Box 3.2: Fiscal-Feedback Model

To complement the SPU projections, the Council has developed a model that allows a two-way relationship between nominal GDP and the nominal primary deficit. These variables are thus determined simultaneously in the model. When parameterised (using assumptions in line with those of the Department of Finance), the model provides a useful aid for assessing the potential impacts of macroeconomic/budgetary developments and also of changes in the fiscal policy stance.

The basic version of the model is captured by two equations:

(1) $Y = Y_0 + mPD$

(2) $PD = PD_0 - bY$,

where Y is nominal GDP, PD is the primary deficit, Y_0 is autonomous nominal GDP (i.e. the part of nominal GDP that is independent of the primary deficit), PD_0 is the discretionary primary deficit (i.e. the part of the deficit assumed to be independent of nominal GDP), m is the deficit multiplier, and finally b is the automatic stabiliser coefficient. It is assumed that both m and b are positive.

Solving this pair of equations yields reduced-form expressions for the equilibrium levels of nominal GDP and the primary deficit.

(3) $Y = \left(\dfrac{1}{1+mb}\right)Y_0 + \left(\dfrac{m}{1+mb}\right)PD_0.$

(4) $PD = \left(\dfrac{-b}{1+mb}\right)Y_0 + \left(\dfrac{1}{1+mb}\right)PD_0.$

Choosing values of m = 0.5 and b = 0.5 produces reduced-form coefficients that are broadly in line with Department of Finance assumptions. Letting Δ represent the nominal change in a variable, equations (3) and (4) imply,

(3`) $\Delta Y = 0.8\Delta Y_0 + 0.4\Delta PD_{0,}$, and

(4`) $\Delta PD = -0.4\Delta Y_0 + 0.8\Delta PD_0.$

The coefficients imply that: (i) a €1 change in autonomous nominal GDP yields an €0.80 change in actual nominal GDP; (ii) a €1 change in the discretionary primary deficit yields a €0.40 change in nominal GDP; (iii) a €1 change in autonomous nominal GDP yields a -€0.40 change in the primary deficit; (iv) a €1 change in the discretionary primary deficit yields a €0.80 change in the primary deficit (owing to a revenue/expenditure buoyancy effect).

Given these relationships, the effects of alternative scenarios for nominal

growth and discretionary fiscal adjustments can be examined. Moreover, when combined with an equation showing debt dynamics (equation 5), it is possible to explore the effects of changes in interest rates and alternative stock-flow adjustments that relate to factors such as borrowing requirements for bank recapitalisation.

$$(5)\ \Delta D = PD + iD_{-1} + SFA,$$

where *D* is the gross debt, *i* is the average nominal interest rate on outstanding debt, and *SFA* is the stock-flow adjustment.

The model can be used first to replicate the SPU baseline projections (Table 3.1). One can then consider the impact of alternative economic and policy scenarios while keeping everything else the same as in the SPU. In Table 3.2.A, an illustrative scenario is presented assuming €1 billion in additional adjustment for every year between 2012 and 2015. Under this scenario, the primary balance and GGD would be 5.2 per cent of GDP and 0.9 per cent of GDP respectively in 2015. The debt to GDP ratio declines more rapidly than in the SPU baseline reaching 107 per cent by 2015.

Table 3.2.A. Scenario with €1 Billion of Additional Annual Discretionary Adjustment, 2012-2015

€ Billions	2011	2012	2013	2014	2015
Gross Debt	172.8	185.4	194.6	197.1	193.8
Change in Gross Debt	25.8	12.6	9.2	2.5	-3.3
Primary Deficit	9.7	5.5	0.2	-5.4	-9.4
Interest Expenditure	5.4	7.6	10.2	10.9	11.0
Stock-flow Adjustment	10.7	-0.5	-1.2	-3.0	-4.9
Nominal GDP	156.1	160.5	166.6	173.5	181.1
Nominal GDP growth (%)	1.4	2.8	3.8	4.1	4.4
Gross Debt to GDP (%)	110.7	115.5	116.8	113.6	107.0
Primary Deficit /GDP (%)	6.2	3.4	0.1	-3.1	-5.2
General Government Deficit/GDP (%)	9.7	8.1	6.3	3.2	0.9
Memo items:					
Assumed Discretionary Fiscal Adjustment	-6.0	-4.6	-4.1	-4.1	-3.0
Implicit Interest Rate (%)	3.7	4.4	5.5	5.6	5.6
Source: Internal calculations.					