

Principles of Economics and Management I

Ciências ULisboa · MMAEG · 2026/2027

Problem Set 12 · Fiscal Policy

Session 12 · LN12

Exercise level: [Easy] routine / warm-up [Medium] typical test level [Hard] challenge (above test level, to consolidate mastery)

1. (2 points) [Easy] **Deficit and debt.** A country has public debt of 200 billion € and GDP of 150 billion €. During the year it runs a deficit of 9 billion €.
 - (a) (1 point) Compute the initial debt to GDP ratio and the debt at the end of the year.
 - (b) (1 point) Distinguish deficit from debt. Can the debt ratio fall while there is a deficit?
2. (2 points) [Easy] **Tax progressivity.**
 - (a) (1 point) Classify by progressivity the Portuguese VAT at a uniform 23% rate and the personal income tax with rising marginal rates.
 - (b) (1 point) A taxpayer earning €20,000 pays €3000 in tax; another earning €60,000 pays €15,000. Compute the average rates and classify.
3. (3 points) [Medium] **The fiscal multiplier.** The marginal propensity to consume is $c = 0.75$.
 - (a) (1 point) With no taxes and no imports, what is the government spending multiplier? The effect of +10 billion € of G ?
 - (b) (1 point) With a proportional income tax of $t = 0.20$, what does the multiplier become?
 - (c) (1 point) Why does openness to trade reduce it further?
4. (3 points) [Medium] **Crowding out and automatic stabilizers.**
 - (a) (1 point) Explain crowding out through the market for loanable funds.
 - (b) (1 point) When is it largest, and when is it practically nil?
 - (c) (1 point) Give two automatic stabilizers and explain why they require no policy decision.
5. (5 points) [Hard] **Debt dynamics.** Let b_t be the debt to GDP ratio and s_t the primary balance as a percentage of GDP.
 - (a) (2 points) Derive $b_t = \frac{1+r}{1+g} b_{t-1} - s_t$ and the approximation $\Delta b \approx (r-g)b - s$.
 - (b) (2 points) With $b = 130\%$, compute the primary balance that stabilizes the ratio if $r = 3\%$ and $g = 5\%$, and if $r = 6\%$ and $g = 1\%$.
 - (c) (1 point) Interpret the condition r versus g .
6. (5 points) [Hard] **Ricardian equivalence.**
 - (a) (2 points) State the proposition and derive it with a two-period consumer who receives a debt financed tax cut T today.
 - (b) (2 points) Under what conditions does it fail in practice?
 - (c) (1 point) What evidence suggests that multipliers are not zero?