margins of available to the Central Banks significantly Interactions between fiscal policy and other economic policies in Algeria

the conclusion of cyclical policies. Therefore, the nature of interactions depends to a large extent both on the directions of the powers and the range of opportunities offered by the macroeconomic framework. This work is organized in three parts. The first comes back to the debates theories surrounding the allocation of economic policy instruments to strategic objectives and its implications for the nature of the interactions that can derive from the crossings of these objectives and instruments as well as the evolution of the statutes and powers of the institutions. The second, for its part, will present the dynamic and stochastic general equilibrium model (DSGE) estimated to valuate the coordination between fiscal policy and monetary policy in Algeria. Finally, the last part will discuss the simulations from the model.

2. Literature review:

The theorem of Tinbergen (1952)¹ made a seminal contribution to identifying the number of objectives to be monitored by decision makers depending on the number of instruments available to them. Indeed, Tinbergen advocates that economic policy must have, at least, as much instruments than independent objectives. Nevertheless, these works were not interested in the constraints linked to the optimal allocation of instruments objectives. It is in this perspective that Mundell (1962)²

provided insights into the unwelcome repercussions of cross-media effects instruments on bjectives. So and starting from an economic policy that pursues two objectives using two instruments, the use of an instrument in particular, may exceed the objective initially

associated with it by other targets. Interference that can emerge between instruments and Targets are becoming costly for governments in terms of efficiency and credibility if the "unwanted" indirect effects take precedence over main goals. For Mundell (1962)³, indirect or "crossed" effects can be minimized if instruments are allocated to targets based on "comparative advantages". This principle is inspired by the work of Ricardo (1817)⁴ on trade the "assignment" of each instrument to the objective that can be the most influence relatively, in another way, the assignment of instruments is operated taking into consideration the intensity of the impact that it can have both on the priority target than on other macroeconomic magnitudes Thus and to the extent that fiscal and monetary policy by the same channel of aggregated demand, the only criterion retained for the implementation economic policies is the effectiveness of instruments regardless of the optimality of coordination between the different public decision-makers. Qualified by Tobin (1982)⁵ of principle of the common funnel, this reasoning implies that no optimal allocation of instruments to the targeted objectives can be discounted. Indeed, the public authorities can act by the prices (interest rate) or activity (public expenditure) as long as they are forced to transit through the same channel of aggregated demand. However, the mechanism of the common funnel initiated by Tobin (1982)⁶ displays his limitations in models representing more open and / or the hypothesis of inAccording to proponents of the current Keynesian synthesis, the funding of deficit by raising taxes or through the use of public debt impact on household wealth and household behavior. consumption and investment. This policy is thus able to stimulate volume of aggregate output of the economy as a whole. However, the theorem of the Ricardian equivalence, taken up in particular by Barro in (1974)⁷ cause the certainties of Keynesian synthesis by demonstrating that every time the government uses indebtedness, the repayment of this loan is synonymous with the imminent rise in tax rates in the years to come. Therefore, boosting consumption through increased spending public would probably be sanctioned by mixed success. Indeed, in an environment characterized by rational households, tax expenditures would not have any effect on household consumption to the extent where if the generation presents

its concerns of the conditions of life of the generation next, it will accumulate more wealth during phases of lower taxes (by consuming less in order to increase savings) and this to compensate Interactions between fiscal policy and other economic policies in Algeria his descendants of the additional taxation that would be required. Are all, the financing of public expenditure by debt becomes perfectly substitutable for financing by raising taxes. interdependence between time horizons (specification model dynamics). Like the critics of early Keynesian inspired models, models proposed by Barro, integrating the Ricardian equivalence, were handed involved for many reasons. In the first place, this hypothesis households a strong rationality that allows them to analyze in depth the impact changes in the public debt on the maintenance of the inter temporal constraint of the government. Secondly, Ricardian equivalence only concerns "flat-rate" type of taxation, whereas in reality Taxation mechanisms are more diversified and more complex. In third place generational altruism may take other forms than those presented by Barro, which concerns only the financial legacies, insofar as the parents invest in health, education and skills development

of their children. Finally, Ricardian equivalence only analyzes the implications of arbitration between the financing of the deficit by tax or by indebtedness, while governments can also resort to monetising the budget deficit. This last criticism was thus the basis for the development of a large literature Debt Monetization Initiative Initiated by Sargent's Work and Wallace (1981)⁸. The Sargent and Wallace model is a model with overlapping generations or each period t coexist N_t young and N_{t-1} old with $N_t = (1+n)N_{t-1} = N_{t-1}$ where $n > 0$ is the growth rate of the population. Thus, each agent receives an endowment

The literature on the fiscal theory of the price level has been mainly developed by Leeper (1991)⁹ Sims (1994)¹⁰ and Woodford (2001). Overall, this work examines the impact of a non-Ricardian budgetary policy, which specifies the level of expenditure and tax burden without actually taking into account the maintenance of the intertemporal constraint of the government. the latter to be ensured by price level adjustments and therefore implicitly by the Central Bank. Also, the investigations conducted by some economists at As in Benhabib, Schmitt and Uribe (2001)¹¹ were interested in the conditions of stability of macroeconomic models in which the Central Bank

conducts policy based primarily on the handling of rates. According to this research, the models globally display very unstable behavior in the measure where the paradigm behind the monetary rules imply that interest rates are set as an increasing function of inflation, thus setting the stage for explosive price trajectories. Therefore, a fiscal policy, noricardian and dominant, can only strengthen the conditions of balance and model stability especially in an environment where prices are increasingly rigid and persistent in the short term.

3.Framework for theoretical reflection:

. Formally, Semmler and Zhang (2003)¹² analyzed the influence of politics the price level through a very simple macroeconomic model

$$\tau t = Tt/Pt : \text{real taxes} \quad (1)$$

$$\Delta t = (R^d - R^m)/R^d: \text{cost of holding money} \quad (2)$$

$$Rt^b = Rt^d \left(\frac{P}{Pt+1} \right) - 1: \text{real rate of return on bonds} \quad (3)$$

$$mt = Mt/Pt: \text{real cash} \quad (4)$$

with p_t the price level at the date t , W_t the nominal value of the asset date t , g_t government expenditures at date t , T_t the nominal value of taxes net paid in period t , R_t^b

the gross nominal yield on bonds on the period t to $t + 1$, R_t^m the gross nominal yield of the currency. From the seminal work of Woodford (1995)¹³ on the budgetary theory of price level, the equilibrium condition which determines the price level p_t at the date t knowing W_t the net face value of government liabilities and expectations at the date t from the present and future value of the real quantities and relative prices, can be expressed in the following form:

$$\frac{W_t}{P_t} = \sum_{s=t}^{\infty} \frac{(\tau_s - g_s) + \Delta_s m_s}{\prod_{j=t}^{s-1} (1 + r_j^b)} \quad (5)$$

Therefore, the price level should change as soon as the agents different perceptions of the future evolution of public finances or interest rates. By way of illustration, a stronger than anticipated increase in the deficit

public policy in relation to an accommodative fiscal policy could lead to a deterioration of the intertemporal constraint of the government. According to described above through the equation above, the general level of prices should be imperatively to increase the viability of public finances. So, the Central Bank would be obliged to raise interest rates in order to

boost inflation and trigger the previously explained wealth effect In a small open economy, households, whose life is infinite, seek to maximize their intertemporal utility under the constraint of the budget to their disposal:

$$E_0 \sum_{t=0}^{\infty} \beta^t \left(\frac{C_t^{1-\sigma}}{1-\sigma} + \chi \frac{G_t^{1-\sigma}}{1-\sigma} - \frac{\varepsilon^t}{1-\rho} - \frac{N_t^{1+\varphi}}{1+\varphi} \right) \quad (6)$$

with $\beta \in (0,1)$ is the discount factor of households, σ is the inverse of elasticity inter-temporal substitution of consumption, φ is the inverse of the elasticity of the labor supply taking into account the level of the real wage and χ is the fraction consumption of public goods. Aggregated variables in the utility function, C_t , G_t and N_t represent respectively private consumption, expenditure and

government and the work offered (measured in hours of work).

The constraint Intertemporal budget of households can be written as follows

$$P_t C_t + E_t \{ Q_{t+1} D_{t+1} \} + T \leq D_t + (1 - \Gamma) W_t N_t \quad (7)$$

On this constraint, $Q_{t+1} = 1/1+r_t$ is the stochastic discount factor on a later period, r_t is the nominal interest rate, T and denotes taxes lump sum and the income tax rate. W_t is the nominal wage, D_t is the nominal portfolio, P_t is the consumer price index (CPI) and C_t is a composite consumption index which consists of the combination of the index of local production of goods (CH, t) and the index of imported goods (CF, t). To note that these goods are produced by operating firms in a competitive market monopolistic.

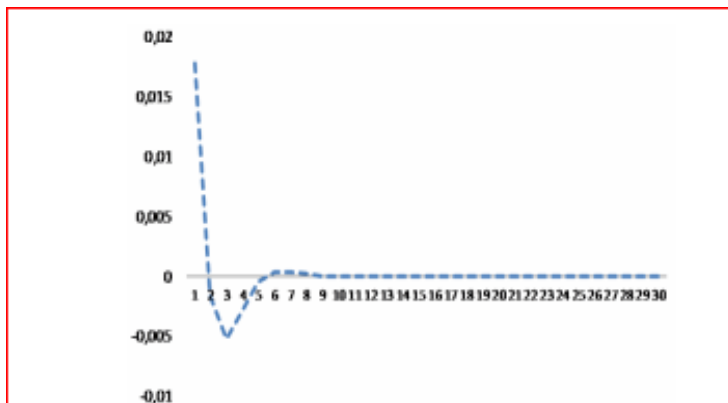
4. Resultat and descusion

the DSGE model implemented in order to analyze the interactions between the policy budget and monetary policy in Algeria will be estimated over the period from First quarter of 1990 to the fourth quarter of 2013. This period remains marked by multitude of reforms concerning both strategic and operational frameworks development and implementation of economic policies. So the data used are Real Gross Domestic Product (GDPR), the Consumer Price Index (CPI), the average interbank interest rate (MTR), public expenditure and tax revenues. These variables were decomposed using the HP filter in order to to extract the cyclic component which is stationary. The estimation of the structural parameters of the DSGE makes it possible to simulate shocks stochastic on the different equations of the model. Like the works empirical evidence presented in this section, the purpose of these simulations is to assess the interdependencies between monetary policy and politics budgetary. In other words, what is the response of the TMP following an increase in budget expenditure or tax revenue? And what about the reaction of Budget Expenditures and Tax Revenue in Response to Monetary Policy restrictive? These results will make it possible to analyze the interactions between Central Bank and the budgetary authorities and to identify the nature of the in Algeria: Monetary Dominance, Fiscal Dominance or Equilibrium strategic

4.1 Reaction to fiscal policy following a shock monetary policy:

An increase in interest rates, approximated by the increase in the TMP, acts negatively on budgetary revenues as well as on expenditure. Indeed, revenues show an instant decline following the increase in the TMP and which is extends almost to the first 4 quarters of the simulation exercise. note also that the effect of rising interest rates on government revenues only disappears after 8 quarters

Fig 1 : interest rates evaluation (DGSE model)

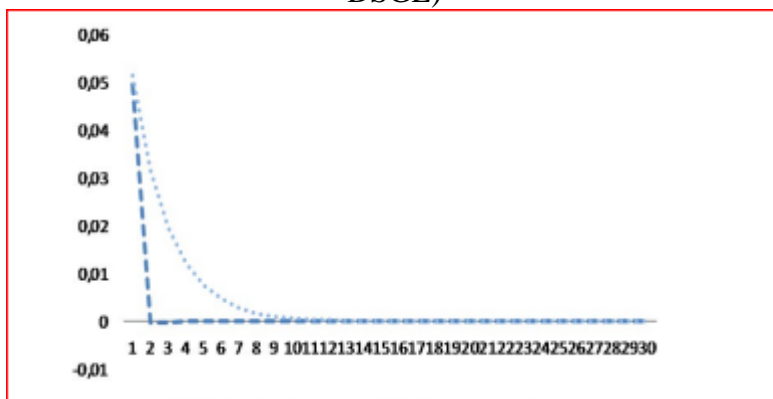


This reaction thus reflects the impact of interest rates on activity in the measure where the tightening of monetary policy causes a widening of the gap production, a drop in inflation and a slowdown in GDP. the sluggishness of the activity has a negative impact on tax revenues from firms and households, which respectively show a decline in their investment and wage income (decrease in hours worked for example). The contraction in budget spending naturally reflects the decline the revenues but also the higher cost of financing. In other words, the increase in the policy rate puts pressure on the borrowing pushes the state to moderate its spending to maintain the sustainability of finances public. This strategy is able to preserve the viability of balances allow the government to have room for maneuver sufficient to practice a fiscal stimulus policy if the activity runs through a cycle of depression

4.2 Reaction to monetary policy following shock of fiscal policy :

Increased budget spending translates into instant growth TMP. This rising interest rate trend is reaching its peak towards the 3rd quarter before converging on the stationary path around the 8th quarter. The TMP is also rising following the increase in revenue this reaction is prolonged during the first three quarters following the shock before disappearing completely towards the 8th quarter like the shock on public expenditure.

Fig 2 : revenue and expenditure evaluation shocks Budget (Model DSGE)



The tightening of monetary policy thus reflects the pressures exerted budget spending on productive capacity and, ultimately, inflation. Indeed, the increase in public spending stimulates consumption and aggregated investment from the Keynesian multiplier mechanism this which follows naturally from higher prices. Since the Central Bank is careful to maintain the stability of inflation, its reaction remains in line with its commitments to economic agents and the efforts that it deploys to preserve the viability of macroeconomic balances. For reasons, in a relatively open economy, excessive growth of consumption could grow imports if the local productive fabric is unable to meet the needs of the economy.

Table 1: Results of DSGE Model Parameter Estimates

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Parameters	priori value	value	statistical law	posteriori
Θ	0.5		beta	0.48
Ω	2.0		normal	1.89
σ	3.0		normal	2.85
ξ	0.7		beta	0.7
ρ	0.5		beta	0.93
r	1.5		gamma	1.37

aggregate prices H_t , π_t . The coefficient κ , influencing the slope of the Phillips curve, provides information on the sensitivity of domestic inflation to the dynamics marginal cost. Also, domestic inflation at the moment (t) is considerably influenced by past inflation, expressing the weight of rigidities, and inflation future, reflecting the importance of expectations. The structural form reduced parameters b , f , λ , λ and κ is defined through the values taken by three main parameters ζ , θ and β . As a result, when the degree of retrospectively ζ is close to 0, the Philips curve takes a prospective form, while the more coefficient moves away from 0 the Phillips curve converges to a hybrid form. By Moreover, if the discount coefficient β is equal to 1, the sum of $b\lambda$ and $f\lambda$ would be equivalent to likely to be 1. According to the work of, the value of taken by the discount coefficient which is generally close to 1 fact that $b\lambda$ and $f\lambda$ can be interpreted as very influential parameters on the path taken past inflation and its future evolution as well. In contrast, a significant weight of past inflation in price formation and price viscosity reduce from current inflation to the evolution of the real marginal cost.

Thus, ρ , g and $\rho\tau$ express the intensity of the budget smoothing, g and τ refer to the

Government's response to spending and tax pressure in the face of fluctuations in activity, g and $b\tau$ correspond to the relative adjustments to the stock of debt and g , τ denote the expenditure and taxation shocks corresponding to the unsystematic reaction of the government.

5. Conclusion :

From a theoretical point of view, the research that prevailed until the beginning of 1990 emphasized the need to analyze the interactions between monetary policy and fiscal policy in a dynamic way. Therefore, the effectiveness of economic policies would be based mainly on the commitment to follow a credible rule that implies goals to be achieved and interventions targeted in case of cyclical imbalances. If for the government this commitment is to be constantly concerned about the impact of deficit and the increase in the debt burden on the sustainability of public finances In the medium and long term, for central banks, the migration of quantities (money supply) to interventions cost of refinancing (rate of interest) contributed to the emergence of a new wave of literature entitled fiscal theory of the price

level ". The major concern of this new current is that monetary policies, acting through rates, do not provide a nominal anchor for the economy and usually lead to a trajectory explosive inflation (Gali , Gertler , 2009)¹⁴. The empirical component which certainly presents the most important dimension of investigations on the interactions between fiscal policy and politics monetary policy proposes a multitude of approaches capable of characterizing the economic policy in force. The objective pursued through statistical tests or simulations performed by SVAR models and DSGE(Amato and Laubach . 2003)¹⁵ models is to analyze the reaction of each entity following the policies adopted by the other. Three cases of figures are as follows: fiscal policy imposes its orientation on monetary policy, the Central Bank manages to discipline the government through a conservative politics or an emerging strategic balance between the two institutions. This balance expresses a degree of coordination between the Bank central government and ambition to minimize the volatility of production but also to aintain the anchoring of expectations and the purchasing power of agents economic. inally, it should be noted that the DSGE model can be improved on several levels(Muscatelli and Tirelli 2005)¹⁶. On the one hand, the central bank's response function should be more fixed exchange rate regime and the limited nature of capital movements. On the other hand, the government's reaction function (revenue and expenditure) would require adjustments to the deficit financing process. Indeed, Algeria does not uses external financing only if the situation of foreign exchange reserves deteriorates or if international conditions are more favorable. Financing by national savings remain almost systematic. Finally, the Bayesian estimates can cover more parameters in order to minimize weight and influence equations calibrated in the model

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