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Chapter 5

One period—表示说你不用考虑 saving

Closed economy – 表示说 $NX = 0$

这是两个很重要的前提！

然后就是这个经济体系中不再只有 representative consumer 和 representative firm，还多了一个 Government！也就是有税收了， $G=T$

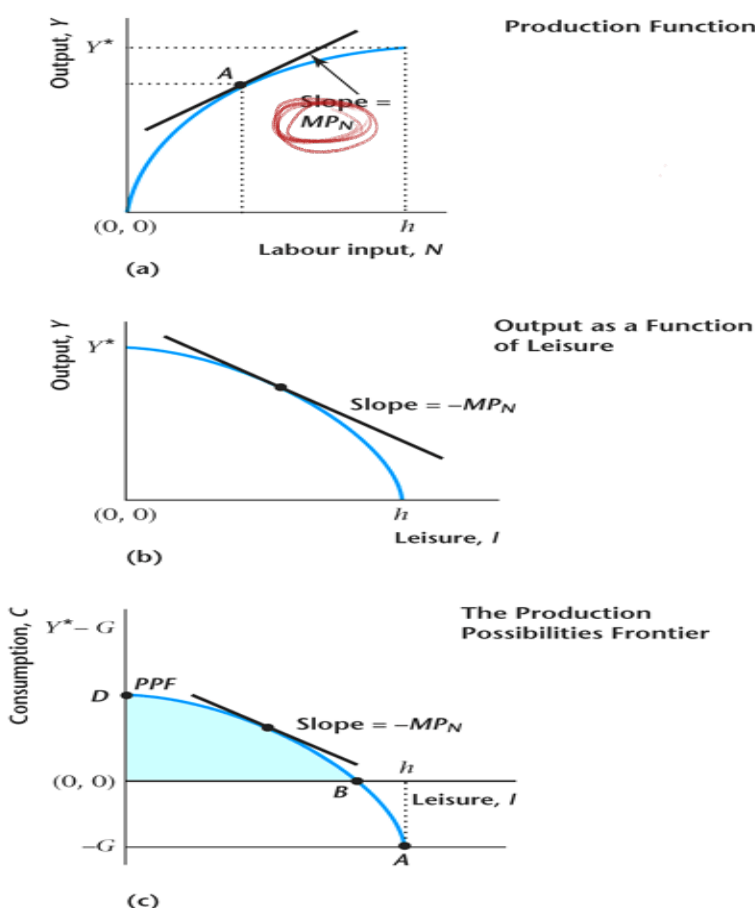
Gov income = tax income.

这一章主要的就是在分析加了 government 之后的经济体系！

The **competitive equilibrium** will be determined where demand = supply.

- $Y = C + G$ (in the goods market) goods market clearing
- labour demand will equal labour supply $\rightarrow N_d = N_s = N$ (employment)

$C + G = Y$ is our goods market clearing condition



PF 是 Y(公司 output) 和 N (labour)之间的关系图

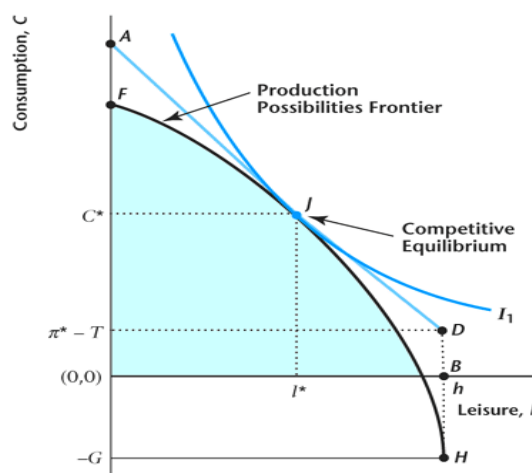
PPF 是 consumption 和 L (Leisure) 之间的关系图

PPF 的斜率绝对值是 MPN, 也叫做 MRT, marginal rate of transformation. 就是在一定技术条件下, 通过劳动可以使一个 unit 的 leisure 转化成多少个 consumption goods 的转化率。

FIGURE 5.3

Competitive Equilibrium

This figure brings together the representative consumer's preferences and the representative firm's production technology to determine a competitive equilibrium. Point J represents the equilibrium consumption bundle. ADB is the budget constraint faced by the consumer in equilibrium, with the slope of AD equal to the minus real wage, and the distance DB equal to dividend income minus taxes.



Distance DH 表示的就是 π^* , 因为 $DB = \pi^* - T$, $BH = G$, 而 $T = G$ 。

因为 consumer 和 company 在这个条件下, 面对的都是同样的 wage, 所以他们利益最大化时,

$MRT = MRS = W$

在这种情况下 competitive equilibrium, consumer 是 maximize 了 utility, 而 company 是 maximize 了 profit。

Pareto optimality: occurs when there is no way to rearrange production or to reallocate goods so that someone is made better off without making someone else worse off.

不可能再改善某些人的境况, 而不使任何其他人受损

前面的 competitive equilibrium 也就是 Pareto optimum。

Pareto Optimum 的 property 是 $MRT = MRS$, 也就是 PPF 和 IC 相切的点

Since this is the same as the competitive equilibrium then, the competitive equilibrium is efficient

Welfare Theorem:

- ▶ 1) Under certain conditions, a competitive equilibrium is Pareto-optimal.
- ▶ 2) Under certain conditions, a Pareto optimum is a competitive equilibrium.

如果一句话说 a competitive equilibrium is always Pareto-optimal, 对还是错? 错! 必须是 under certain conditions, 也就是说 CE 不一定是 Pareto-optimal

如果有 Externality (外部性) --就是说非交易双方的人也会受到影响的话, 就会导致 CE 不一定是 Pareto-Optimal, 也就是说 CE 不 economical efficient

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Positive externality (正外部性): 比如说一座大家都可以欣赏的美丽建筑, 绿化

Negative externality (负外部性): 比如说污染

如何理解: With a negative externality, the competitive equilibrium will lead to too much being produced relative to the Pareto-optimal equilibrium. Positive externalities will lead to too little being produced relative to the Pareto-Optimal, from a social perspective, too little is produced)

因为在 CE 时, 公司只考虑使得 $MC = MR$, 并没有考虑外部性, 当有正外部性时, MC 事实上小于 MR , 那么对于 Pareto-optimal 来看 (考虑整个社会), too little to be produced. 有负外部性时, MC 事实上大于 MR , 对于 Pareto-optimal 来看, too much to be produced.

Distorting tax 也会使得 $MRS < MPN = MRT$, competitive equilibrium 就不是 pareto-optimal 了

Source of social efficiency

- Externality
- Distorting tax
- Monopoly power

如果 G 增加了!

PPF 会怎么变化? 向下平移

G 增加了, T 也就增加了, 那么可消费的收入就会随之减少了, 因为 $C = wN + \pi - T$, income 减少, C 就会下降, I 也会下降了, 那么 N -employment 会上升了, 从而会导致 Y 也会上升

$C + G = Y$, G 上升, Y 上升, 那么 C 下降的数量就会比 G 增加的数量要少。这种叫做 **Partial Crowding out**

如果是 full crowding out 的话, Y 是不变, 那么 G 的改变量是等于 C 的改变量

因为 N supply 上升, 所以 w 会下降 $\Rightarrow C \downarrow$

如果 TFP (z) 增加了!

PPF 会 shift out, Y 上升, 而且 MPN 会上升, w 就会上升, 那么就要考虑 sub effect 和 income effect

Sub effect? C 上升, L 下降

Income effect? C 上升, L 上升

Total effect? C 上升, L ?? N ?? Y 会上升, 因为 C 上升

We conclude that fluctuations in TFP may be the primary cause of business cycles if in the short run the sub effect 大于 income effect, 因为这样的话, N -employment 就会上升 (labour supply increase with the real wage increase)

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Chapter 9

Two periods! – 意味着有现在和将来，那么人会开始想要考虑存钱（saving）Government lend 或者 borrow 的利率跟消费者面对的一样

Period 1 （消费者会把一部分收入存起来，或者借钱）： $c + s = y - t$ （ t 在这是 lump-sum tax）

Period 2 （第二阶段的时候消费者会把存的钱收回来或者把借的钱要还回去，还有利息）

$$c' = y' - t' + s(1+r)$$

如果 $s < 0$, 这个人是 borrower, 如果 $s > 0$, 这个人是 lender

这个 model 里有一个很重要的 assumption, 叫做 consumption smoothing: consumers wish to have a smooth consumption path over time, rather than an uneven one. 也就是说消费者想要让自己的消费均衡一些，而不是现在消费得非常多，以后消费得非常少，或者反过来。

c 和 c' 都是 normal goods!

$$s = \frac{c' - y' + t'}{1+r}$$

$$c + \frac{c' - y' + t'}{1+r} = y - t \quad (c + s = y - t)$$

$$c + \frac{c'}{1+r} = y + \frac{y'}{1+r} - t - \frac{t'}{1+r}$$

通过 rearrange:

得到 lifetime budget constraint

等式右边其实就是 consumer 一生能消费的钱的现在价值（present value），用 we 表示那么通过这个式子，当我们知道其他量时，就可以计算 c 或者 c'

还可以画出 c 和 c' 之间的关系图， c' 做 y 坐标轴， c 在 x 坐标轴，那么这条线的斜率就是 $-(1+r)$ ，也可以画出 vertical intercept 和 horizontal intercept，那么这个就是类似 chapter4 中的 budget constraint，只是现在的消费品不再是 c 和 l ，而是变成 c 和 c'

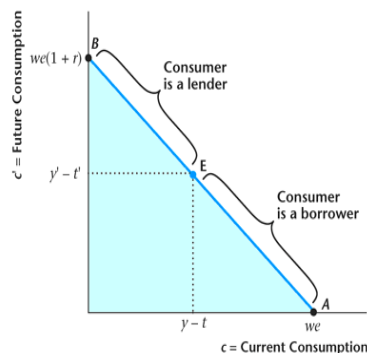


FIGURE 6.1

Consumer's Lifetime

Budget Constraint

The lifetime budget constraint defines the quantities of current and future consumption the consumer can acquire, given current and future income and taxes, through borrowing and lending on the credit market. To the northwest of the endowment point E , the consumer is a lender with positive savings; to the southeast of E , he or she is a borrower with negative savings.

E 那个点叫做 Endowment point! (这个点表示 saving 为 0, $s=0$)

那么在这个点是, $c=y-t$, $c'=y'-t'$ 一定要记住 endowment point 上 $s=0$, 这个点不一定是 consumer 的最佳 consumption bundle!

如果一个人选择的 consumption bundle 在 E 的左边, 这个时候 $c < y-t$, 所以这个人是个 lender;

如果一个人选择的 consumption bundle 在 E 的右边, 这个时候 $c > y-t$, 所以这个人是个 borrower;

什么时候 consumption bundle 是最佳? 跟之前一样, 就是要使得 IC (indifference curve) 和 budget line 相切, $MRS = -\text{slope of budget line} = 1+r$

讨论几种量改变时对 c 和 c' 还有 s 的影响, 当题目只说改变某个量时, 表示其他不是 c, c', s 的量是保持不变的!

如果 y —current income 上升, (y', t, t', r 都不变)

y 上升, lifetime wealth will increase, c and c' are normal goods, due to consumption smoothing, both c and c' will **increase**. (What about s ? $c' = y'-t' + s(1+r)$) Since y', t' and r do not change, consumer must save more to increase future consumption. s will also **increase**.

What about endowment point? (问你 endowment point 时, 你只用考虑两个式子! $c=y-t$, $c'=y'-t'$)

那么 y 上升, endowment point 对应的 c 也会上升, 而 y', t' 不变, endowment point 对应的 c' 也就不变。

*记住! Consumption of durables MORE variable than aggregate income, but nondurables and services LESS variable than income. 因为 durables 更像是一种投资, 而 nondurables 的变化不会太大

*记住! There is some *excess variability* of aggregate consumption relative to aggregate income. Therefore, the facts do not exactly match the theory. Why?

- 1. There are imperfections in the credit market.

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2. When all consumers are trying to smooth consumption in the same way, market prices will change.

FIGURE 6.5

The Effects of an Increase in Current Income for a Lender

When current income increases, lifetime wealth increases from we_1 to we_2 . The lifetime budget constraint shifts out, and the slope of the constraint remains unchanged, since the real interest rate does not change. Initially, the consumer chooses A, and he or she chooses B after current income increases. Current and future consumption both increase (both goods are normal), and current consumption increases by less than the increase in current income.

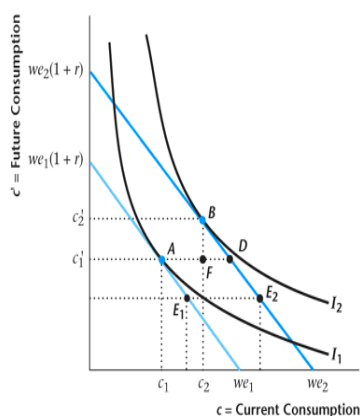
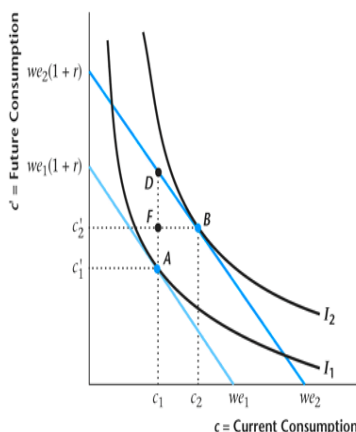


FIGURE 6.7

An Increase in Future Income

An increase in future income increases lifetime wealth from we_1 to we_2 , shifting the lifetime budget constraint to the right and leaving its slope unchanged. The consumer initially chooses point A, and he or she chooses B after the budget constraint shifts. Future consumption increases by less than the increase in future income, saving decreases, and current consumption increases.



y 上升的情况

如果 y' -current income 上升, (y, t, t', r 都不变)

y' 上升, lifetime wealth will increase, c and c' are normal goods, due to consumption smoothing, both c and c' will **increase**. (What about s ? $c' = y' - t' + s(1+r)$) Since y, t, t' and r do not change, consumer must save less to increase current consumption. s will decrease.

What about endowment point? (同样问你 endowment point 时, 你只用考虑两个式子! $c=y-t$, $c'=y'-t'$)

那么 y' 上升, endowment point 对应的 c' 也会上升, 而 y, t 不变, endowment point 对应的 c 也就不变。

(收入如果只是 temporarily 增加, 消费者会需要增加 saving 来提高未来的消费, 但如果收入 permanently 增加, 消费者就不怎么需要改变 saving 了)

If income increases temporarily in the current period, since both future and current consumption increase (smoothing), then savings will increase in the current period to finance future consumption increasing.

If income increases permanently, savings does not need to change since income increases in BOTH periods.

C increases *more* if Y increase in BOTH periods, therefore savings would increase *less* than if Y increased in only period 1.)

如果 r 上升了, (y, t, y', t' 都不变)

那么这个时候 c 和 c' 的 budget line 也改变了, 斜率变陡了, endowment point 却不变, 因为 y, t, y' 和 t' 都没变。假设 c 是 1 刀, c' 也是 1 刀, 但 c 换到以后来看是 $(1+r)$ 刀, 所以当 r 上升, c 对于 c' 来看就变得更加 expensive 了。

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而 r 上升, 对于一个 borrow 钱的消费者是不利的, 表示他要还的钱多了, 也就是变得 poorer 了;
相反对于一个 lend 钱的消费者来说是有利的, 表示他要的利息变多了, 变得 richer 了。

For borrower: sub effect: c decreases, c' increases, s increases

Income effect: c decreases, c' decreases, s increases

Net : c decreases, c' ?? , s increases

If sub > income, c' goes up

If sub < income, c' goes down

For lender: sub effect: c decreases, c' increases, s increases

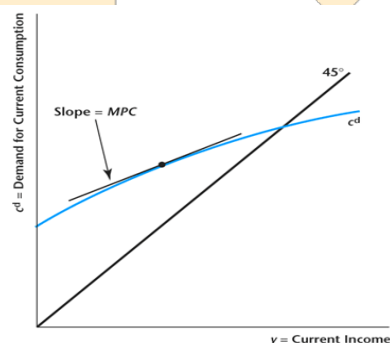
Income effect: c increases, c' increases, s decreases

Net : c ??, c' increases , s ??

If sub > income, c goes down, s goes up

If sub < income, c goes up, s goes down

FIGURE 6.15
A Consumer's Demand for Current Consumption Goods, c^d , as a Function of Current Income
The slope of the c^d curve is the marginal propensity to consume, MPC, which is less than 1 for all y .



- ▶ An increase in current income increases current consumption but less than one for one.
- ▶ So the slope is less than 1
 - ▶ The slope is the MPC.
 - ▶ It is possible that the MPC will vary with income.

Government 是怎样呢?

Period 1: $G = T + B$ Period 2: $G' + B(1+r) = T'$

Rearrange 之后得到 $G + \frac{G'}{1+r} = T + \frac{T'}{1+r}$

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Defined competitive equilibrium:

- 1) Each consumer maximizes utility subject to their budget constraint.
- 2) The government present value budget constraint holds.
- 3) Markets clear: The goods market : $Y = C + G$ in both periods (recall $I = 0$, $NX = 0$)

The Credit Market: Private savings = gov't wants to borrow $S^P = B$

Ricardian Equivalence -- (这个理论很重要，是跟 government 的 tax cut 有关)

- ▶ If the government decreases current taxes, it must borrow from the private sector to finance spending, and therefore, future taxes must increase to pay for the higher gov't debt.
- ▶ If consumers recognize that this will happen, then they won't respond to the tax cuts with higher consumption today. They will just save the tax cut.

这个 theorem 就是说: Holding current and future government spending constant, a change in current taxes with an equal and opposite change in the present value of future taxes, leaves the equilibrium real interest rate and the consumption of individuals unchanged.

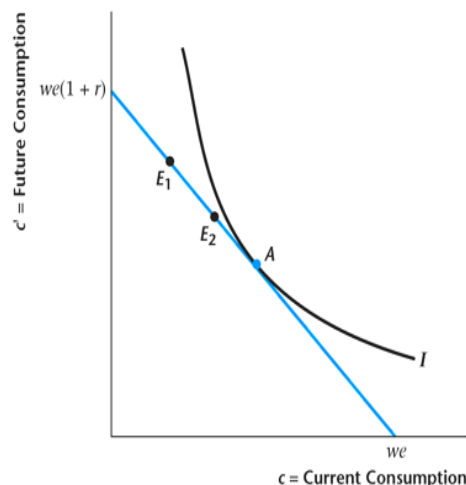
Ricardian Equivalence 可能会在现实中不成立，会 fail，会 invalid，why?

- ▶ 1) All individuals may not pay the same taxes. If some consumers received higher tax cuts than others, they would change their consumption and the interest rate would change.
- ▶ 2) Debt may not be paid off during the lifetime of all individuals who were alive when it was issued. Tax cuts could benefit currently old individuals while future tax increases could be paid by the current young. This would lead to an intergenerational redistribution of wealth.
- ▶ 3) Lump-sum taxes are not used much in practice. We currently have proportional taxes which lead to differences across individuals. If savings are taxed, we will also get a different result.
- ▶ 4) Credit markets may not be perfect. Eg: Lending rate usually less than borrowing rate. If you increase taxes today and consumers cannot borrow, their consumption will go down.

FIGURE 6.17

Ricardian Equivalence with a Cut in Current Taxes for a Lender

A current tax cut with a future increase in taxes leaves the consumer's lifetime budget constraint unchanged, and so the consumer's optimal consumption bundle remains at A. The endowment point shifts from E_1 to E_2 , so that there is an increase in saving by the amount of the current tax cut.

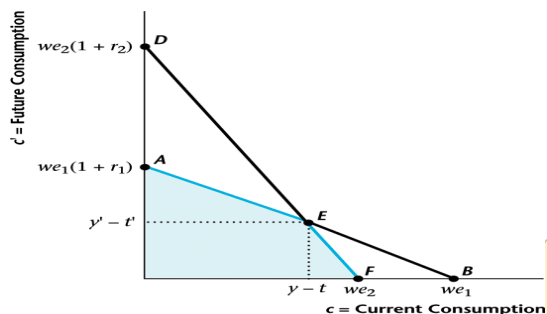


这是一个 borrower，不是 lender

Chapter 10

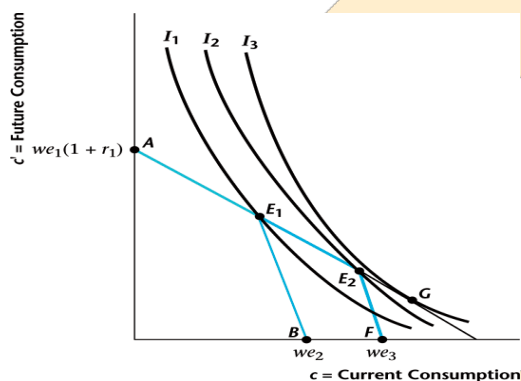
Assume that lenders can lend at a lower interest rate than the one faced by borrowers.

The government borrows and lends at the interest rate that lenders face.



the effective budget constraint is the kinked line AEF, the kink is at the endowment point.

Effects of a Tax Cut for a Consumer with Different Borrowing and Lending Rates



Suppose a consumer initially is credit constrained – that is he or she saves zero. For such a consumer, the entire tax cut will be spent on current consumption.

记住! Two key credit market *frictions*: asymmetric information and limited commitment.

Asymmetric information: Would-be borrowers know more about their characteristics than do lenders.

Limited Commitment: Borrowers may choose to default – lender can overcome limited commitment with collateral.

Effect of a Decrease in the Fraction of Creditworthy Borrowers

- Default premium increases – even good borrowers face higher loan rates.
- Budget constraint shifts in.
- Consumption falls for all borrowers.