Union Debt Management

A growing literature on optimal debt management (DM) in macroeconomic models with distortionary taxes advocates that governments should focus on issuing long term nominal bonds. In doing so, first of all, they would benefit from using inflation to stabilize debt in periods of high fiscal deficits (Chari and Kehoe (1999), Lustig et al (2008) and Faraglia et al (2013)). Moreover, they would be able to exploit the negative covariance between long bond prices and government deficits, the so called fiscal hedging channel of debt management (e.g. Angeletos (2002) and Buera and Nicolini (2004) (hereafter ABN) and Faraglia et al (2010)).

All these papers consider debt management in a closed economy setting. It is, however, not clear that the same conclusions apply when we consider the optimal structure of government debt in an open economy and especially in a currency union. There are, in fact, two main issues.

Firstly, the role of inflation in stabilizing macroeconomic variables, such as public debt, is limited in currency areas and in the presence of idiosyncratic shocks. This is a well-understood problem for monetary policy in a currency area. If country members experience changes in spending levels that leave average spending roughly constant across the union, a change in inflation would make public debt more stable in some countries, but destabilize debt in others. Secondly, the covariance between long bond prices and government deficits may be close to zero, when shocks are asymmetric and governments will not be able to benefit from fiscal insurance. This relates to the endogenous behaviour of long bond prices and bond returns in a currency area. When nominal government bonds of creditworthy countries are held by domestic and foreign citizens in almost frictionless financial markets, or when long term interest rates follow closely future short term rates due to the common monetary policy, bond yields are highly correlated across countries. Nominal bond prices will, then, not respond negatively to idiosyncratic spending shocks, they may only respond to aggregate shocks that affect the overall spending levels in the currency area.

For these reasons, this paper studies DM in a currency union, both empirically and theoretically, to explore whether debt portfolios can help governments hedge against fiscal shocks. In Section 2 we lay out our empirical analysis which tests formally for the presence of fiscal hedging in Euro Area government bond markets. We use a detailed dataset, also documented in Equiza-Goni (2016), which contains information on bond prices and quantities of all types of debt in the portfolios of five Euro Area governments since 1999, the year the common currency was formally introduced.

Between 1999 and 2008, the period considered in our analysis, governments in the Euro Area have issued debt in a wide range of maturities including large amounts of long term bonds, and have mainly focused on issuing nominal debt. Nominal bond yields were highly correlated across countries, reflecting the markets' perception of stability of the Euro and the creditworthiness of its member countries. To test for the presence of fiscal hedging in this data, we estimate a series of panel VARs, which enables us to identify the effects of fiscal shocks on the holding returns of government portfolios. We propose a novel identification strategy, which separates idiosyncratic and aggregate spending shocks, and study their impact effects on the holding period returns. If these impacts are negative, then a rise in spending levels leads to a drop in the market value of government liabilities, and governments experience a capital gain. This is essentially the fiscal hedging channel of DM.

Our findings suggest that bond returns responded strongly to spending shocks over the sample period considered. However and most importantly, this only holds for shocks, which affect the average level of spending in the Euro Area, which we identify as aggregate shocks. Whereas we find that shocks that

do not affect average spending (s.a. shocks increasing spending levels in some countries but compensated by a drop in spending elsewhere), which we identify as idiosyncratic, did not have any effect on bond returns. Hedging against the latter types of shocks through DM therefore seems to have been nearly impossible.

We then turn to a formal model of optimal DM in a currency union. We setup a model in which two countries, members of a currency area, face fiscal shocks and finance them through distortionary taxes and through debt portfolios. Key features of our model are monopolistic competition and sticky prices (e.g. Siu (2004) and Lustig et al (2008)), private sector preferences which exhibit a mild bias towards home goods, and government consumption that is allocated in home goods (e.g. Gali and Monacelli (2008)). Using this model, we study the optimal policy under complete markets, assuming that a benevolent planner with full commitment sets taxes, prices and the debt portfolio of state contingent assets in both countries to maximise the joint welfare of their citizens. The assumption of a benevolent planner that maximises joint welfare, essentially amounts to assuming coordinated optimal monetary and fiscal policies, as in Siu (2004) and Lustig et al (2008), Faraglia et al (2013) and others in the DM literature and also Gali and Monacelli (2008) and Fahri and Werning (2017) in the international macro literature.

We first use the theoretical model to interpret our empirical findings and understand their implications. Our main quantitative experiment, presented in Section 4, attempts to decentralize the optimal complete market allocation using non-state contingent bonds of various maturities, as seen in the data. We consider the case of nominal bonds, and find that though these bonds are useful to hedge against aggregate shocks, in the presence of idiosyncratic shocks the complete market outcome generally cannot be attained. Nominal bond prices do not covary negatively with idiosyncratic fiscal shocks, or they vary too little to enable a government to use DM in order to fully insure against these types of shocks, exactly as in our empirical findings.

We then ask which kind of bonds can help the government to implement the complete market outcome regardless the type of shocks. We find that issuing inflation indexed debt can achieve this goal because in our model the covariance between real bond prices and government deficits is negative irrespective of the shock and in particular long term bonds can be used to fully exploit the fiscal hedging channel (similar to Angeletos (2002), Buera and Nicolini (2004) and Faraglia et al (2010)).

As in the data, in our model nominal yield curves are very strongly correlated across countries in the currency union. Therefore, nominal yields cannot absorb shocks that redistribute the fiscal burden across countries (our definition of idiosyncratic shocks). However, real yields are not strongly correlated, and governments can exploit these differences and complete the markets.

To complete the empirical analysis, we turn again our attention to our dataset to document the response of returns of inflation indexed debt to the fiscal shocks we identified. Though three out of five countries in our sample did not issue (virtually) any inflation indexed bonds during the period considered, France has been using this instrument since 1999 and increasing significantly its share over time. This enables us to test for the presence of fiscal hedging in real yields. Our empirical estimates reveal a strong negative response of returns to both aggregate and idiosyncratic spending shocks, which implies that inflation indexed bonds can fully absorb fiscal risks as predicted by our theoretical findings.

Admittedly, at the centre of today's policy debate in the Euro Area, is also the notion that various frictions hamper the implementation of optimal policies. Moral hazard concerns make difficult to reach consensus over fiscal transfers and, for the same reason, it is questionable whether marketable

GDP-linked bonds can actually resolve governments' problems. Various financial market frictions, which our paper abstracts from, may also limit the scope of DM. In our view the potential presence of frictions, is a further reason to consider the DM as an additional policy margin. We leave, however, to future work to study the interplay between DM and fiscal transfers in a model with realistic frictions.

Finally, our findings are relevant for the literature on the so called 'equity home bias puzzle' in DSGE models, especially the recent strand in this literature which considers bonds and equities together (see for example Coeurdacier and Gourinchas (2017) and Coeurdacier and Rey (2013) and references therein). In these models households choose portfolios to hedge consumption against real exchange rate and non tradable income risks. However, the hedging motives of governments have not been yet considered in this context. Since governments are an important supplier of debt, accounting for their behaviour explicitly seems a meaningful next step in the agenda.

This paper brings several new insights to the literature and relates to several strands. First, our empirical exercise is complementary to related empirical papers on fiscal hedging, for example Berndt et al (2012) and Faraglia et al (2008). Berndt et al (2012) use post World War II US data, identifying fiscal shocks as innovations to defence spending, and find a significant impact on holding period returns. Faraglia et al (2008) provide evidence of the presence of fiscal insurance in a panel of OECD countries studying the covariance between deficits and bond returns over the period 1970-2000. Our empirical analysis validates the fiscal hedging channel of DM focusing on the Euro Area.

 Second, the post 2008-9 turmoil in the Euro Area bond markets and the sovereign debt crisis that followed, raised numerous concerns regarding the ability of governments to repay their debts, and the future of the Euro as a common currency. A substantial effort has been devoted in academic and policy circles to find ways to stabilize governments' budgets and promote risk sharing, in particular of fiscal risks, across countries. A recent stream of papers (see for example Fahri and Werning (2017), Dmitriev and Hoddenbagh (2015), Auclert and Ronglie (2014)) studies optimal fiscal transfers in models of currency unions (essentially fiscal unions). Other papers (e.g. Blanchard et al (2016), Acalin (2018), Shiller et al (2018)) have investigated whether introducing new types of debt (primarily GDP growth linked debt) can help resolve the debt instability problem. Our paper is complementary to this growing literature. In particular, we offer an alternative way for governments to share fiscal risks efficiently with other governments, i.e. across countries, and stabilize their budgets. Under complete markets, using transfers to distribute the fiscal burden across countries or using debt management, achieves the same effect. Equivalently, GDP denominated debt can, in our model, complete the market, as inflation indexed debt can.

The paper has been revised in the last months and now has been submitted for publication. A link to the latest version of the paper can be found here:
https://drive.google.com/file/d/1prF6mBIcEwXNZeGeCNNvT7RfbOh0db4L/view .

The paper this year has been presented in: University of Surrey, CERF finance seminar, Queen Mary University and Conference on "Public Debt Management", OECD Paris.