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## *THE ACCOUNTING OF DERIVATIVES BY SOVEREIGN STATES*

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### **Abstract**

The access by Sovereign States to financial markets in order to raise funds as a result of increasing debt poses challenging issues, with respect to the use of financial innovation, like financial derivatives, which circumvent traditional accounting rules and standards.

### **Introduction**

Public finance is the oldest branch of economics; its roots go back to the XVI century, and its principles should be coordinated with those governing the market<sup>1</sup>. Governments interact with financial markets in order to raise funds and manage expenses, taxes and public debt outstanding. Financial innovation, especially derivatives contracts like interest or exchange rate swaps, are widely used by Sovereign States to manage the public debt outstanding; public accounting rules and general principles should be updated to consider the modified environment. We discuss briefly the macroeconomic effects due to the use of derivatives, present the most recent proposal for the proper accounting of derivatives and analyse main balance sheet effects.

### **Public Finance and Moral Hazard**

Fiscal policy is the sovereign management of expenses, taxes, debt; from a simplified economic point of view the public sector face a yearly budget, whose balance can exhibit a deficit (or surplus), and can be expressed as:

$$DEF_t = G_t - T_t \quad (1)$$

where  $G_t$  represents expenses, and  $T_t$  revenues (taxes). The debt outstanding ( $B_t$ ) is a legal obligation of the Government to make interest or amortisation payments to holders of claims, in accordance with a defined temporal schedule. It evolves according to the law of motion:

$$B_t = B_{t-1} + I_t + DEF_t \quad (2)$$

where the debt resulting from last year ( $B_{t-1}$ ) is increased by the amount of interests ( $I_t$ ) and by the current deficit ( $DEF_t$ ). The static rule of thumb to evaluate the sustainability of public debt outstanding is that the interest rate ( $r$ ) to be paid on debt should be lower than the growth rate of the economy ( $g$ ) (i.e. no Ponzi game condition) in all periods;

$$r_t < g_t \quad \forall t \quad (3)$$

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<sup>1</sup> Definitions of various concepts are taken from the New Palgrave Dictionary of Economics.

This simplified condition is not enough to evaluate special cases, like over indebted countries which enjoy very poor growth rates. The intertemporal sustainability analysis is necessary. Let's express all variables with respect to GDP, considering its growth rate between  $t-1$  and  $t$  as  $g_t$  so that:

$$\frac{B_t}{Y_t} = \frac{(1+r_t)B_{t-1}}{(1+g_t)Y_{t-1}} + \frac{DEF_t}{Y_t} \quad (4)$$

If we simplify the notation, and use  $b_t = B_t / Y_t$  and  $def_t = DEF_t / Y_t$ , rewrite the above equation as:

$$b_t = \frac{1+r_t}{1+g_t} b_{t-1} + def_t \quad (5)$$

$$\Delta b_t = b_t - b_{t-1} = \frac{r_t - g_t}{1+g_t} b_{t-1} + def_t \quad (6)$$

Moving to the infinite time horizon we should satisfy some constraints, in order for the economy to be dynamically efficient. The dynamic no Ponzi game condition can be written, considering a constant interest rate  $r^2$ , as:

$$\lim_{N \rightarrow \infty} \frac{B^{N+1}}{(1+r)^{N+1}} = 0 \quad (7)$$

By imposing the no Ponzi game condition, at any point of time the debt must equal the present discounted value of its expected primary surpluses (*SURP*):

$$B_{t-1} = \sum_{j=0}^{\infty} \frac{SURP_{t+j}}{(1+r)^{j+1}} \quad (8)$$

If these dynamic conditions are not satisfied, the sustainability of debt is not achieved and the economy is dynamically inefficient and unstable; credit rating of the Government is influenced by these conditions and the international access to funds can be straightforward modified.

The elected Government inherits the debt outstanding and bears a part of costs related; when innovative financial instruments emerge on the market, and enable investors to hedge or manage costs, the Government can be interested in entering these transactions. Financial innovation influences modern fiscal policy in different ways, in particular it can be used by the State itself (centrally or locally) to lower the cost of debt, to improve the cash and debt management, and reduce costs (OECD, 2002). The most popular derivative contract is the Interest Rate Swap; it is used basically to hedge the interest rate risk, and on the basis of the last decade experience, it seems to be an efficient tool for risk management.

As shown by Oldani and Savona (2005) the use of derivatives by the fiscal sector has certain macroeconomic effects; in particular it modifies the risk attitude of the public sector<sup>3</sup>, and the

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<sup>2</sup> The interest rate should be positive at all time for the model to provide finite solutions.

transmission mechanism of impulses as a result. The saving-investment relationship becomes unstable<sup>4</sup>, and the equilibrium setting and the growth path are affected. A conflict between fiscal and monetary policy can arise, if the debt outstanding is high and there is no room left for deficit, and the cost of debt (i.e. the interest rate) is under the control of the (autonomous) monetary authority.

The Government is not compelled to report its outstanding position in Over The Counter (OTC) securities such as derivatives, according to present accounting and prudential rules. This leaves complete freedom to public managers to choose how and at which costs to hedge and manage debt outstanding.

The equilibrium condition can be modified in the presence of derivatives as:

$$B_{t-1} = \sum_{j=0}^{\infty} \frac{SURP_{t+j} \pm HEDGE_{t+j}}{(1+r)^{j+1}} \quad (9)$$

where  $Hedge_{t+j}$  is positive if derivatives are effective tools to decrease costs and safeguard financial stability, while is negative if it is not the case.  $Hedge$  is evaluated over the entire life of all contracts (underlying and derivatives) and not on a simple yearly basis in order to mitigate the risks. The risk management becomes of central importance and this additional information “better reveals the risks these transactions pose and the impact they could have on a government’s finances” (GASB, 2007).

Benefits of derivatives for sovereign States are similar to other investors (liquidity, marketability, hedging, and so on) but due to their uncomplete reporting, they can contribute to artificially increase funds available, in the presence of rigid budget criteria based on yearly figures (e.g. Maastricht or IMF)<sup>5</sup>. Derivatives increase international transparency, since capital markets are under intense international scrutiny. They are good alternatives to privatisation, which is not always the best solution to efficiently exploit public assets; they diversify investments and generally contribute to better debt management procedures.

A pervasive problem in finance is moral hazard, where agents maximise their own utility to the detriment of others, in situations where they do not bear the full consequences or do not enjoy the full benefits of their actions, due to the uncertainty and incomplete or restricted contracts, which prevent the assignment of full damages (benefits) to the agent responsible. It is a special case of contracts incompleteness, since it creates conflicts between the agent’s utility and that of others. Incomplete information and contracts can be severe if involve complex transactions and long maturities, which is exactly the case of the use of OTC derivatives by sovereign States. The transparency and disclosure of the strategy are very important for the market to believe in a sovereign State financial management and, at the present, the lack of information is perceived as a risky factor, with respect to many indebted

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<sup>3</sup> According to a part of the literature the State should exhibit risk aversion, but the use of derivatives is usually related to risk loving.

<sup>4</sup> I.e. the slope of the IS curve in a simple Hicksian IS-LM model becomes unstable.

<sup>5</sup> At the present the initial payment of a swap can be recorded as cash, and not as loan.

countries.

### **The Accounting of Derivatives**

The use of derivatives by the central or local administration has certain moral hazard implications. For example in federal states, like Europe, or the US, each nation decides on its funding strategy, and the incomplete reporting can induce some of them to prefer OTC instruments, and to use them for fund raising<sup>6</sup>. Derivatives can be used to shift costs and revenues back and forth<sup>7</sup>, according to the economic and political cycle in a single electoral mandate (e.g. mandate length risk). Suppose a small public administration underwrites a twenty years swap contract on interest rates; suppose market rates are 2%, the swap can be designed in order to pay 1% for the first 5 years and the markets rates +200 basis points on the remaining 15 years. If the public administration can undersign such a contract, it is possible to shift presents costs (1% given by the difference between 2% and 1%) to future budget years. It is worth noticing that five years is the maximum length of most public administration mandate, and 20Y means at least four mandates!

The public sector, given its relative dimension, can suffer of the illusion of control, which is the (irrational) tendency to believe that it is possible to control or influence the outcomes of every choice, which is not true in reality. It is a form of investor's overconfidence sustained by the possibility for the public sector to change the rules and laws of the game.

Many financial instruments have been used over the recent history to manage the debt, like securitisation<sup>8</sup>. The Government, when enters the market to issue debt, should use the instruments provided to market participants to smooth associated risks; systemic risk cannot be diversified, or shifted, but can be actively and successfully managed.

The public sector has special accounting rules, and each year is subject to the electoral control; the budget law is a crucial moment in democracy, since its composition is the expression of the political economy of the Government. The public sector compiles its income statement, but not the Asset and Liabilities Balance. It is not possible to quantify the amount of assets held by a State; just think of the Coliseum or the Grand Canyon! Liabilities are difficult to be measured too, for example the social security debt is inter-generational and depends on the birth rate of population and its ageing. On the contrary the public debt outstanding, issued domestically or abroad on financial markets, is measured, monitored and managed. Results of derivatives' investments, being loss or gains, are computed in the

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<sup>6</sup> Cf. Oldani and Savona, 2005 and the document of the Committee for the Investigation of the Effects of Derivatives by the Italian Parliament.

<sup>7</sup> It means that the Government acts in order to guarantee that the condition  $g > r$  is satisfied, by shifting forward present costs or anticipating future revenues.

<sup>8</sup> An example is the Italian social security (INPS), which uses securitisation to manage present and future revenues, facing ageing population.

income statement, while the notional amount is not reported<sup>9</sup>.

The Government Accounting Standard Board (GASB), which is an independent non profit organisation for improving financial accounting and standards, is developing an international project to put derivatives in the Financial Statement of countries. The proposal describes “how state and local Governments should report their involvement in often complex transactions known as derivative instruments” (GASB, 2007). The Financial Statement is a document, which describes the financial strategy of the country and then provides relevant information to stakeholders<sup>10</sup>. This project relies on fair value accounting and asks for an increase in the degree of transparency. In particular, the details to be provided are the types of derivatives and reasons based on which they have been purchased, the most significant terms of contracts, how the fair value changed over the period, the net cash flow, the risks to which the derivative exposes the Government, and in particular:

- the termination risk (the risk that the transaction might end before expected);
- the credit risk (the risk that the counterpart changes its credit rating);
- the interest rate risk (the risk that a change in the interest rate affects the value of the derivative);
- the basis risk (the risk to lose cash flows because the index upon which the derivative is priced changes);
- the rollover risk (if the derivative ends before its termination date, the Government might be exposed to the risk of not finding another contract-counterpart to hedge the original risk);
- the market access risk (the risk that the Government would not be able to issue debt or that it becomes more expensive)<sup>11</sup>.

The GASB project should be applied worldwide, in order to significantly decrease the overall hazard and risk. Without complete and transparent accounting financial operators can be tempted to exploit asymmetric information with public managers, and the final inefficiency is paid by the market, and investors.

Without complete information the principle of No Taxation Without Representation can be violated. A recent survey on Government debt management practices in Europe highlights the lack of data on innovative instruments issuances, especially swaps, which separate the issue of liquidity from the risk profile (Wolswijk and De Haan, 2006).

The ban over structured instruments or complex derivatives introduced in Italy and other European countries in 2003, and confirmed by the GASB, is not enough, since it does not eliminate the

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<sup>9</sup> According to the IAS rule n. 39, derivatives activity by private firms and banks are reported in the Balance Sheet and are valued at market price.

<sup>10</sup> The Financial Statement is of extreme relevance if the country wants to raise funds abroad on financial markets.

<sup>11</sup> GASB (2006) p. 3.

moral hazard, which clearly emerges given present accounting asymmetries and limits. It is not acceptable to live with this inefficiency, since (young) taxpayers will finally pay the unknown costs.

### Effects of the Accounting of Derivatives

Main effects of the introduction of GASB rules on sovereign States can be related to the evolution of debt ( $B_t$ ), to the interests paid ( $I_t$ ) and to the credit risk rating, on the basis of hedging evaluation, which dynamically affects both of them. We make no further hypothesis on the behaviour of expenses ( $G_t$ ) and revenues ( $T_t$ ) since gains and losses in derivatives should be already reported.

The use of derivatives introduces the *Hedge* term into (9); for those countries active in OTC and other derivatives, if the result of their portfolio strategy is an effective hedging ( $Hedge_{t+k} > 0$ ), the credit rating should improve (i.e.  $I_{t+k}$  can be positively influenced and is reduced). On the contrary, if the portfolio is not aiming at hedging the debt outstanding (for example fund raising), the credit risk could be negatively affected (i.e.  $I_{t+k}$  can increase, and the debt outstanding worsens).

For those countries which are not active in derivatives, the effect is null. However, if they could sensibly gain from entering these markets, the lack of proper risk management and hedging procedures can influence their credit rating, and finally force them to enter.

In any case, the initial payment from the seller of the contract to the Government (e.g. up front) should be always accounted as a loan, and not as cash; by accounting a loan, the debt outstanding increases ( $B_t$ ). In the past the initial payment was considered an increase in cash available, which means a decrease in costs ( $G_t$ ), which shifts forward the effective cost of debt.

The transmission mechanism of impulses, after transparency increases, become less unstable, and the risk embedded in the public debt can be more efficiently priced. The improved transparency deriving from the application of GASB rules would provide better information to investors and market participants, contribute to develop common hedging and accounting standards, and lower the costs of debt management.

We strongly support the immediate and complete application of GASB rules on derivatives and other exotic or complex instruments' accounting for all central and local Governments and Public Administrations. The GASB principles should play an increasingly important role with respect to credit rating, enhancing transparency and risk management procedures.

*Tab. 1 Effects of Derivatives Accounting*

	Country using derivatives	Country not using derivatives	Country not using derivatives
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<i>Variable</i>	Hedge >0	Hedge <0		but could gain from them
<i>B</i>	decreases	increases	null	increases
<i>I</i>	decreases	increases	null	increases

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