

Advanced Macro Lecture 7

Introduction of govt policy in macro framework.

Tax revenue generation for provision of public good/service, some theories regard as waste.

Public good could be prod. input in endogenous growth model.

Look at:

- expenditure shocks (raising/lowering)
- tax changes (effects on the economy)

Government Policy

Govt. expenditure on public good (g)

$$U(C, g) = U(C) + \phi(g) \quad \text{— most common description in Macro literature}$$

Govt. expenditure is a factor of productive input (G)

$$F(K, L, G)$$

How to find public expenditure

1. First-best: lump-sum tax. \Rightarrow the timing of taxes
levy does not matter i.e. deficits/surpluses
have no real effect on the economy.

This is called a Ricardian equivalent. (Proof in textbook)

2. Second-best: distortionary taxes \Rightarrow non Ricardian
Deficits/Surpluses matter

Effects of changing g — how do consumption/savings change over time.

- what are the effects of running temporary deficits (lowering taxes & accumulate public debt)

Lump-sum tax - no effect on consumption pattern.

e.g. typical tax of 100 lowered to 10.

Consumer knows govt will have to pay more in future, so instead of boosting expenditure, consumer will save the tax break (90) and put it in savings account, as in future govt. deficit will have to be paid back with interest (90 deficit per consumer + interest). Thus consumer saves on paying interest by putting money into sav. account.
 → No effect upon consumer expenditure by raising/lowering taxes.

Government planner maximises lifetime utility.

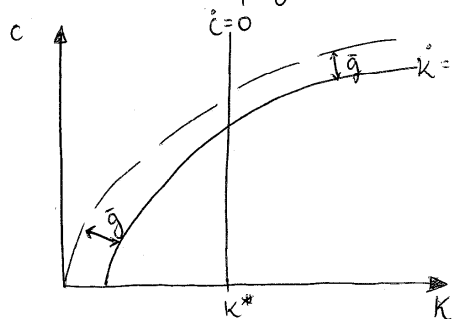
$$\max \int_0^{\infty} e^{-\rho t} (u(c) + \phi(\bar{g})) \cdot dt$$

subject to $\dot{k} = f(k, L) - c - \bar{g}$

\bar{g} is exogenous in order to prevent max. with respect to $\bar{g} \therefore \bar{g}$

Euler equation $\Rightarrow \dot{c} = \frac{U_c}{-U_{cc}} (f_k - \rho)$

since \bar{g} does not affect marginal utility of consumption (U_c), this means $\phi(\bar{g})$ can be dropped.

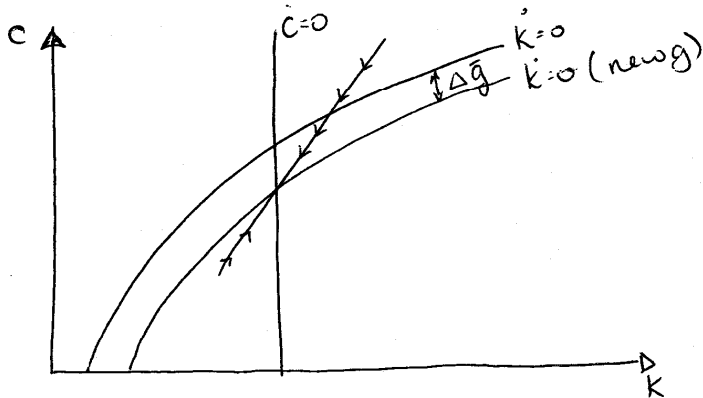
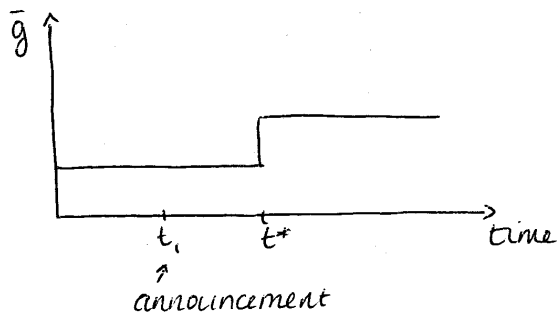


To obtain $\dot{k}=0$ line, $c = f(k, L) - \bar{g}$

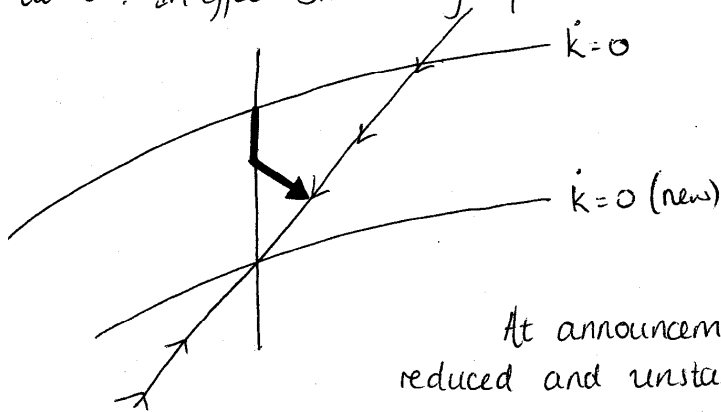
If 0 consumption, capital stock has to exist to equate to \bar{g} .

Phase diagram

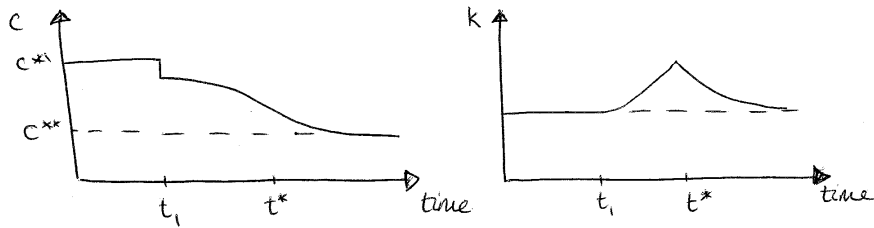
At t^* govt will increase g , with pre-announcement at t_1 .



Optimal to react to information at announcement, rather than at t^* . In effect smaller jump



At announcement date, consumption is reduced and unstable trajectory leads to capital accumulation until t^* where the stable trajectory is met and smoothing in consumption until steady state occurs.



Model has absence of Keynesian effects of Δg increasing GDP, only temporary increase in GDP.

Distortionary taxation

b - govt debt k - physical capital.

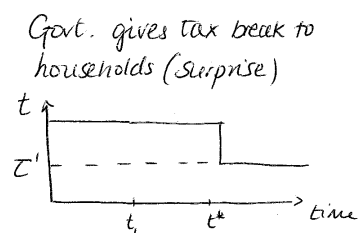
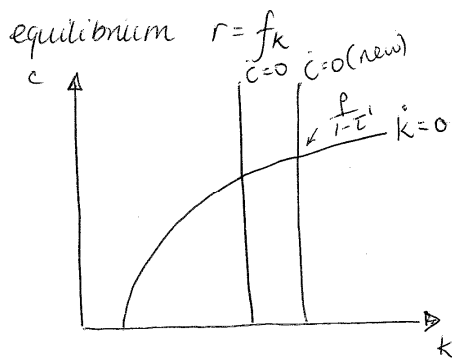
If govt. runs debt, individuals/dynasty hold loans/assets,
 $\therefore a = k + b$

Household gets interest from assets, wages from labour, but has to pay taxes (t).

$$\max \int_0^{\infty} e^{-\rho t} U(c) \cdot dt$$

subject to $\dot{a} = (1-t)(ra + wL) - c$

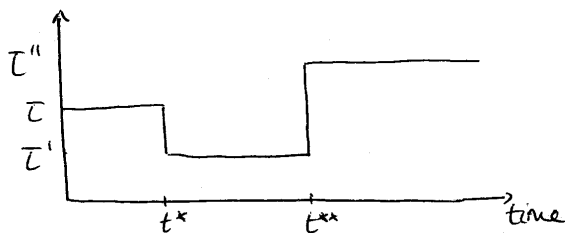
Euler equation $\Rightarrow \dot{c} = \frac{U_c}{-U_{cc}} ((1-t)r - \rho) = \frac{U_c}{-U_{cc}} ((1-t)f_k - \rho)$



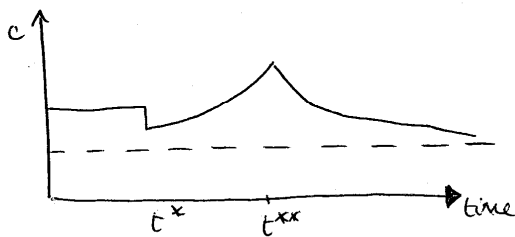
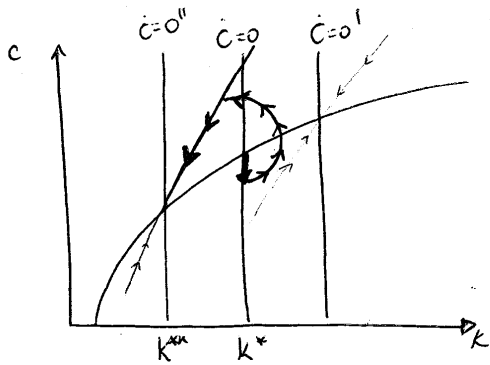
As slope k is $\frac{f}{1-\tau}$, as $\tau \downarrow$, slope decreases.

This results in an outward shift of consumption = 0

In future cannot go back to original tax level, but higher, due to debt accumulation



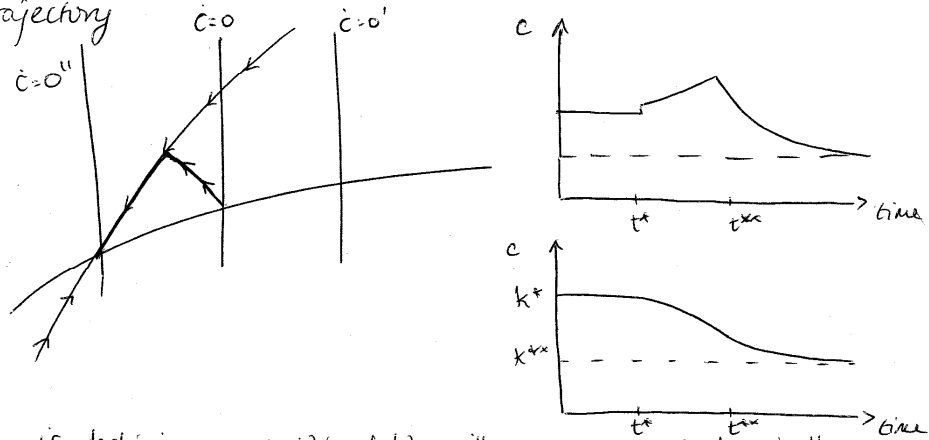
Scenario of minimum increase of taxation increase to fund the initial tax break.



C does not return to original level



For short time-span t^* flows to t^{**} , there can be an alternate trajectory



Welfare is declining, as public debt will carry a marginal cost that is higher than marginal gain from tax break.

In such models, govts should tax early and lower later.

Some tax reforms can lead to Pareto gains.