FULL INSURANCE / RISK SHARING

$\Downarrow$

Each region should get $y + \frac{1}{2}$ every time

$y_1 + \frac{1}{2} + y_2 + \frac{1}{2}$

Requires region with $y+1$ to give away $\frac{1}{2}$ to the other region.

But will the region do so?

If positive shock, I have 2 options:

- stay with risk sharing agreement $v(y+\frac{1}{2}) + \delta V^s$

- If I leave (defect): $v(y+1) + \delta V^d$

$V_1 \quad V_2 \quad V_3$ — How we trade off utilities in time?

$V = V_0 + \delta V_1 + \delta^2 V_2 + \delta^3 V_3 \ldots$ total lifetime utility — $\delta < 1$ discount factor

$= V_0 + \delta \underbrace{\left[V_1 + \delta^1 V_2 + \delta^2 V_3 \ldots \right]}_{}$

$V_1 \to$ utility tomorrow

There are different consequences if we STAY or DEFECT

- STAY

$v(y+\frac{1}{2}) + \delta v(y+\frac{1}{2}) + \ldots +$

so

$v(y+\frac{1}{2}) \underbrace{\left[1 + \delta + \delta^2 + \delta^3 + \ldots + \right]}_{= \frac{1}{1-\delta}} \to$ the utility will be the same in each period

$$v\left(y+\frac{1}{2}\right)+\frac{\delta}{1-\delta}v\left(y+\frac{1}{2}\right)$$

EXCLUDED FOR T PERIODS (DEFECTED)

$$v_0^{d}=E[v_0]+\delta E[v_1]+\ldots+\delta^{t}E[v_t]+\delta^{t+1}v\left(y+\frac{1}{2}\right)$$

$$=E[v]\underbrace{\left\{1+\delta+\delta^2+\ldots+\delta^{t}\right\}}_{\to\frac{1-\delta^{t+1}}{1-\delta}}$$

$$v\left(y+\frac{1}{2}\right)\left\{\delta^{t+1}+\delta^{t+2}+\ldots\right\}\longrightarrow v\left(y+\frac{1}{2}\right)\delta^{t+1}\underbrace{\left[1+\delta+\delta^2+\ldots\right]}_{\to\frac{\delta^{t+1}}{1-\delta}}$$

So I can force $1+\delta+\delta^2+\ldots+\delta^{t}+\delta^{t+1}+\delta^{t+2}+\ldots$

or $-\delta^{t+1}-\delta^{t+2}=$

$$=-\delta^{t+1}\underbrace{\left[1+\delta^1+\delta^2+\ldots\right]}_{\frac{1}{1-\delta}}=\frac{1}{1-\delta}-\frac{\delta^{t+1}}{1-\delta}=\frac{1-\delta^{t+1}}{1-\delta}$$

exclusion period

SO WHEN I AM EXCLUDED:

$$v(y+1)+\delta\left[\frac{1-\delta^{t+1}}{1-\delta}E[v(y)]+\frac{\delta^{t+1}}{1-\delta}v\left(y+\frac{1}{2}\right)\right]$$

I would stay in the risk sharing if:

$$v\left(y+\frac{1}{2}\right)+\frac{\delta}{1-\delta}v\left(y+\frac{1}{2}\right)\geq v(y+1)+\frac{\delta}{1-\delta}\left[(1-\delta^{t+1})E[v(y)]+\delta^{t+1}v\left(y+\frac{1}{2}\right)\right]$$

$$v\left(y+\frac{1}{2}\right)\geq(1-\delta)v(y+1)+\delta\left[(1-\delta^{t+1})E[v(y)]+\delta^{t+1}v\left(y+\frac{1}{2}\right)\right]$$

righthand side larger
SMALLER δ => more likely to defect

LARGER T => Righthand side smaller => less likely to defect

$\boxed{\text{more risk adverse}}$

$v(y+\frac{1}{2}) >> E[V]$ -> righthand smaller

larger

22/03/2017

TAXACTION : TAX COMPETITION

CAPITALISM MOBILE

A SMALL OPEN ECONOMY

FIX AMOUNT OF CAPITAL AVAIABLE that can be invested in production or local market

it's a quantity* $\bar{K} = K + K^g$ -> demand is fixed, so if I invest more in K, I invest less in K^g

home investment; investment in global market

The decision is if to invest in home or abroad (in market)

- PRODUCTION (function of capital and labour)

$F(k, L)$ labour $F = k^{\alpha} \cdot L^{1-\alpha}$ L can be the hours of work, people employed

Investment decision

I have to maximize my profit by choosing how much to invest in K and K^g

LABOUR IS FIXED

If I invest in here; if I invest in global market

$$F(K,L) - WL + \rho K^{d} - tK$$

wage rate — world market rate — the investor has to pay taxes on capital

$$F(K,L) - WL + \rho(\bar{K}-K) - tK$$

→ marginal product of capital

~~the only variable is~~ K, L

The company can chose L (that in equilibrium is constant)

$$\frac{\partial}{\partial K} = \frac{\partial F(K,L)}{\partial K} - \rho - t = 0$$

$$\frac{\partial}{\partial L} = \frac{\partial F(K,L)}{\partial L} - W = 0$$

$$\frac{F}{L} = K^{+\alpha} L^{-\alpha} = \left(\frac{K}{L}\right)^{\alpha}$$

$$\frac{F(K,L)}{L} = F\left(\frac{K}{L}, 1\right)$$

Homogeneous of degree 1

Constant returns to scale

Homogeneous function: $F(\lambda K, \lambda L) = \lambda^{s} F(K,L)$ Homogeneous of degree s

IF $s = 1$ → constant return to scale

$$\frac{\partial}{\partial \lambda} = \frac{\partial F(\lambda K, \lambda L)}{\partial (\lambda K)} \cdot K + \frac{\partial F(\lambda K, \lambda L)}{\partial (\lambda L)} \cdot L = F(K,L)$$

Must hold for all λ including $\lambda = 1$

$$\frac{\partial F}{\partial K}\cdot K + \frac{\partial F}{\partial L}\cdot L = F$$

Differentiate per k

$$\frac{\partial}{\partial K} = \frac{\partial F}{\partial(\lambda K)}\cdot\lambda = \lambda\cdot\frac{\partial F}{\partial K}$$

$$\frac{\partial F(\lambda K,\lambda L)}{\partial(\lambda K)} = \frac{\partial F(K,L)}{\partial K}$$ set $\lambda = \frac{1}{L}$

$$\underbrace{\frac{\partial F(\frac{K}{L},1)}{\partial(\frac{K}{L})}}_{f'(k)} = \frac{\partial F(K,L)}{\partial K}$$

⇓

capital's marginal product is a function of $\frac{K}{L} \equiv k$

$$f(k) = \frac{F(K,L)}{L} = F\left(\frac{K}{L},1\right)$$

per capital capital

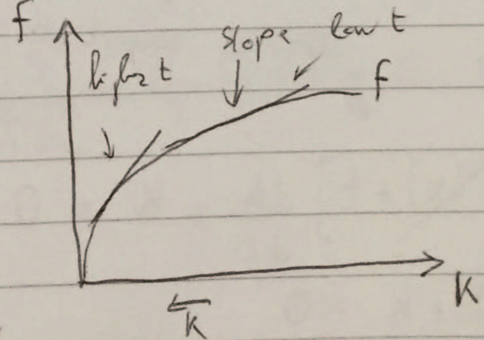
per capital production is a function of per capital capital

$$\Rightarrow f'(k) - \rho - t = 0$$

per capital production

↓ k is an implicit function of t

If I have a concave production technology; it will look:



if $t\uparrow$, $k\downarrow$

If taxes increase, less capitalist will be attracted

$\Rightarrow F''(k)\,dk - dt = 0$

$\Rightarrow \dfrac{dk}{dt} = \dfrac{1}{F''(k)} < 0$ negative second derivate for concave function

So reducing taxes will encourage investments

NOW SEE WHAT <u>GOVERNMENT</u> WILL DO ON t

$\max\limits_{t} \dfrac{wL}{L} + \dfrac{tK}{L}$

is the same if I maximize for capital

$\max\limits_{t} \; w + tk$ $\quad w = \dfrac{\partial F}{\partial L}$

$wL = \underbrace{F}_{\text{total production}} - \underbrace{\dfrac{\partial F}{\partial K} \cdot K}_{\text{what capital owners earn}}$

$w = \dfrac{F}{L} - \dfrac{\partial F}{\partial k} \cdot \dfrac{K}{L} = F(k) - F'(k) \cdot k$

$\max\limits_{t} \; F(k) - F'(k)K + tk$ government maximizes wage plus tax

k is function of t

derivate respect to t

ideally

$\Rightarrow \left[\cancel{F'(k)} - F''(k) \cdot k - \cancel{F'(k)} + t\right] \dfrac{dk}{dt} + K = 0$

$(-F''(k) \cdot k + t) \dfrac{dk}{dt} + k = 0$

$$\frac{-F''(k)\cdot k + t}{F''(k)} + k = 0$$

$$-\cancel{k} + \frac{t}{F''(k)} + \cancel{k} = 0$$

$$\Rightarrow \frac{t}{F''(k)} = 0$$

denominator is negative

$t = 0$ ~~I can push my tax negative~~

the best thing I can do is not tax at all

TWO ECONOMIES (NO COOPERATION)

$$\bar{K} = k^1 + k^2$$

$$\cancel{\frac{F(k,L)}{L} - w}$$

$$\cancel{F(k) - w}$$

3 can invest in region one or two

$$F(k^1, L^1) - w^1 L^1 - t^1 k^1 + F(k^2, L^2) - w^2 L^2 - t^2 \underbrace{k^2}_{\bar{k} - k^1}$$

$$\frac{\partial}{\partial k^1} = \frac{\partial F(k^1, L^1)}{\partial k^1} - t^1 + \frac{\partial F(k^2, L^2)}{\partial k^2}(-1) + t^2 = 0$$

$$\Rightarrow f'(k^1) - t^1 - f'(k_2) + t^2 = 0$$

$$f'(k^1) - t^1 - f'(\bar{k} - k^1) + t^2 = 0 \quad *$$

REGION ONE FIRST

$\max_{t^1} F(k^1) - F'(k^1)k^1 + tk^1$ $\rightarrow$ the consequences are given also by region TWO; and the same for region ONE (independence)

take t^2 as given

Whatever the other government decides, I have to do what is optimal for me.

NASH EQUILIBRIUM

$$\left[-F''(k^1)k^1 - F'(k^1) + t^1\right]\frac{dk^1}{dt^1} + k^1 = 0$$ THIS BEFORE

NOW

$$* \quad [F''(k^1) + F''(\underbrace{\bar{k}-k^1}_{k^2})]dk^1 - dt^1 = 0$$

$$\frac{dk^1}{dt^1} = \frac{1}{F''(k^1) + F''(k^2)}$$

$$\frac{-F''(k^1)k^1 + t^1}{F''(k^1) + F''(k^2)} + k^1 = 0$$

$$\frac{-\cancel{F''(k^1)k^1} + t^1 + \cancel{k^1F''(k^1)} + k^1F''(k^2)}{F''(k^1) + F''(k^2)} = 0$$

$$t^1 + k^1F''(k^2) = 0$$

$$\Rightarrow t^1 = -k\underbrace{F''(k^2)}_{-} > 0$$

$$\Rightarrow t^2 = -k^2F''(k^1) > 0$$

Contrary to open economy, here it is possible to impose taxes

$$t^1 = -\frac{\bar{k}}{2} F''\left(\frac{\bar{k}}{2}\right) > 0$$

CENTRAL GOVERNMENT

$$t^2 = -\frac{\bar{k}}{2} F''\left(\frac{\bar{k}}{2}\right) > 0$$

$$2\left(F\left(\frac{\bar{k}}{2}\right) - F'\left(\frac{\bar{k}}{2}\right)\frac{\bar{k}}{2} + t\,\frac{\bar{k}}{2}\right)$$

$$\frac{\partial}{\partial t} = \frac{\bar{k}}{2} > 0$$ it's more than TWO SEPARATE GOVERNMENT

PESTIEAU

ECONOMICS OF SOCIAL PROTECTION

INTRODUCTION

A Design and sustainability

THREE SOCIAL POLICIES

B Performance of social protection

C social protection and private insurance

D Tagging, transfer in kind and workfare

OBJECTIVES

- PROTECTION AGAINST LIFETIME RISKS
  - DISABILITY
  - FAMILY
  - EARLY / LATE DEATH
- POVERTY AND INEQUALITY ALLEVIATION
  RELATIVE VS ABSOLUTE
  TEMPORARY VS