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A Normative Argument Towards the Independence of Public Debt Management

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We explore the links between credit expansion, inflation, and inflation expectations, and show that active public debt management can trigger a non-interest rate channel of credit expansion. This creates incentives for the government to use debt management for promoting non-debt management goals, thus, choosing debt maturity structure that differs from its optimal. Through a theoretical monetary policy game, we show that it is welfare improving to delegate public debt management to an independent office separate from the fiscal authority.

Keywords: Macroprudential policy, Fiscal policy, Central banks, Public debt

JEL Classifications: E58, E60, H63

1 Introduction

The financial and economic crises of recent years have kindled a re-evaluation of the macroeconomic policy framework, with an emphasis on the complex interlinks between fiscal, monetary, and public debt issuing policies (Smets, 2014). For example, Galati and Moessner (2013) highlight the increasing calls for a macro perspective on financial regulation. Blinder et al. (2017) found that many central banks already implement macro-prudential measures to

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increase the resilience of the financial system, in both crisis and non-crisis countries, signifying the links between credit expansion and the real economy.

We explore whether public debt management should be independent. Today, there is no broad consensus regarding the independence of public Debt Management Offices (DMOs), contrary to the case of central banks whose independence is widely recognized as essential for bringing price stability, enhancing long-term macro-financial stability (Reinsberg et al., 2021).

In some countries DMOs are fully independent, while in others they are under the responsibility of the central bank, finance ministry or treasury, with various degrees of independence (Singh, 2016). When public debt management is under fiscal or monetary authorities, its goals are an additional factor (possibly considered secondary) to those of the authority. These multiple mandates can create inconsistencies resulting in suboptimal policies, especially during periods of economic stress where authorities struggle to achieve their main policy goals, thus, it might be preferable to have an autonomous and independent DMO.

The links between monetary, fiscal, and public debt management policies are important, and have been extensively explored in the relevant literature. Authors have argued that public debt management can have a role in tax smoothing (Barro, 1979; Angeletos, 2002), in deficit stabilization (Missale, 2000), can be used to ensure time-consistent monetary policies (Lucas and Stokey, 1983), etc.

Sargent and Wallace (1981) combined fiscal and monetary authorities into a comprehensive framework and argued for the coordination of these policies. Togo (2007) extended their framework by adding a public debt manager and found that debt management should be a separate macroeconomic policy with its own policy objectives, otherwise it may be used to support monetary or fiscal policies, leading to an inefficient policy mix. Sadeh and Porath (2017) also advocate for autonomous public debt managers for reducing political influence. This autonomy can be considered as a credibility mechanism that protects lenders from the government's informational advantage on its own fiscal situation, reducing incentives to manipulate bond issues

Considering the above, there is a need to further understand the goals and instruments of public debt management, especially their impacts on financial markets and the real economy. In effect, public debt management mainly entails the effort of minimizing the cost of servicing the debt, given an acceptable level of risk and the government's financial needs, while also considering other goals such as developing and maintaining an efficient government bond market (Blommestein and Turner, 2011).

An essential element of public debt management regards the design of the maturity structure of the total debt, implemented mainly through new issues which is a passive procedure, or even with aggressive policies e.g., debt buy backs.

Financing debt with shorter maturity securities could entail higher refinancing risks for the DMO (e.g., roll-over risk) compared to longer-maturity securities, as it is subject to more

frequent refinancing (Missale, 1999). However, if an economy is experiencing both productivity and public spending shocks that may lead to serially correlated inflation, then nominal debt with a longer maturity can provide a better hedge on the budget than shorter maturity.

The above are just two examples when considering long versus short term maturity cost-risk trade-offs. For our paper, it is important to note that this trade-off implies that an optimal maturity structure of non-contingent debt exists, which is dynamic and, thus, 'active' debt management has a role (Angeletos, 2002).

The existence of an optimal maturity has implications on whether the DMO should be independent or placed under the auspices of the fiscal or monetary authority. If debt management is used to serve other needs (e.g., to increase output), then the maturity of the debt will not be (only) determined by its optimal structure, leading to refinancing risks and other costs.

In this paper, we explore two alternative scenarios for public debt management. In the first, it is conducted by a fiscal authority and in the second by an independent DMO. We find that welfare loss is minimized when public debt management is conducted by an autonomous DMO, independently from other policies.

The paper is structured as follows. Section 2 discusses a special case of a non-interest rate channel of credit expansion. Section 3 presents the analytical framework, and Section 4 concludes.

2 Non-Interest Rate Channel of Credit Expansion

To explore if public debt management should be independent, we extend the model of Spyromitros and Tsintzos (2019). The authors build upon a Rogoff (1985) type monetary policy game by introducing credit expansion in the supply function as in Ueda and Valencia (2014) and Smets (2014). They find that there is space for a particular strategic interaction between the fiscal and monetary authorities, especially through a non-interest rate channel of credit supply.

In this paper, we (first) assume that the fiscal authority (i.e., the government) conducts public debt management. In this case, the fiscal authority has an incentive to use public debt management to affect credit expansion. This is done by altering the maturity profile of public debt through active public debt management. Public debt assets are usually considered highly liquid and safe, thus, have a key role as collateral for bank financing. In effect, this is the non-interest rate channel of credit supply referred to above.

In this paper, we adopt a standard Barro and Gordon (1983) - Rogoff (1985) framework where both the central bank and the government are targeting a level of output above the natural level, and that the government attaches more weight on output than the (conservative) central bank, and therefore is more eager to increase output, especially during recessions, e.g., through

fiscal expansions. However, markets will react to policies that increase government borrowing needs during a recession and may require a higher coupon on new bond issues, regardless if these new issues are roll-over debt operations, deficit-financing, or government debt management practices where a restructuring of the maturity profile takes place (Angeletos, 2002). An increase in the bond's coupon rate could increase the weighted average nominal interest rate on total debt and, as a result, the cost of net debt servicing. In turn, the increased cost of debt servicing will tend to put more pressure on the overall budgetary balance, rendering expansionary fiscal policy gradually less effective.

On the other hand, if the government also exercises public debt management, it can use it to create positive output shocks, as discussed above. For example, Spyromitros and Tsintzos (2019) show that new issues that would decrease the weighted average maturity of total debt can trigger a credit expansion. This non-interest rate path of credit supply can also arise through the central bank collateral framework (Nyborg, 2017).

However, the acquired liquidity does not match the nominal value of the bonds. The central bank applies a haircut to collateral assets based on their creditworthiness, liquidity, and duration (longer maturity is associated with higher levels of haircut).

In this context, a reduction of maturity will affect commercial banks' portfolios, by marginally increasing their level of liquidity. Depending on the characteristics of each bank (balance sheet, capital adequacy ratios, leverage ability, etc.), the reduction of maturity can be translated into increased loans to the real economy and, thus, higher output (Ueda and Valencia, 2014).

Deviations of maturity from the optimal structure may have debt-refinancing risks. Therefore, when a government is faced with a recession, it cannot credibly commit that it will not use active public debt management to create positive output shocks, even with the presence of the above-mention4ed risks. In other words, a dynamic inconsistency exists, leading to a loss of social welfare when the government is also responsible for public debt management.

3 The Model

We develop a standard game-theoretical framework of fiscal and monetary policy to explore how active public debt management can have welfare effects.

Output is given by a standard Lucas supply curve augmented with the changes in the supply of credit (Ueda and Valencia, 2014), where we add the changes in the government's primary balance (Δpb), similar with the new Keynesian supply curve as e.g. in Eggertsson and Krugman (2012):

$$y = \bar{y} + \gamma(\pi - \pi^e) + k\delta + \lambda\Delta pb + \epsilon_t \quad (1)$$

where $\bar{y}$ is the natural level of output, π inflation, π^e inflation expectations, γ the sensitivity of output to surprise inflation $(\pi - \pi^e)$, δ the change in credit expansion, k the sensitivity output to credit expansion, Δpb changes in the government's primary balance, λ the sensitivity of the change of the fiscal stance (in effect a Keynesian short-run fiscal multiplier) and ϵ_t the productivity shock where $\epsilon_t \sim (0, \sigma_\varepsilon^2)$.

From (1) we observe the positive link between credit expansion and output. Credit expansion can enable firms to invest more leading to expansion, especially in developing countries with inferior financial systems (Miskin, 2007). However, it can also lead to non-warranted inflation as consumption becomes cheaper. Thus, a socially optimal level of credit expansion exists.

For this model, we assume that financial agents, mainly commercial banks, absorb any level of offered credit in the short run, as is common during a credit crunch. Thus, credit expansion is regarded as a function that captures the effect of the valuation haircut framework of the central banker, i.e., is a function of the level of available debt that can serve as collateral, the maturity structure captures the average residual to maturity and the fiscal's authority creditworthiness (credit rating agencies). These features determine the amount of (central bank) money that commercial banks can access, which depends on the bank's balance sheet, its capital adequacy (e.g., tier core indices), and their overall ability for leverage and credit creation. In this context, δ is a composite function of all these features (see Spyromitros and Tsintzos, 2019 for a discussion).

In what follows we set-up the model, define and solve the optimization problem of each actor, and derive the welfare effects.

3.1 Scenario 1: Fiscal Authority Supervises the Debt Management Office

In this scenario, the fiscal authority is also responsible for public debt management (i.e., also controls m) while the central bank remains responsible for the rate of inflation (π). In particular, maturity (m) is the average weighted maturity of all outstanding sovereign bonds (a single point calculated from the maturity profile).

Firstly, the fiscal authority simultaneously chooses the maturity of public debt (m) through active public debt management and the changes in the primary balance (Δpb). Then, the private sector forms its inflation expectations (π^e), then the productivity shock (ϵ) occurs, and finally the central banker (CB) optimally chooses the rate of inflation (π). We derive the strategies of each player by solving the model recursively, beginning with the CB's choice of inflation.

3.1.1 The Central Banker's Optimization Problem

We assume that the CB is independent, shares the same output target with the government but places an extra positive weight on inflation, thus, she is more 'conservative' regarding inflation (Rogoff, 1985). The CB chooses the level of inflation that minimizes its loss function which is:

$$L^{CB} = \frac{1}{2}\left[\beta\left(\pi - \pi^*\right)^2 + \left(y - y^*\right)^2\right] \tag{2}$$

where y^* is the output target ($y^* > \bar{y}$), and β is the relative (extra) weight the CB places on inflation. In the standard Barro-Gordon literature the CB's weight on inflation is positive ($\beta > 0$), and as this model assumes a Rogoff-type 'conservative' central banker, the weight is always greater than one ($\beta > 1$). The assumption that the natural level of output is lower than the efficient one is standard in the Barro-Gordon literature, and it creates an incentive to boost output (Smets, 2014). In this framework, Spyromitros and Tsintzos (2019) show that the more 'conservative' central banker is, the lower will be the level of optimal credit expansion.

To find the optimal level of inflation (π), we substitute (1) into (2) and solve for the level of inflation expectations (π^e):

$$\pi^e = \frac{1}{\beta}\left[\beta\pi^* + \gamma\left(y^* - \bar{y}\right) - \lambda\gamma\Delta pb - \gamma k\delta\right] \tag{3}$$

Solving for inflation (π):

$$\begin{gathered}\pi = \pi^* + \frac{\gamma\left(y^* - \bar{y}\right)}{\beta} - \frac{\gamma(\lambda\Delta pb + k\delta)}{\beta} - \frac{\gamma}{\beta + \gamma^2}\epsilon_t \\ \pi = \pi^e - \frac{\gamma}{\beta + \gamma^2}\epsilon_t\end{gathered} \tag{4}$$

From (4) we observe that inflation (π) is negatively affected by primary balance increases (Δpb) and the magnitude of credit expansion (δ). We note that there is no surprise inflation (as $E[\varepsilon] = 0$ it follows that $E[\pi] = \pi^e$), and any deviations between inflation and inflation expectations are merely for offsetting (stochastic) shocks (output smoothing).

To obtain the CB's loss, we substitute inflation (4), inflation expectations (3) and output (1) into the CB's loss function (3):

$$L^{CB} = \frac{[(\beta + \gamma^2)(y^* - \bar{y} - \lambda\Delta pb - k\delta) - (\beta + \gamma^2)\beta\epsilon_t]^2}{2\beta(\beta + \gamma^2)} \tag{5}$$

From (5), we derive the optimal level of credit expansion (δ) that minimises the CB's losses:

$$\delta[m] = \frac{y^* - \bar{y}}{k} - \frac{\lambda \Delta pb}{k(\beta + \gamma^2)} - \frac{y^* - \bar{y}}{k(\beta + \gamma^2)} \epsilon_t \quad (6)$$

The δ in (6) is a minimum, given that the second derivative of the CB's loss function (5) with respect to δ is positive $[(\beta + \gamma^2)k^2]/\beta > 0$.

3.1.2 The Fiscal Authority's Optimization Problem

We assume that the fiscal authority (FA) chooses the average residual maturity of the overall debt (m) through active public debt management, and its fiscal stance which here are the changes in the primary balance (Δpb). The FA's loss function is:

$$L^{FA} = \frac{1}{2}[(m - m^*)^2 + ((i[\Delta pb] - m(\pi - \pi^e))^2 + (y - y^*)^2] \quad (7)$$

where $i[\Delta pb]$ is the weighted average nominal interest rate of the whole public debt, m^* is the optimal level of maturity of non-contingent debt (Angeletos, 2002). A low value of m may increase risks related to debt refinancing, while a large value can create risks due to the unpredictable market conditions at the long end of debt refinancing. Thus, an optimal value exists (m^*) where deviations are sub-optimal. In this model, we do not attempt here to describe the characteristics of the optimal maturity structure, but simply assume the existence of a theoretical optimal level of maturity (m^*). For simplicity, we also assume that changes in m will not affect nominal interest rates, at least during the short-lived period of our game.

Regarding the other policy instrument (Δpb), government needs to refinance annually at least some of the debt, regardless of the primary fiscal balance (e.g., rollovers). Bond markets determine the price of the new debt issuing affecting the nominal interest rate and thus $i[\Delta pb]$. While they tend to disregard macroeconomic fundamentals in their pricing, they do seem to take into account the primary fiscal balance (Arghyrou and Kontonikas, 2012). In other words, the government's choice of its fiscal stance will also affect nominal interest rates, especially if debt issuing is very large which may significantly reduce liquidity in markets, affecting the perceived sovereign creditworthiness etc.

While the government has two policy instruments (m and Δpb), eq. (7) reveals a triple mandate where the first mandate is expressed by the term $(y - y^*)$ which concerns the usual output stabilization around a target higher than natural output (Rogoff, 1985). The other two mandates are characterized by the term $(m - m^*) + [i[\Delta pb] - m(\pi - \pi^*)]$ which is taken from Missale and Blanchard (1994) and expresses the net cost of servicing public debt. In particular, this expression captures the usual public debt management objective of debt servicing cost minimization, $(i[\Delta pb] - m(\pi - \pi^*))$ under a given accepted level of risk $(m - m^*)$, that is, the risk minimization objective.

Given the multiple objectives, when choosing m the FA does not only consider the optimum m^*, as shown in eq. (7) above.

Regarding the valuation haircut, we define $\delta = a_1 - a_2 m$ ($a_1 > 0, a_2 > 0$). In other words, a higher maturity (m) can lead to a higher valuation haircut. Moreover, we set $i[\Delta pb] = a_3 \Delta pb$, thus, changes in the primary balance affect the average interest rate. To reduce clutter, we assume a linear relationship.

Following the above, we solve the FA's optimization problem (7):

$$m = \frac{m^* + a_3 \Delta pb(\pi - \pi^e) - a_2 k[y^* - \bar{y} - \gamma(\pi - \pi^e) - a_1 k - \lambda \Delta pb] + a_2 k \epsilon_t}{1 + (\pi - \pi^e)^2 + {a_2}^2 k^2} \tag{8}$$

$$\Delta pb = \frac{a_3 m(\pi - \pi^e) + \lambda[y^* - \bar{y} - \gamma(\pi - \pi^e) - k(a_1 - a_2 m)]}{{a_3}^2 + \lambda^2} - \frac{\lambda}{{a_3}^2 + \lambda^2} \epsilon_t \tag{9}$$

To avoid clutter we provide only the last results, but all derivations are available upon request. As the FA sets m before the productivity shock is realised, from (8) we derive:

$$E[m] = m^* \frac{(1 - a_2 k(y^* - \bar{y} - a_1 k - \lambda \Delta pb))}{1 + {a_2}^2 k^2} \tag{10}$$

We observe that when the FA also conducts public debt management, m deviates from its optimum value (m^*). To find the welfare loss we substitute (8) and (9) into (5), and find that it is positive ($L^{CB} > 0$):

$$L^{CB} = \frac{{\alpha_3}^2(\beta + \gamma^2)\left[\alpha_3[(y^* - \bar{y})(\beta + \gamma^2) - (\alpha_1 - \alpha_2 m)(\beta + \gamma^2)k] + (m^* \gamma \lambda - \beta)\epsilon_t\right]^2}{2\beta[{\alpha_3}^2(\beta + \gamma^2)^2(1 + \alpha_2 k^2) + 2\alpha_2 \alpha_3 \gamma k \lambda(\beta + \gamma^2)\epsilon_t + ((\beta + \gamma^2) + \gamma^2 {\epsilon_t}^2)\lambda^2]^2} \tag{11}$$

3.2 Scenario 2: The Case for Independent Public Debt Management

We now explore our alternative scenario where public debt management is conducted independently, where the public debt manager (PDM) chooses the level of maturity (m) solely considering only the financing needs and the optimal maturity level (m^*).

The timing of events now differs as firstly the government chooses its fiscal stance (Δpb), then the PDM chooses the level of maturity (m), inflation expectations are set (π^e), shocks are realised (ϵ_t) and finally the CB chooses the inflation level (π).

As the CB's optimization problem is unchanged, the relevant equations for inflation (4) and inflation expectations (3) are valid. However, the FA's loss function is now:

$$L^{FA} = \frac{1}{2}[(y - y^*)^2] \tag{12}$$

Substituting output (1) into (12) and solving for Δpb:

$$\Delta pb = \frac{\bar{y} - y^* + \gamma(\pi - \pi^e) + (a_1 - a_2 m)k}{\lambda} + \frac{1}{\lambda}\epsilon_t \tag{13}$$

As noted above, the PDM chooses the level of maturity (m) solely considering only the financing needs and the optimal maturity level (m^*). Thus, the PDM's loss function is:

$$L^{PDM} = \frac{1}{2}[(m - m^*)^2 + (i[\Delta pb] - m(\pi - \pi^e))^2] \tag{14}$$

Substituting (3) and (4) into (14) and solving for m:

$$m = \frac{m^* + a_3 \Delta pb(\pi - \pi^e)}{1 + (\pi - \pi^e)^2} \tag{15}$$

From (15), we find $E[m] = m^*$ (as $E[\pi] = \pi^e$).

Substituting (13) and (15) into (5), we find that the CB's loss is zero:

$$L^{CB} = 0 \tag{16}$$

By comparing (10) with (15) we find that it is welfare improving to have an independent PDM who chooses m to its optimal value (m^*), vis-à-vis the case where the Fiscal Authority controls m

4 Conclusions

We explore the different welfare effects when public debt management is exercised by fiscal authorities, compared to when it's delegated to an independent DMO. The two key elements are: a) an augmented Lucas type supply curve where output is also affected by credit and fiscal expansions; and b) that active public debt management can create a path of interaction of control policy variables through the characteristics of the central bank's collateral framework.

We show that if debt management is conducted by the government, it can be used to pursue objectives that are beyond cost minimization and risk control, which result in a deviation from the optimal maturity of public debt with detrimental effects for welfare. Thus, it is welfare

improving to delegate public debt management to a politically and operationally independent DMO.

We consider that this normative argument may have a role in the era where the central bank's monetary tools seem to have weakened dramatically while challenges are ever increasing. Our proposition may help improve monetary policy effectiveness in stressful financial conditions, by not allowing space for non-macroprudential policies. During crises, the management of the Euro system's collateral framework was crucial in the role of the central bank as a lender of last resort (Bindseil et al., 2017). We argue that if the ability to use public debt management for creating positive output shocks is removed through the introduction of an independent public debt management office, monetary policy outcomes may be improved, especially in times of crisis, and the sovereign state will bear less risk on its public debt.

The limitations of the model are evident as it is highly stylized. For example, it does not consider all aspects of credit creation. However, the model provides a normative argument subtracting from reality intended to explore a special case to highlight the benefits of providing independence to the DMO.

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