The new Stability and Growth Pact, theoretical background and implications

The new EU Governance
Tax smoothing and fiscal policy
Public debt dynamics
Ricardian equivalence and property taxation
Debt sustainability notions
Fiscal discipline and keyenesian (and anti) effects
New SGP implications and policies for Italy

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The new economic governance in EU EC, 24-25 march 2011

- 1. Euro Plus Pact (political commitments on economic reforms)
- 2. **Stability and Growth Pact (SGP) reform =>**
- 3. Economic Disequilibrium watch => controlling macroeconomics performance
- 4. *European Financial stability facility* (EFSF), 440 billions of lending capacity (r, 7,5 => 5,5) => privatization of public debt for improving liquidity of countries in trouble => 2013 ESM (*European stability mechanism*), 500 billions of lending capacity

The new SGP content

- **Prevention part**
- Countries toward the medium term target (~0 deficit) => -0.5% of GDP per year of *structural deficit* **and** ΔNPE ≤ ΔGDP in medium term (no consolidation with increase of tax burden)
- **Corrective part** by 2013
- Δ[DEBT/GDP] per year = 1/20(DEBT/GDP-0.60)

Fundamental equation of Stability Pact (SP): deficit ratio on GDP at year t

$$d_t = d_0 - (\alpha + \beta)(g_t - g_0)$$

- d_0, long run deficit on the trend (possibly ~0)
- Output gap $\Delta g_t = g_t - g_0$:
  - α => automatic flexibility
  - β => discretional measures of fiscal policy

$\Delta g_t > 0$ ("good time") => $d_t < d_0 \sim 0$ (=> surplus)
$\Delta g_t < 0$ ("bad time") => $d_t > d_0 \sim 0$ (=> deficit)

The notion of structural deficit (cyclically adjusted balance, CAB)

$$c_0 \equiv CAB / GDP = d_t + \alpha \Delta g_t$$

$$\Delta g_t \equiv g_t - g_0 = output\ gap$$

$$\alpha_{Italy} = 0.5$$

EU members states should reach the target c_0 ~0 => Deficit (surplus) only from automatic stabilizers => **tax smoothing policy**

Golden rule of public finance

- Some constitutions authorizes use of debt to finance public capital expenditure only, at least in the long run (over the cycle)
- The financing burden is spread over the years during which the financed equipment will be productive, and the outstanding government debt is matched by government assets (preserving net wealth). However
  - does not prevent debt becoming unsustainable
  - definition of public investment is open to criticism
  - Gross or net investment? (only net investment benefits future generations)

$$c_0 = d_t + \alpha \Delta g_t = dc_t + e_{Gt} + \alpha \Delta g_t$$

$$c_0 \rightarrow e_{Gt} => dc_t = -\alpha \Delta g_t$$

Tax smoothing: OT interpretation (Blanchard)

- *Tax-smoothing*

$\Downarrow$

- In order to minimize aggregate tax distortion income tax rates should be maintained constant independently of the business cycle
- In a two periods life-cycle model if the elasticity of labour is constant along the life Ramsey formula implies tax-smoothing

Ramsey rule and tax smoothing

$$U = u(C_1, l_1) + \delta u(C_2, l_2); \quad C_t(\varpi_t), l_t(\omega_t), L_t \equiv 1 - l_t$$

$$Max_{\tau}\ \Psi = V(\omega_1, \omega_2) + \mu[\tau_1 w_1 L_1 + \frac{\tau_2 w_2 L_2}{1+r} - R]$$

$$\omega_1 \equiv w_1(1-\tau_1); \omega_2 \equiv \frac{w_2(1-\tau_2)}{1+r}$$

$$\Rightarrow \text{int}\, ertemporal\ Ramsey - Rule$$

$$\frac{\frac{\tau_1}{1-\tau_1}}{\frac{\tau_2}{1-\tau_2}} = \frac{\varepsilon_2}{\varepsilon_1} \Rightarrow \varepsilon_t = \varepsilon \rightarrow \tau_t = \tau; t = 1,2$$

Proof

$$\tau_1^* \rightarrow$$

$$\frac{\partial V}{\partial \omega_1}\frac{\partial \omega_1}{\partial \tau_1} + \mu[w_1 L_1 + \tau_1 w_1 \frac{\partial L_1}{\partial \omega_1}\frac{\partial \omega_1}{\partial \tau_1}] = 0$$

$$-\alpha w_1 L_1 + \mu w_1 L_1 + \mu \tau_1 w_1 \frac{\partial L_1}{\partial \omega_1}(-w_1) = 0$$

$$-\alpha + \mu - \mu \frac{\tau_1}{1-\tau_1}\varepsilon_1 = 0$$

and similarly for τ^*_2 *. QED*

Barro (1979) tax smoothing

Distortion Cost of raising amount T_t

$$C_t = Y_t \varphi(T_t / Y_t); \varphi(0) = 0, \varphi'(.) > 0, \varphi''(.) < 0$$

Present value of the distortion costs

$$\sum_{t=0}^{\infty} \frac{1}{(1+r)^t} Y_t \varphi(T_t / Y_t)$$

Tax Reduction in time t: ΔT => tax increase in time t+1: $(1+r)\,\Delta T$

$$MB \equiv \frac{Y_t \varphi'(T_t / Y_t)(1/Y_t)\Delta T}{(1+r)^t} = \frac{\varphi'(T_t / Y_t)\Delta T}{(1+r)^t}$$

$$MC \equiv \frac{Y_{t+1} \varphi'(T_{t+1} / Y_{t+1})(1/Y_{t+1})(1+r)\Delta T}{(1+r)^{t+1}} = \frac{\varphi'(T_{t+1} / Y_{t+1})\Delta T}{(1+r)^t}$$

Optimality condition
MB=MC => $T_t/Y_t = T_{t+1}/Y_{t+1}$
t=0,…∞

Deficit (primary and total) and Public Debt dynamics

$i=r+\pi$ = nominal rate of interest
$g=y+\pi$ = nominal rate of growth

$$dB/dt \equiv \dot{B} = iB + G - T \equiv D$$
$$b = B/Y;$$
$$\dot{b} = d(B/Y)/dt = \frac{\dot{B}Y}{Y^2} - \frac{B\dot{Y}}{Y^2} = \frac{\dot{B}}{Y} - bg;$$
$$g = \dot{Y}/Y;$$
$$x = (T-G)/Y;$$
$$d = D/Y$$
$$\Rightarrow$$
$$\dot{b} = d - bg$$
$$\dot{b} = (i-g)b - x = (r-y)b - x$$

b ratio and fiscal policy

$$\dot{b} = (ib - x) - gb = d - gb =$$
$$\dot{b} = d_0 - (\alpha + \beta)\Delta g - gb$$

With $i>g$, b decreases only with $x>0$ (primary surplus)
With $\beta=0$, $c_0=0$ (SGP) =>

$$\dot{b} = -\alpha\Delta g - gb$$

debt increase due to the crisis 2008-2010:
-0.5x(-0.05-0.02)+0.05x1,15=0.0350+0.0575
=> About 1% per year (3% cumulative)

Steady state and long run debt level

$$\dot{b} = 0, \Delta g = 0 \Rightarrow$$
$$b = x_0 /(i - g_0); b = d_0 / g_0$$

With g=(0.03+0.02)=0.05
and d=0.03
b=0.6 <=
The "rationale" of Maastricht indexes

Timing of taxes: Ricardian equivalence

- **Ricardian Theorem**: *A policy reform that does not change government spending (G_1,G_2, …G_T) and only changes the timing of taxes, but leaves unchanged the PDV of taxes paid by each household in the economy has no effect on aggregate consumption in any time period*
- G_1 =war cost, G_2=0: to collect taxes in period 1 or to issue abroad debt and repays it in period 2 ?
- Two periods Government budget constraints in general terms:
- $G_1=T_1+B_1$, $(1+r)B_1=T_2$

Derivation of Ricardian equivalence

- Policy 1: Immediate taxation: $T_1=G_1$, $B_1=T_2=0$
- Policy 2: Debt issue, to be repaid tomorrow: $T_1=0$, $B_1=G_1$, $T_2=(1+r)B_1=(1+r)G_1$
- Both policies satisfy the intertemporal GBC: $G_1=T_1+\frac{T_2}{1+r}$
- Consumer max

$$u(c_1)+\beta u(c_2)$$

$$s.t.\ \ c_1+\frac{c_2}{1+r}=(e_1-T_1)+\frac{e_2-T_2}{1+r}+A$$

- The two tax-debt policies imply exactly the same PDV of lifetime taxes => the same lifetime consumer budget constraint

$$c_1+\frac{c_2}{1+r}+T_1+\frac{T_2}{1+r}=e_1+\frac{e_2}{1+r}+A$$

$$c_1+\frac{c_2}{1+r}+G_1=e_1+\frac{e_2}{1+r}+A$$

=> the same individual choices of consumption:

$u'(c_1)=\lambda$

$\beta u'(c_2)=\lambda/(1+r)$

$c_1^*=e_1-T_1-s_T=e_1-s_B \Rightarrow$

Saving: $s^B=s^T+T_1$

If Ricardian equivalence holds it is also equivalent to consolidate the debt with a once for all property tax or with a future flow of primary surplus

Main (restrictive) assumptions of RE Theorem

- **Absence of binding borrowing constraint**:

  with b.c. the timing of taxes may affect private consumption of households and RE does not hold (the b.c. is binding in Policy 1 and not in Policy 2)

  Postponing taxes to the future relaxes borrowing constraints and may increase current consumption

  A debt-financed tax-cut effectively gives the constrained household the loan that it wanted but could not obtain from private lenders. The household will respond by increasing consumption, even with the knowledge that the result is higher taxes and lower consumption in the future

No redistribution of the tax burden across generations:
In Policy 2 part of the cost of the war (interests) is borne by future generations. However Barro (1974) model of altruism and the bequest motive

$$V_t = U(C_t) + \beta V_{t+1}$$

$$V_t = U(C_t) + \beta U(C_{t+1}) + \beta^2 U(C_{t+2}) + ... \beta^n U(C_{t+n}) ...$$

or

$$V_t = U(C_t) + G(B_t)$$

$\Rightarrow$RE could yet hold

Lump sum taxation:
With distortionary taxes changing relative prices of consumption and leisure in different periods RE fails

Crowding out from debt financed by distortionary taxation

- $Y=Lf(k)$ *production function*
- $\tau Y=\rho B+G$ *budget constraint*
- $r=f'(k)$ *competitive equilibrium in steady-state*
- $(1-\tau)r=\rho$ = *rate of time preference* (Arbitrage condition)
- (Mankiw 2000) shows that this Ramsey model implies:
- *dK/dB* <-1 (with Cobb-Douglas =-1.11), so one euro of debt reduces steady-state capital stock over than one euro, given distortionary taxation on capital.

Debt sustainability

$$\frac{db}{dt} = (r-g)b - x; \pi = 0, x = primary\ surplus$$

$$b_t = b_0 e^{(r-g)t} - \int_0^t x_s e^{(r-g)(t-s)} ds$$

$$b_t e^{-(r-g)t} = b_0 - \int_0^t x_s e^{-(r-g)s} ds;$$

$$2\ conditions:$$

$$\lim_{t\to\infty} b_t e^{-(r-g)t} = 0 \to b_0 = \int_0^\infty x_s e^{-(r-g)s} ds$$

1. Transversality condition: interpretation

$$\lim_{t\to\infty} b_t e^{-(r-g)t} = 0$$

If r>g it is necessary and sufficient that the debt ratio increase at a lesser pace than the discount rate r-g

If g>r the government can finance the debt service through new borrowing while remaining solvent This was the situation of 1970s, in Europe, a period when public debt problems were benign. But in 1980s and 1990s real interest rates were higher than the growth rates of economy

2. INTERTEMPORAL BUDGET CONSTRAINT of the GOVERNMENT: The sum of the initial debt and the PDV of future expenditures has to equal the PDV of future income streams

$$b_0 = \int_0^\infty x_s e^{-(r-g)s} ds$$

$$\Rightarrow$$

$$x_s = \tau - (pe + tr)$$

$$b_0 + \int_0^\infty (pe + tr)_s e^{-(r-g)s} ds = \int_0^\infty \tau_s e^{-(r-g)s} ds$$

Sustainable tax rate (str)

- Blanchard str: the constant tax rate that ensures debt sustainability

$$\tau^* = (r-g)[b_0 + \int_0^t (pe_s + tr_s)e^{-(r-g)s)}ds$$

The rate of taxation sufficient to service at rate (r-g) the sum of the initial debt and the PDV of the perspective stream of expenditure on goods and service and on transfers

The gap between τ* and the observed tax tax rate τ provides an indicator of sustainability => if τ*> τ the l.r.s. of p.d. requires either a rise on the tax rate or a cut on expenditures on goods and services or on transfers

The constant tax rate necessary to restore the initial level of the ratio of public debt after a given number N of years

$$\tau_N^* = (r-g)[b_0 + \frac{1}{1-e^{-(r-g)N}} \int_0^N (pe_s + tr_s)e^{-(r-g)s)}ds]$$

Public debt and fiscal policy effectiveness (Benassy et al 2011)

- Fiscal expansion exhibits traditional Keynesian effects at **a moderate debt level**, because consumers consider the implied tax burden will be born by later generations.
- Conversely, when **debt reaches very high levels**, a fiscal expansion may well lead to a contraction of output, because consumers anticipate that adjustment will have to take place in their lifetime and expect an offsetting tax increase in the immediate future

Sutherland Overlapping Generations Model

Debt Ceiling U => U-T

Debt Floor L => L+T

θ probability to death. *r+θ* return to wealth A

δ =+1 when a crisis bringing a debt reduction occurs, -1 when debt reaches the floor L, =0 in other cases

$$dB_t = rB_t dt + D_t$$

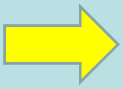
$$dA_t = [y_t - c_t + (r+\theta)A_t]dt + D_t$$

$$\max E_t \int_t^{\infty} u[c_t] e^{-(r+\theta)(\tau - t)} d\tau \Rightarrow$$

$$c_t = y_t + (r+\theta)[A_t - S_t]$$

$$S_t \equiv E_t \int_t^{\infty} \delta_\tau T e^{-(r+\theta)(\tau - t)} d\tau$$

$$\frac{\partial S}{\partial B} > 0$$



When B is low => L, a fiscal expansion (positive D) increases the consumption of each individual and total C => *keynesian effect*

When B => U, the same D generates expectations of an impending adjustment and causes a reduction of individual and total C in preparation for the tax increase to come

$\Rightarrow$ *anti keynesian effect* and a contraction of output

Controlling debt as well deficit dynamics: what implications in the long run?

If the targets are both on primary deficit and on public debt dynamics we have a extraordinary finance (the stock-flow adjustment) in some sense given:

$$\frac{db}{dt}(policy\ t\arg et) = d - bg + df = (r-g)b - x + df$$

$$-x = primary\ deficit\ (policy\ t\arg et)$$

$$(r-g)b = snow-ball\ effect\ (partially\ exogenous)$$

$$df = stock - flow\ adjustment\ (unknown)$$

df => privatization, selling public assets and also property tax?

Decomposition of DEBT dynamics in Italy

	2004	2005	2006	2007	2008	2009	2010	2011	2012
b	103,9	106,4	106,5	103,4	106,1	115,7	118,4	118,7	117,2
db/dt	-0.38	2.41	0.09	-2,91	2,61	9,05	2,33	0,25	-1,26
-x	-1.30	-0.40	-1.30	-3.50	-2.50	0.60	0.40	-1.00	-2.50
(r-g)b	0.76	1.38	0.14	1.32	2.95	8.25	1.38	1.14	0.95
df	0.16	1.43	1.26	-0.73	2.16	0.20	0.56	0.12	0.29

Excessive deficit procedure => other significant elements as
Private DEBT(WEALTH)/Public DEBT
Pension system sustainability

Annual transactions……

DEF decisions 13.4.2011

- Deficit = 2,7% on GDP in 2012
- Deficit = -0.2 in 2014 => starting to fulfill the debt rule (reduction per year of 0.05 (b-0.6))
- 2014 debt dynamics -4,1%:
  - Primary surplus -5,2
  - +snow-ball effect 1,6
  - S/F adj. -0,5
- => correction reducing deficit by 2,3% of GDP 2013-2014 (primary expenditure -4% on GDP)
- b in 2014 = 112,8% => 111% in 2015

Restructuring public debt: what does it mean in the new ESM?

- Generally speaking:
- EFSF (*European financial stability facility*), having A.A.A. rating, can borrow funds in secondary financial market at relatively low r
- Then it lends money at good rates to countries near to de-fault
- => These countries buy their bonds with these funds saving cost of debt (present value of the spread of the two rates)

Three proposals (Krugman)

- ***Partial default*** => to make a unilateral reduction of the debt (% of nominal value of bonds not re-paid)
- ***Buy back*** => to borrow funds from EFSF for buying in secondary market its own debt (with an increase of the price of bonds)
- ***Swap*** => to issue eurobonds guaranteed by EFSF (the "new" debt, *senior*) for buying own "old" debt (*junior*). 2 segments with two systems of prices

How to re-pay the debt due to crisis? (Visco, Fitoussi et al)

- Put the the specific part of **debt due to crisis** (2008-2010) in a European Fund (independent by the states)

$$\dot{b} = -\alpha\Delta g - gb$$

- To pay the service of this debt by a tax on financial transactions
- To issue eurobonds for financing recovery

Candidate countries to EFSF assistance

- Debt repayment + Deficit (2011-2013)

States	Billions €
Belgium	192
Greece	141
Ireland	68
Italy	818
Spain	467
Portugal	72
	1750