Optimal Debt Management and Callable Bonds

The recent turbulent years have shifted the research attention to government debt management and optimal debt structure issues. Most of the optimal debt management theoretical literature so far has abstracted from the empirical evidence that shows that Debt Management Offices rarely buy back their debt and that they prefer to leave the outstanding instruments to mature. The motivation for this theoretical choice has been mainly because of tractability and computational simplicity.

Recently Faraglia, Marcet, Oikonomou and Scott (2016, FMOS from now on) extended the simple incomplete market optimal fiscal policy model (Aiyagari, Marcet, Sargent and Seppala 2001) to introduce first long bonds with features that are closer to the data. In particular they consider the impact on the optimal properties of long bonds by varying modelling assumptions around commitment, repurchasing bonds and coupon payments and find that doing so leads to non-trivial variations. They argue that some features of long bonds that have been usually ignored in the literature are important in order to explain actual bond issuance and its virtues. The existing literature has stressed the advantages of issuing long bonds that arise from fiscal insurance (essentially the covariance of long bond prices with government expenditure shocks). But they show that long bonds without repurchase cannot complete the market, even under certainty. More generally, they find that the advantages of fiscal insurance that long bonds provide may be offset by additional tax volatility induced by repurchase and coupons. These limitations of long bonds are strongest when the assumptions made are closest to actual practice, namely when long bonds are not repurchased each and every period and when coupons are fixed for the duration of the bond.

In another paper (FMOS (2014)) the authors extend the same environment to let the government to issue a richer maturity structure of bonds: short and long bonds. Their aim is to provide insights into some basic facts of US government debt management by introducing simple financial frictions in a Ramsey model of fiscal policy. They find that the share of short bonds in total U.S. debt is large, persistent, and highly correlated with total debt. A well-known literature argues that optimal debt management should behave very differently: long term debt provides fiscal insurance, hence short bonds should not be issued and the position on short debt is volatile and negatively correlated with total debt. The authors show that this result hinges on the assumption that governments buy back the entire stock of previously issued long bonds each year, which is very far from observed debt management. They document how the U.S. Treasury rarely repurchased bonds before 10 years after issuance. When we impose in the model that the government does not buy back old bonds the puzzle disappears and the optimal bond portfolio matches the facts mentioned above. The reason is that issuing only long term debt under no buyback would lead to a lumpiness in debt service payments, short bonds smooth out interest payments and tax rates. The same reasoning helps explain why governments issue coupon-paying bonds.

This project aims to extent the previous two papers. So far FMOS have used two extreme assumptions in their theoretical frameworks: one hundred percent buyback in every period of long bonds or no possibility of buyback, all the debt is left to mature. It is true that from the data we see that government rarely buy back fraction of their debt. Usually they do it in order to address liquidity issues and it is done only close to maturity. Whilst debt managers give many reasons why they do not repurchase every period and a few moments introspection can lead to many plausible

theoretical candidates as to why they might not, it is indeed an important lacunae in our understanding of debt management as to why governments repurchase only occasionally. This is an important theoretical gap that needs to be filled.

FMOS (2014) empirical analysis finds that in the past callable bonds have been extensively used from the Second World War until the '80s in the US. In particular FMOS show that in the '50s callable bonds were on average 40% of the long bond issued and in the '80s 25%. Most of the callable bonds have been called back at the first calling date available (Figure 14 and Table 5 in FMOS 2014). This implies that the debt managers have actively managed the structure of debt using these instruments.

These empirical facts give rise to two complementary research questions. Firstly it is interesting to extend the optimal fiscal policy model used in the previous papers introducing callable bonds. This modification will open the possibility to study under which circumstances the government wants to buy back debt and the extent of the repurchases. Under careful calibration of the model the theoretical results can be compared to the actual data to address the optimality of repurchases through callable bonds in the years available.

Secondly the price of callable bonds can help to disentangle both empirically and theoretically the option value of buyback. Have the government sold these bonds at a premium or at a discount? Which variables have more influence in the pricing? How does the option value vary given different levels of outstanding debt? The project then will try to extract the option value as the difference between to similar instruments callable and non-callable. The empirical result could be used then as a proxy of the costs that the Debt Manager Offices of buying back part of the debt. The data set used will be the US data used by FMOS and eventually some data provided by the Swiss National Bank.

This project is still ongoing, it started two months ago, and therefore there are still no tangible research results to report, nor any activity or output related to the project (such as seminars of papers).

References:

- Aiyagari, R., A. Marcet, T.J. Sargent and J. Seppälä. (2002) "Optimal Taxation without State-Contingent Debt", Journal of Political Economy, vol. 110, 1220-1254.
- Faraglia, E., A. Marcet, R. Oikonomou and A. Scott. (2014) "Government Debt Management - The Long and the Short of it", CEPR DP 10281
- Faraglia, E., A. Marcet, R. Oikonomou and A. Scott. (2016) "Long Term Government Bonds", unpublished wp.