

OPTIMAL COORDINATION BETWEEN FISCAL AND MONETARY POLICY

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Abstract

The period before the COVID-19 pandemic and the ensuing economic crisis may have suggested that economic cycles had stabilized. However, this period has proven that the economic cycles do not stand still and require an update of macroeconomic policy issues.

It is well-known that monetary and fiscal policies are the two most important tools for managing macro economy. That is why we focus this research on the interactions of essential macroeconomic policies for the purposes of their skill full development and implementation in times of post-pandemic crisis and similar adverse economic fluctuations in the future.

Keywords: optimal coordination, fiscal policy and monetary policy

1. Theoretical background

At the outset, we would like to pose the question: Why are monetary and fiscal policies relevant for macroeconomic management? The answer lies in the general goals such as higher employment rates, price stability and overall economic growth.

Economists also seek to understand how the dependence, independence and interdependencies between monetary and fiscal policy can bring them closer to the above-mentioned goals.

In a poorly coordinated macroeconomic environment, a fiscal policy might affect the chances of success of monetary policy in various ways, such as its eroding impact on the general confidence and efficiency of monetary policy, through its short-run effects on aggregate demand, and by modifying long-term conditions for economic growth and low inflation (Chibi, A. At al., 2021).

On the other hand, we know that monetary policies can be accommodative, but also counteractive to fiscal policies, of course, depending on the prevailing policies in a particular economy.

The dependence between fiscal and monetary policy is particularly important for macroeconomic governance in resource-dependent economies. Such is the case with oil-dependent countries, where sustainable fiscal easers in less flexible exchange rate policies is needed. In flexible monetary / exchange rate regimes, such as inflation targeting, high income volatility will require strong fiscal stabilization policies that support the chosen monetary regime. In turn, the high and frequent volatility that afflicts these economies requires exchange rate flexibility to minimize the burden of fiscal adjustment and to promote fiscal policy effectiveness (Elbadawi et al, 2017).

In this context, back in 1981, Sargent and Wallace discussed the impact of coordination between fiscal and monetary pricing policies.

They explored the idea that the fiscal authority (government) must stick to an intertemporal budget

constraint (IBC). According to them, fiscal authorities are insensitive and irresponsible to changes in debt, they do not adjust government expenditures or tax revenues to reduce government debt and that the creation of base money is the only way to finance the fiscal deficit.

From the fiscal standpoint, the fiscal authority wins the "game of chicken". In this case, the monetary authority could only control the timing of inflation (Sargent and Wallace, 191).

However, if the government adjusts its primary deficit to limit the debt accumulation and the central bank follows a Taylor (1993) rule, the nominal interest rate increases more than proportionally when inflation increases.

Thus, monetary policy provides the nominal anchor to deliver price-level determinacy (inflation target). In this approach, the fiscal authority follows a rule under which lump sum taxes stabilize debt. This approach has been referred to as "monetary dominance" (MD) or Ricardian regime (Chibi, A. At al., 2021).

In equilibrium, the fiscal solvency condition holds under both the MD (monetary dominance) and FD (fiscal dominance) regimes. In fact, the difference between the two regimes lies in how solvency is achieved.

Fiscal and monetary policies can be classified as active and/or passive, according to their behaviour and based on effects on debt. An authority that uses an active policy has autonomy to establish its policy without considering the behaviour of current and past variables controlled by the passive authority. Conversely, if an authority uses a passive policy, it will be limited to optimization decisions made by consumers and by the active authority's actions (Leeper, M., 1991).

Active monetary policy targets inflation whereas passive monetary policy adjusts interest rates in a way to bring debt within sustainable limits. Active fiscal policy spends ignoring debt levels, whereas passive fiscal policy adjusts taxes and expenditure to keep debt within sustainable limits. Unique balance requires one policy to be active and the other to be passive. Determinate prices require one of the policies to be active, and the budget solvency condition requires one of the policies to be passive. (Chibi, A. et al., 2021).

Woodford (1995) proposed another way whereby fiscal policy can interfere with price level determination, known as the Fiscal Theory of the Price Level (FTPL). The FTPL adds to the theory developed by Leeper (1991) and differs from the theory put forward by Sargent and Wallace (1981) by assuming that the government budget constraint equation represents an equilibrium condition. If the constraint is violated for a given price level, then such a level is not consistent with the equilibrium.

As a result, Woodford (1995) classified fiscal policy as Ricardian when the fiscal authority acts judiciously, and the debt does not prevent the conduct of monetary policy from attaining the inflation target (MD). On the other hand, a non-Ricardian regime occurs when the risk of fiscal insolvency requires that the monetary authority cause inflationary "surprise" to deflate the nominal value of the government debt (FD). This terminology is quite intuitive since in the Ricardian model government bonds do not represent net worth. For example, a bond financed tax cut should not affect the price level under MD but may affect it under FD.

Woodford (2003) also shows if fiscal policy is locally Ricardian, or taxes are responsive to debt, equilibrium is determinate if and only if the response of monetary policy to inflation exceeds unity. If fiscal policy is locally non-Ricardian, monetary policy will have to violate the Taylor Principle and moderate its response to inflation in order to prevent government debt from exploding. So, unsustainable borrowing requires monetary accommodation.

In this regard, when the two approaches are considered together, there are four possible

combinations of monetary and fiscal policy stances:

- an F regime,
- an M regime,
- a regime where both authorities try to provide the nominal anchor and the debt is unbounded,
- a regime where no authority provides the nominal anchor and the price level is indeterminate (-Astudillo, M., 2013).

Policymaking is a complicated process of analysing and interpreting data, receiving advice and applying judgement. During some periods, policymakers may pay more attention to inflation or debt stabilization, while in other periods they may pay more attention to output stabilization (Troy D., & Leeper E., 2007).

In this regard, numerous studies (Semmler & Zhang, 2004); Fialho and Portugal (2005); Chuku (2010); (Gonzalez-Astudillo, M., 2013); (Gerba and Hauzenberger, 2013), Cekin (2013); Kliemet al, 2016) formulate and solve a new Keynesian model that incorporates monetary and fiscal policy rules whose coefficients are time-varying and interdependent (regime shifts in the interactions between monetary and fiscal policies).

Time variation and interdependence allow for co-movements in monetary and fiscal policymaking, thereby introducing a direct channel of interactions. This channel influences expectations about future monetary and fiscal policymaking, affecting the dynamics of the variables in equilibrium. When there are co-movements in monetary and fiscal policymaking in the direction of stable and determinate equilibria—the M and F regimes - the volatility of output and inflation are reduced, compared to the case where co-movements in that direction are absent (Chibi, A. et al., 2021).

However, despite its popularity and general acceptability, the FTPL has come under intense criticism on the theoretical and empirical formulations. Canzoneri et al. (2000), McCallum (2001), Semmler and Zhang (2003) and Buiters (2002, 2018), provide some detailed criticism on the FTPL. According to these authors, the original FTPL rests on a fundamental compounded fallacy: confusing the intertemporal budget constraints (IBC) of the state, holding with equality and with sovereign bonds priced at their contractual values, with a misspecified equilibrium nominal bond pricing equation, and the "double use" of this IBC (Chibi, A. et al., 2021).

Empirical research yields four approaches to evaluate these complex interactions between monetary and fiscal policy.

The first is related to the fiscal theory of the price level (monetary versus fiscal dominance), which proves that it can change the conditions of stability of monetary policy. In practice, this approach can be confirmed with the Kuncoro and Sebayang (2013) analysis of the dynamic interaction between monetary and fiscal policies in Indonesia for the period of 1999-2010. Besides the reaction function between monetary and fiscal policies, they identify the main determinants of both interaction decisions, i.e., interest rate and primary balance surplus. The results of quarterly data estimation show that in the short-term monetary policy reacts as expected to the fiscal policy – in the sense that governments could run a primary surplus. This action makes fiscal sustainability easier to achieve in the long run. On the other hand, fiscal policy marginally reacts to the monetary policy (interest rate) so that fiscal sustainability will be more difficult to attain given the opposite response of governments to public debt shocks.

Javid and Arif (2014) examine the relative importance of fiscal and monetary determinants of inflation for Pakistan during 1960-2011. The study finds that the incident of wealth effects of adjustment in nominal public debt may pass through to prices by escalating inflation variability as

predicted by the fiscal theory of price determination. The results do not support the perception that monetary authorities acted consistently with monetary dominant regime in Pakistani case to accommodate the fiscal shocks.

In resource-dependent economies, Elbadawi et al (2017) analyse the fiscal foundation of the choice of monetary regimes and the extent of pro-cyclicality of fiscal policy during the post mid-1990s oil boom in the relatively under-research oil-dependent Arab economies. They find preliminary evidence on the existence of a threshold effect for oil rents per capita, below which countries tend to be subject to fiscal dominance and pro-cyclical fiscal policy.

Panjer et al. (2017) empirically determine whether a Ricardian or a non-Ricardian regime is more plausible for the euro area. A Vector Autoregressive (VAR) model for the primary government balance and the government debt is estimated for the period 1980q2-2013q4. Their model uses dummy interaction terms to account for the breaks due to the introduction of the Euro Convergence Criteria (ECC) and the start of the global financial crisis, respectively. No evidence is found in favour of either regime for the pre-ECC period. In the post-ECC period, a Ricardian regime is more plausible. Some evidence points in the direction of a non-Ricardian regime for the period after the start of the financial crisis.

Mezhoud and Achouche (2017) tried to determine the origin of inflation in Algeria based on the fiscal theory of price level. They examined the case of Algeria during the period 1989-2013. They used the VECM and VAR and found that Algeria's inflation is of budgetary origin due to the recourse to the internal debt and the dominating regime is an active fiscal policy and an active monetary policy.

In addition, Chibi, A. at al. (2021) emphasize that Jevđović and Milenković (2018) empirically ascertain the prevailing policy regime (monetary versus fiscal dominance) in five emerging European economies (Hungary, Romania, Bulgaria, Serbia, and Macedonia). Results overwhelmingly suggest that monetary policy may have been subordinated to fiscal policy over the period of analysis in all economies under scrutiny and that fiscally led regime prevailed.

Second approach test the hypothesis of time varying regime changes (accommodative and counteractive) and the nature of the interactions (i.e., substitutes or complements) between monetary and fiscal policies.

Davig and Leeper (2006) estimate Markov switching models of monetary and fiscal policy rules with U.S. data. Their results show that there have been numerous switches in monetary and fiscal policy rule coefficients. Whenever the interest rate rule pays more (less) attention to inflation deviations, less (more) weight is given to output deviations. Also, when the tax rule pays more (less) attention to debt deviations, more (less) weight is given to output deviations in line with an automatic stabilizer's argument.

Gonzalez-Astudillo (2013) uses Bayesian methods to estimate the policy rules with time-varying coefficients, endogeneity, and stochastic volatility in a limited-information framework. Results show that monetary policy switches regime more frequently than fiscal policy, and that there is a non-negligible degree of interdependence between policies.

Policy experiments reveal that contractionary monetary policy lowers inflation in the short run and increases it in the long run. Also, lump-sum taxes affect output and inflation, as the literature on the fiscal theory of the price level suggests, but the effects are attenuated with respect to a pure fiscal regime (Chibi, A. at al., 2021).

Piergallini (2017) investigates global equilibrium dynamics in a macroeconomic model where both monetary and fiscal policies are nonlinear, consistent with empirical evidence.

Nonlinear monetary policy, in which the nominal interest rate features an increasing marginal

reaction to inflation, interacting with nonlinear fiscal policy, in which the primary budget surplus features an increasing marginal reaction to debt, gives rise to four steady-state equilibria.

Each steady state exhibits in its neighbourhood a pair of „active“/„passive“ monetary/fiscal policies a la Leeper. It is shown that the steady states are endogenously connected. In particular, the global dynamics reveals the existence of infinite equilibrium paths that originate around the steady states locally displaying either monetary or fiscal dominance, and thus locally delivering determinacy, as well as around the steady state with active monetary-fiscal policies, and that converge into an unintended high-debt/low-inflation (possibly deflation) trap. This implies that the dynamic system is indeterminate even around the steady states usually displaying fiscal and monetary dominance. In other words, under nonlinear interest-rate and primary-surplus adjustments of the type empirically documented, neither monetary variables nor fiscal variables are viable to „pin down“ the inflation rate (Chibi, A. at al., 2021).

Third approach analyses the interaction between monetary and fiscal authorities through the dynamic equilibrium models that have become a staple of macroeconomic theory since the real business cycle (RBC) revolution. This approach implicates both fiscal and monetary interactions through a government budget constraint. A considerable number of authors examined the interaction between monetary and fiscal policy using new Keynesian dynamic stochastic general equilibrium model (DSGE), among which there are three types - the Solow model, the Ramsey model and the so-called overlapping generations model. Moreover, apart from the conventional dynamic, new Keynesian DSGE models are developed in the literature, the so-called new Keynesian structural DSGE models, which consider a richer range of fiscal channels and using these models some authors conclude that the automatic stabilizers that are used in the tax system are combined more effectively with monetary policy based on the rules compared to public spending policy based on rules (Ibid.).

Muscattelli et al (2004) examine the interaction of monetary and fiscal policies using an estimated New Keynesian dynamic general equilibrium model for the US. In contrast to earlier work using VAR models, they show that the strategic complementarity or substitutability of fiscal and monetary policy depends crucially on the types of shocks hitting the economy, and on the assumptions made about the underlying structural model. We also demonstrate that countercyclical fiscal policy can be welfare-reducing if fiscal and monetary policy rules are inertial and not coordinated (Chibi, A. at al., 2021).

Ornellas (2011) investigates the interaction between fiscal and monetary authorities in Brazil in order to measure the degree of fiscal dominance in the Brazilian economy. To do that, a dynamic stochastic general equilibrium model is used. The model was developed for an economy with sticky prices and inflationary trend, whose parameters of interest are estimated by Bayesian inference. It is concluded that the degree of fiscal dominance in the Brazilian economy is low vis-à-vis the U.S. and Canadian economies. This result has a direct impact on the conduct of policies targeted at reducing inflation, and this probably means having to bring inflation targets down, which would directly influence the agents' expectation about future inflation.

Shahid et al (2016) investigate fiscal and monetary policy interaction in Pakistan using dynamic stochastic general equilibrium model. Their results show that fiscal and monetary policy interacts with each other and with other macroeconomic variables. Inflation responds to fiscal policy shocks in the form of government spending, revenue and borrowing shocks. Monetary authority's decisions are also affecting fiscal policy variables. It is also evident that fiscal discipline is critical for the effective formulation and execution of monetary policy.

Fourth approach employs the game-theoretic tools (strategic interaction) and considers fiscal and

monetary authorities as playing a “game” against each other. The interaction between the fiscal authority (FA) and monetary authority (MA) is strategic since each optimizes its objective function taking account of the other's action.

Strategies available to each are C (cooperate) and NC (do not cooperate). The FA gives more weight to growth and the MA to reducing inflation.

C for the FA means improving the supply-side and reducing inflation, and for the MA it means maintaining demand to allow output to grow at potential while restraining the cost of government borrowing. Reducing demand by raising interest rates reduces inflation, but marginally. The passive-active strategies are each NC. An active FA that can get any deficit financed may neglect improving the composition of expenditure. Whoever plays NC when the other plays C, gets a relatively higher immediate payoff.

This is the crux of the Prisoner's Dilemma game; growth is lower and inflation higher than the optimal. The Nash equilibrium will shift up the AS, and shift AD to the left.

For example, on a pooled sample of 19 industrial countries with annual information for the period 1970-94, Bennett and Loayza (2000) present a game-theoretic model where the fiscal and monetary authorities interact to stabilize the economy. These authorities are different in that they have dissimilar preferences with respect to output and inflation gaps and control different policy instruments. Modelled as Nash or Stackelberg equilibria, the solution under lack of policy coordination implies that an increase in the preference divergence between the monetary and fiscal authorities leads to, *ceteris paribus*, larger public deficits (the fiscal authority's policy instrument) and higher interest rates (the central bank's instrument).

On Russian economy in the period between 2001 -2008, Merzlyakov (2012) shows that, in an export-oriented economy, the independence of the central bank does not play a significant role. The effective interaction of fiscal and monetary policies is possible under a cooperative Stackelberg game interaction with the government as leader social loss is minimal under both forms of interaction, if fiscal and monetary policies are expansionary and allow output to approach its optimal level. In other words, the efficient interaction of fiscal and monetary policies is possible given either coordination or political differences of opinion between the government and the central bank. Intuitively, this can be explained by the fact that the condition of independence of the central bank does not play a decisive role and is more a political rather than economic issue in a resource-based economy with undeveloped financial markets (Chibi, A. at al., 2021).

2. Interactions between fiscal and monetary policies

The two prime macroeconomic powers of the state, monetary and fiscal policies, interact closely. Both the monetary and the fiscal policy have a major impact on aggregate demand and on aggregate supply. When it comes to fiscal policy, it affects aggregate demand directly through the taxes, public investment, transfers to household and firms, and wages in the public sector. Monetary policy works more indirectly through the interest rate, which influences financing conditions *i.e.*, consumption and investment. The effects of monetary policy are generally slower and less certain, but also more pervasive, when it comes to interest rates (Stein, 2013).

An example of positive interactions is global monetary and fiscal expansion after the outbreak of the Great Financial Crisis in 2008-09. An example of less helpful interaction can also be found in the post-financial crisis period, with inflation at all-time lows. The fiscal stimulus from 2012 could have helped lift inflation in the short term and potential output in the long term, but fiscal policy was arguably too tight, stunting the recovery and shifting the burden of supporting the post-crisis

recovery to monetary policy (Bernanke, 2013; Draghi, 2014).

A longer-term perspective is helpful in describing policy interactions because throughout history monetary and fiscal policies have been closely intertwined. To the extent that one can identify similarities and differences between policy roles in respective historical episodes, one can be in a better position to understand whether some issues are missing or are being overstressed in current policy discussions. (Mihaljek, D., 2021).

At the current post-pandemic recession juncture, the key question is whether monetary and fiscal policies are doing “too little” or “too much” to support the recovery, i.e., whether they are withdrawing support too early or providing it for too long. Given that monetary policy has by large reached the limits of its expansionary stance, this has mainly been a question about the “right” fiscal policy stance (Ibid.).

There are two types of monetary-fiscal mix in economic theory:

1. loose fiscal – tight monetary policy and
2. loose monetary – tight fiscal policy.

In the first mix, which was applied in the United States during the Reagan presidency, in the 1980s, when defence spending was significantly increased but without tax revenue increases, the result was a budget deficit. In the specific example, the central bank applied a tight monetary policy, and this resulted in high interest rates, reduced investments in the private sector, net exports etc.

In the second mix, when a combination of loose monetary and tight fiscal policy is applied, the same example in economic textbooks is taken from the United States in the 1990s, now under Bill Clinton. He inherited a high budget deficit and gradually reduced it, while increasing investment in order to accelerate economic growth. He increased taxes, and with a loose monetary policy, the interest rate was reduced. This led to an increase in investment and exports. This eventually resulted in a budget surplus.

Let us see the case, also noted in the economic textbooks, of the application of fiscal-monetary mix in Macedonia in the period 1994-1995, when an internal mix was applied, i.e., Tight fiscal policy and tight monetary policy, as a third type in addition to the abovementioned two types. What happened? At that time, the country was facing rampant inflation, i.e., 2000% per year, and all economists know that it leads to hyperinflation. The application of this mix proved to be justified and resulted in a drop in inflation to single digits, due to the sharp decline in aggregate demand, a steep decline in gross domestic product and rising unemployment.

In the period 2001-2002, there was yet another mix, namely, fiscal-monetary mix of loose fiscal policy and tight monetary policy. With the conflict in the country, the budget expenditures for defence were significantly increased and the budget deficit reached 7%. In such a case, the central bank, committed to maintaining price stability, applied a restrictive monetary policy, which led to an increase in interest rates, but also reduced the opportunity for investment in the private sector. The rate of the real gross domestic product reached a negative of -4.5%, for the next year - in 2002 the gross domestic product reached a growth of only 0.7%. These were the results of the application of loose fiscal and tight monetary policy viewed through examples.

The disruptions caused by the COVID pandemic have added a new element of uncertainty to this relationship, notably the recent rise in inflation. Although this increase is currently seen as temporary, it complicates the plans for policy normalization. In addition, new challenges have been added to policy agendas: addressing the rise in inequality and climate related risks, among others. The expectations about what central banks can do are thus not likely to diminish (Bartscher et al., 2021). This might create additional strains for the relationship between monetary and fiscal policies, as they cannot deliver on these expectations without the help of structural economic

policies.

3. Conclusion

General and common economic thinking says that monetary policy should control inflation, while fiscal policy should manage the level of public debt. Recently, however, new research reveals that tasks can be changed by stabilizing debt by the monetary policy and by fiscal policy that sets price levels.

In the short term, monetary and fiscal policies interact mainly through their respective views. The "right" policy mix depends on the stage of the business and financial cycle and the structure of the economy.

In the long run, the interactions between monetary and fiscal policy face additional challenges, especially from high public debt and threats to central bank independence, i.e., the risk of a return to some form of fiscal domination.

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