Non transitivities - Non rationality

Regrets
Addictions (chemical: immediate benefits more than compensated by harmful consequences)
Addictions (behavioral: gratifications and…)
Obsessions (relief and…)
Compulsions (relief and…)

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A.3 The consumer's goal (and her rationality)

«i» prefers A to B, (fact)

«i» will try to obtain A rather than B (goal)

«i» knows how to obtain A rather than B (rationality)

(given the economic, technological, institutional, social **constraints**)

The ordering «at least as liked as» induces choices.

Baskets of 2 goods

A ≡{3;7} A is made of 3 apples and 7 burgers

B ≡ {1;0} B is made of 1 apple and 0 burgers

Individual Utility Function

Given an individual *i*, this function U_i (X,Y) will be such that, for any basket A - consisting of a combination of X_a unit of good X and Y_a unit of good Y - and any basket B - consisting of a combination of X_b unit of good X and Y_b unit of good Y - where $A \succ_i B$ (i.e. A is strictly preferred to B by the individual "i"), U_i (X_a, Y_a)> U_i (X_b, Y_b). Similarly, for any basket A - consisting of a combination X_a of good X and Y_a of good Y - and any basket B - consisting of a combination X_b of good X and Y_b of good Y, where A ~ B (A is indifferent to B), the utility function will be such that U_i (X_a, Y_a) = U_i (X_b, Y_b).

Preferences

Continuous (another assumption):

Then in that case **the «Utility function»**

exists!

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Our consumer, John

Basket	Books (quantity B)	Tennis (hours L)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

From cardinal to ordinal Utility

if "before" the utility defined the preferences (if $U(A) > U(B)$ - where U was considered measurable - then $A \succ B$) "now" the preferences define the utility (if $A \succ B$ then there exists a mathematical function U such that $U(A) > U(B)$).

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Who is he?

Basket	Books (quantity B)	Tennis (hours L)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

Basket	Books (quantity B)	Tennis (hours L)	Utility
A	10	0	-100
B	7	1	-100
C	5	2	-100
D	4	3	-100
E	3	5	-100
F	2	8	-100
G	10	1	-20
H	8	2	-20
I	7	3	-20
L	9	1	?
M	7	5	?

Basket	Books (quantity B)	Tennis (hours L)	Utility
A	10	0	100.000
B	7	1	100.000
C	5	2	100.000
D	4	3	100.000
E	3	5	100.000
F	2	8	100.000
G	10	1	1.000.000
H	8	2	1.000.000
I	7	3	1.000.000
L	9	1	?
M	7	5	?

Always John!

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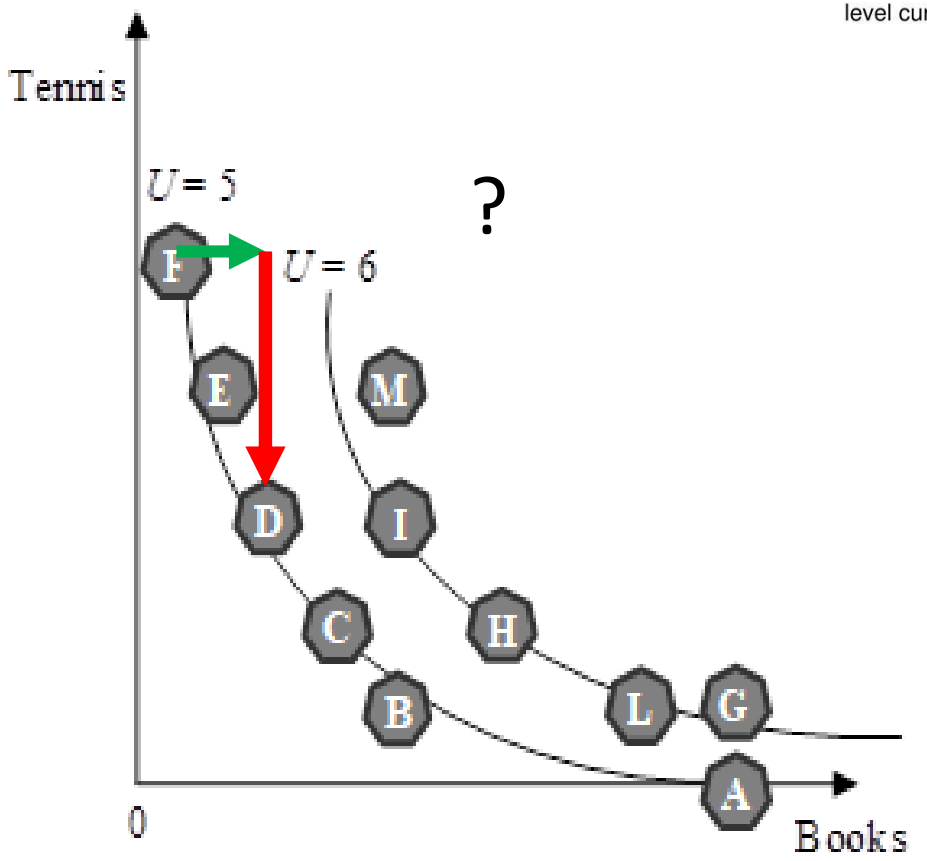
The indifference curve!

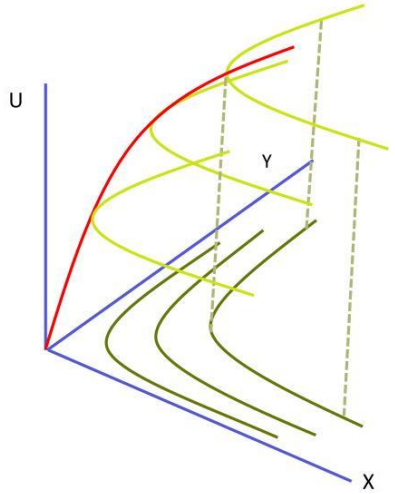
Basket	Books (quantity B)	Tennis (hours L)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

$$U = U(B;T)$$



Digression on indifference curves.

Indifference curves are often thought of as level curves projected onto the base plane



U=U(x, y)

is strictly concave as drawn

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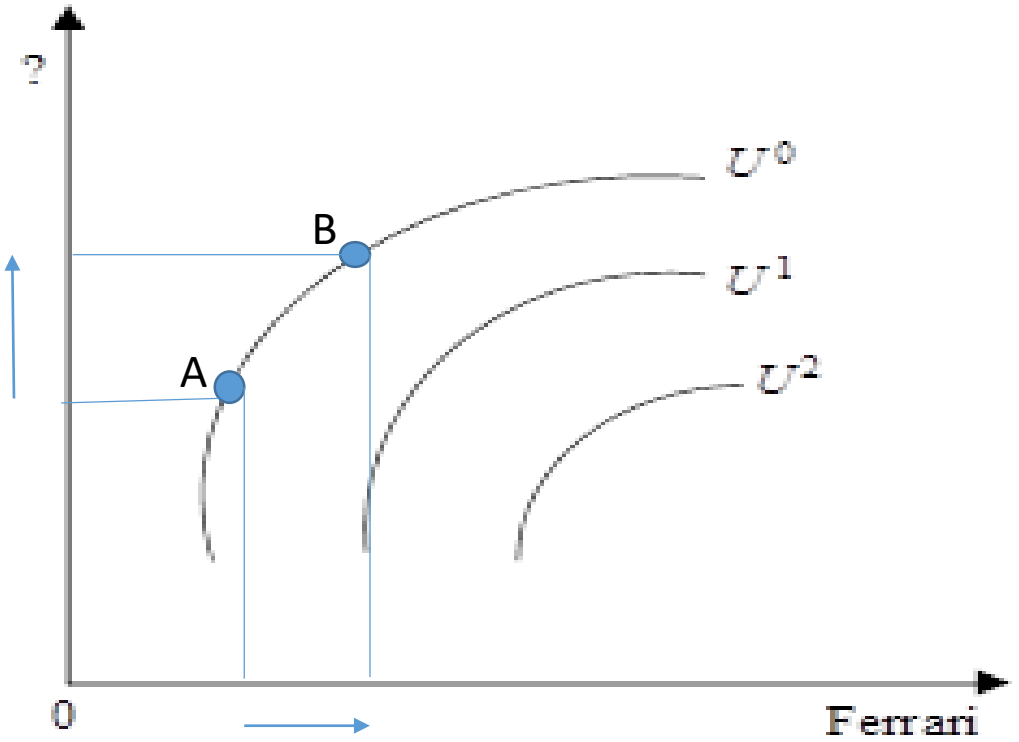
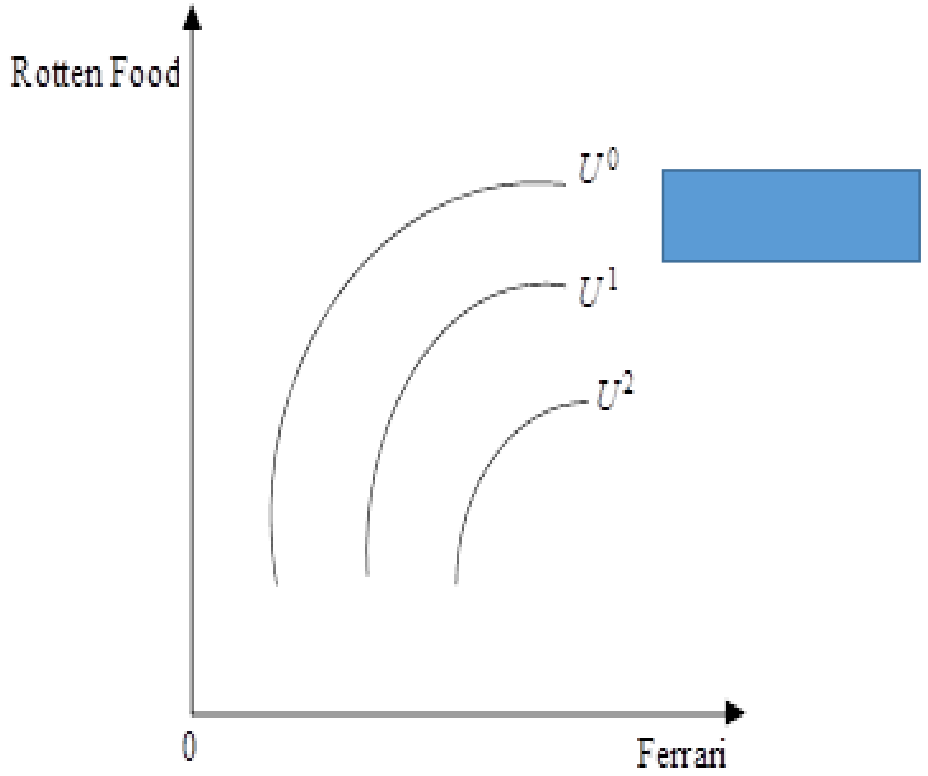
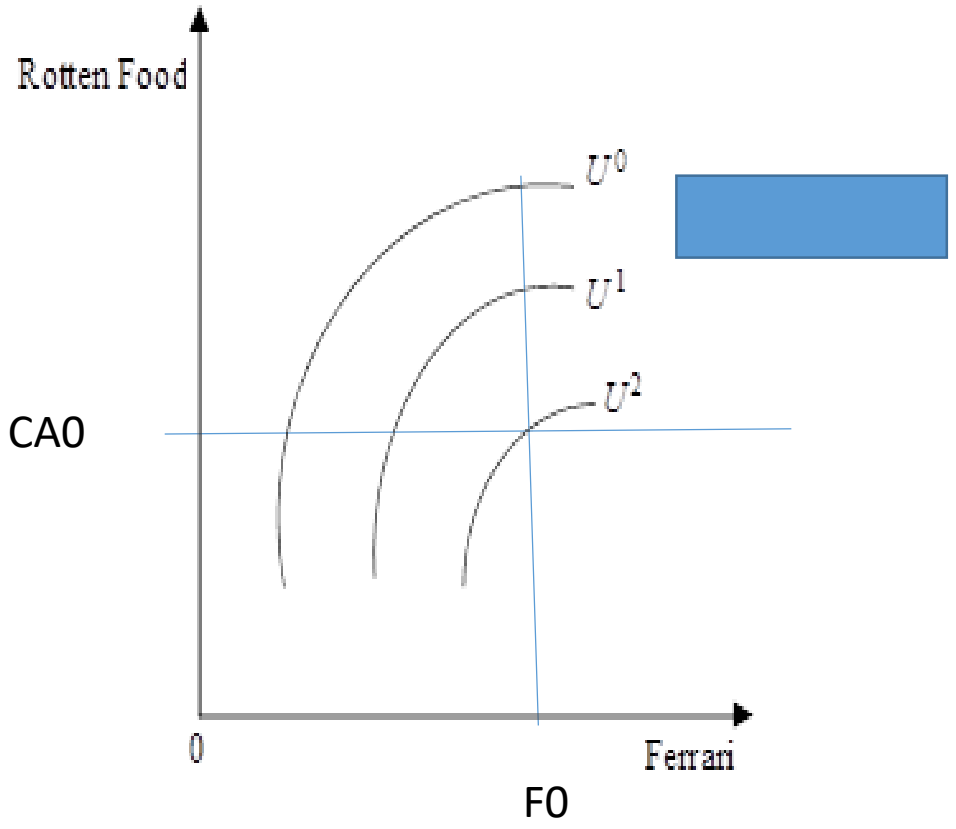
Why increasing? What is «?» ?



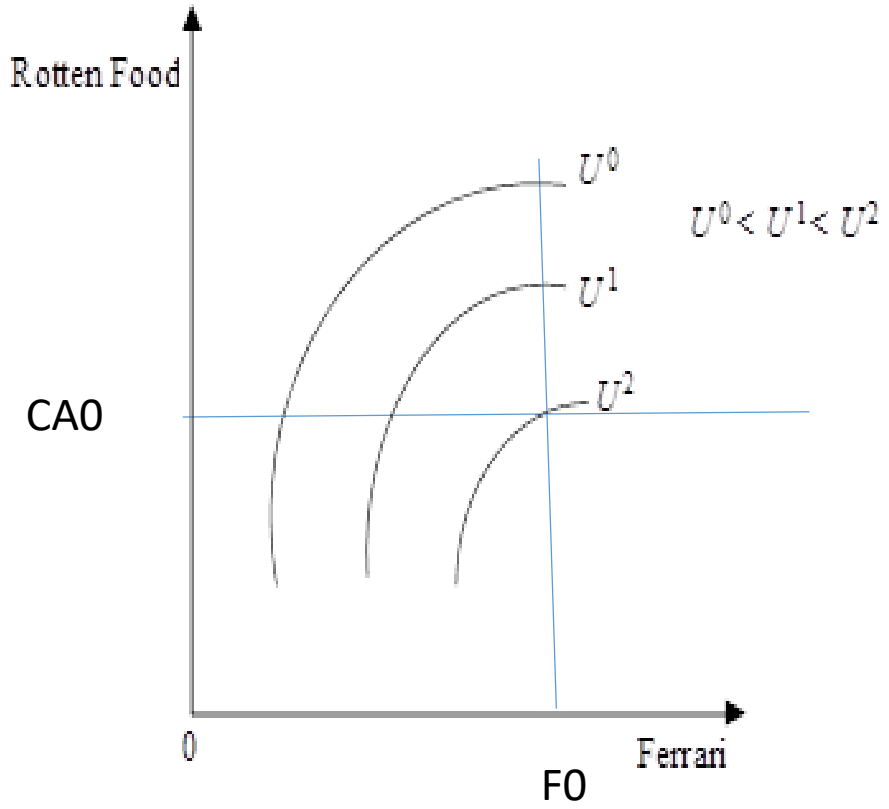
A «bad»



How bad?



How bad?



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Bads exist

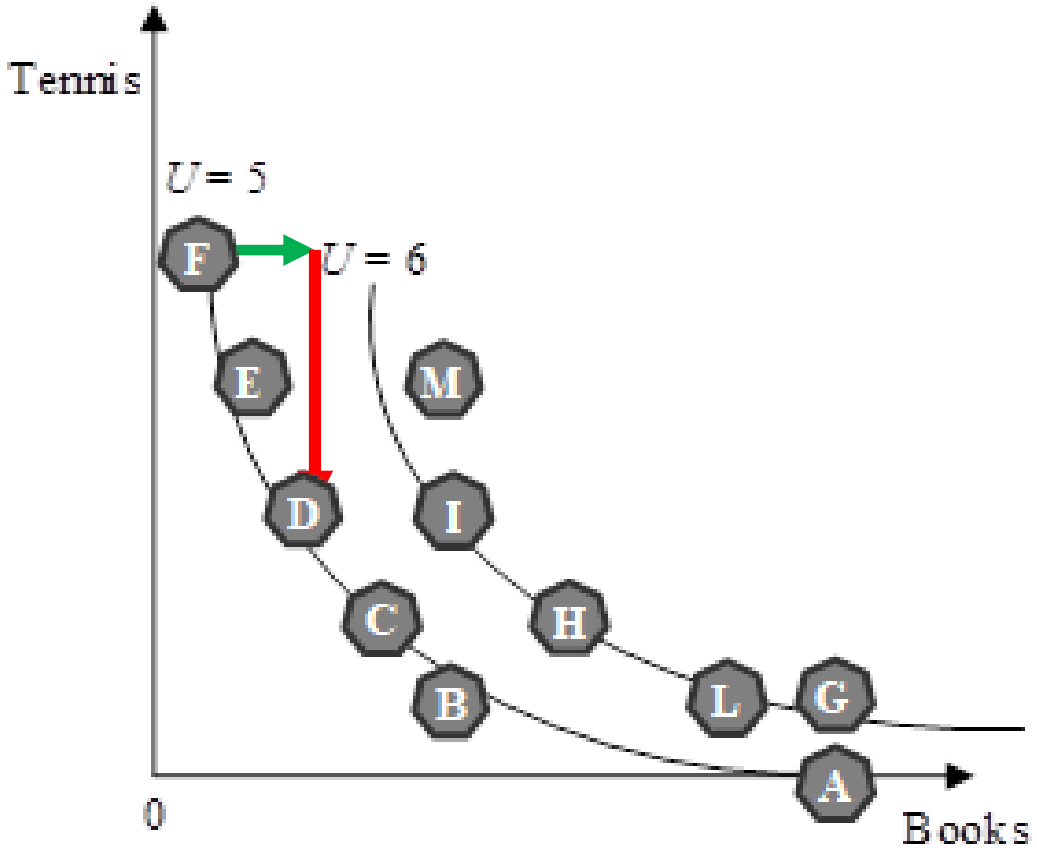
Nino Manfredi!

Perfect Days!

Karoshi

JOHN. Decreasing curves? NON SATIATION

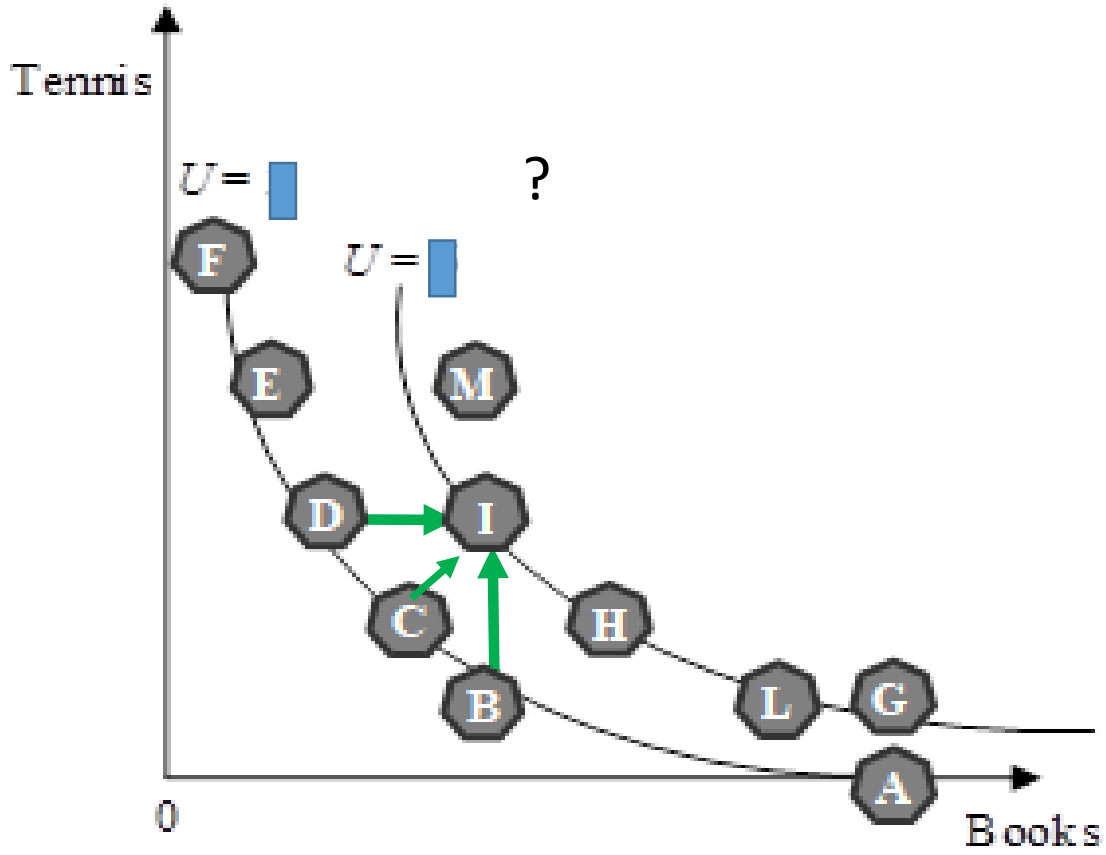
PS: Through every basket passes only one indifference curve: preferences are complete and individual know ho to choose



Non satiation: implications

For each basket on a lower indifference curve you can always find a basket on a higher indifferent curve which has more of both the 2 goods! So we will attribute to the latter a higher number because of the assumption of….

non satiation!



Basket	Books (quantity B)	Tennis (hours L)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

Take basket «I». Of which other basket does «I» have more of both goods?

So?

Ps: John and who else prefers I to C?

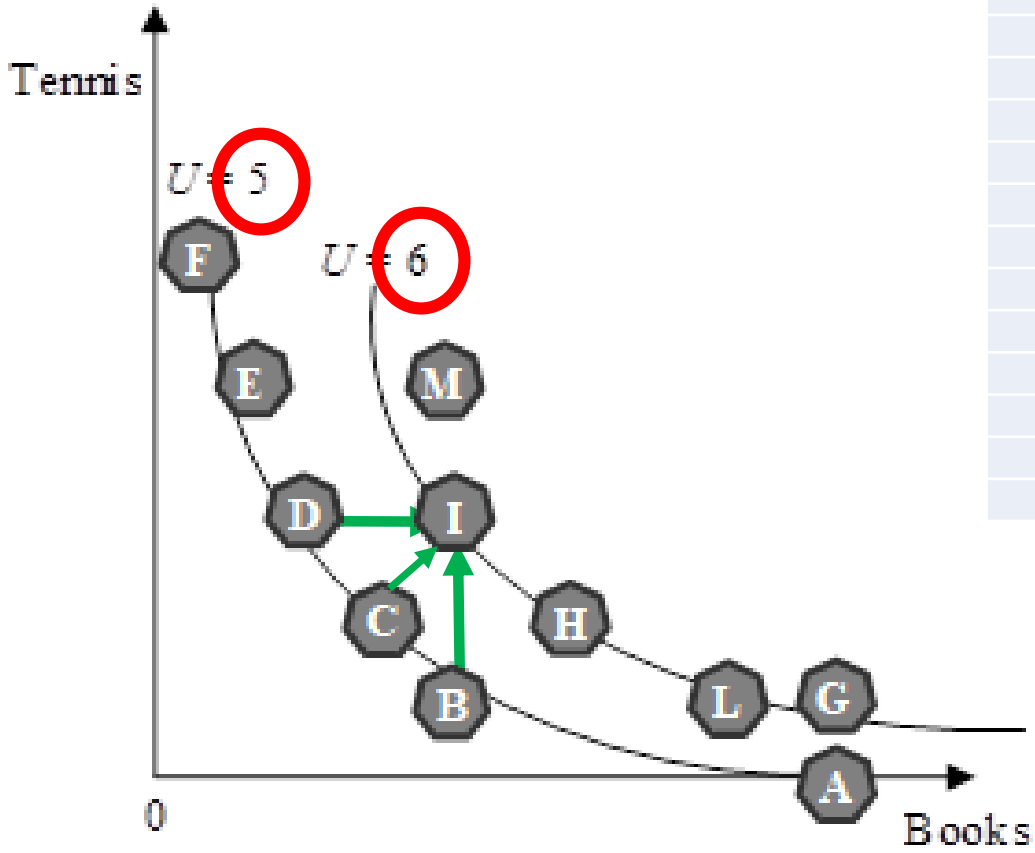
Non satiation and transitivity: implications

Careful:

I vs F?

If I $\succ$ D

And since for John D is indifferent to F then…



Basket	Books (quantity B)	Tennis (hours L)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

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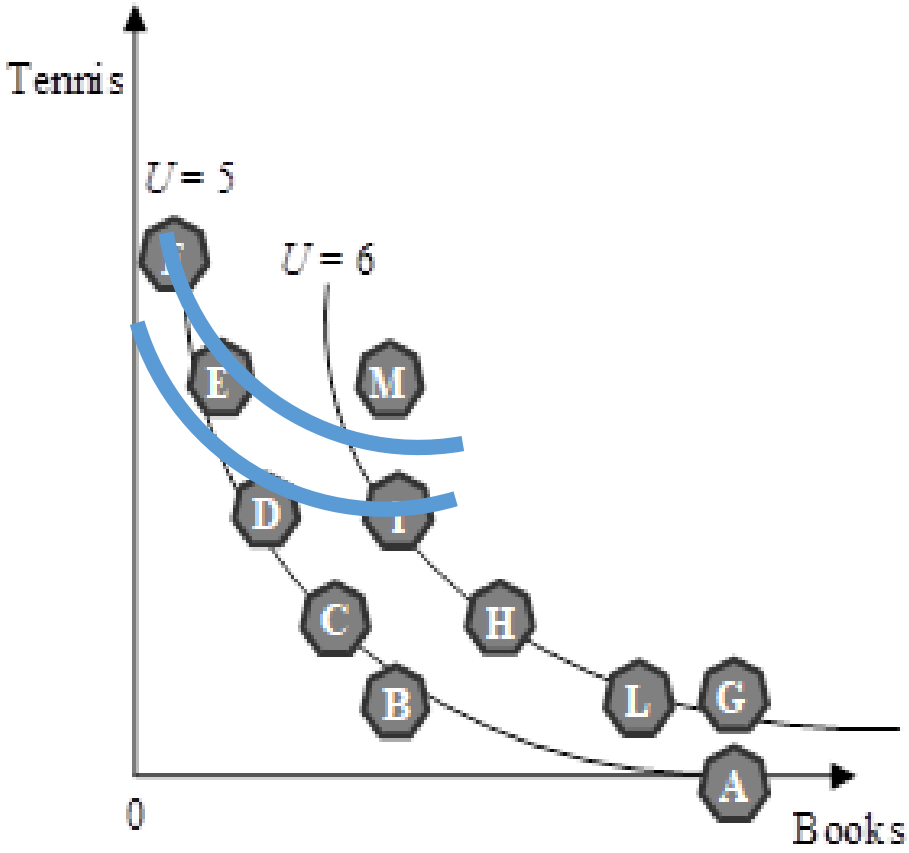
Another individual, Frank

Basket	Books (quantity B)	Tennis (hours L)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?



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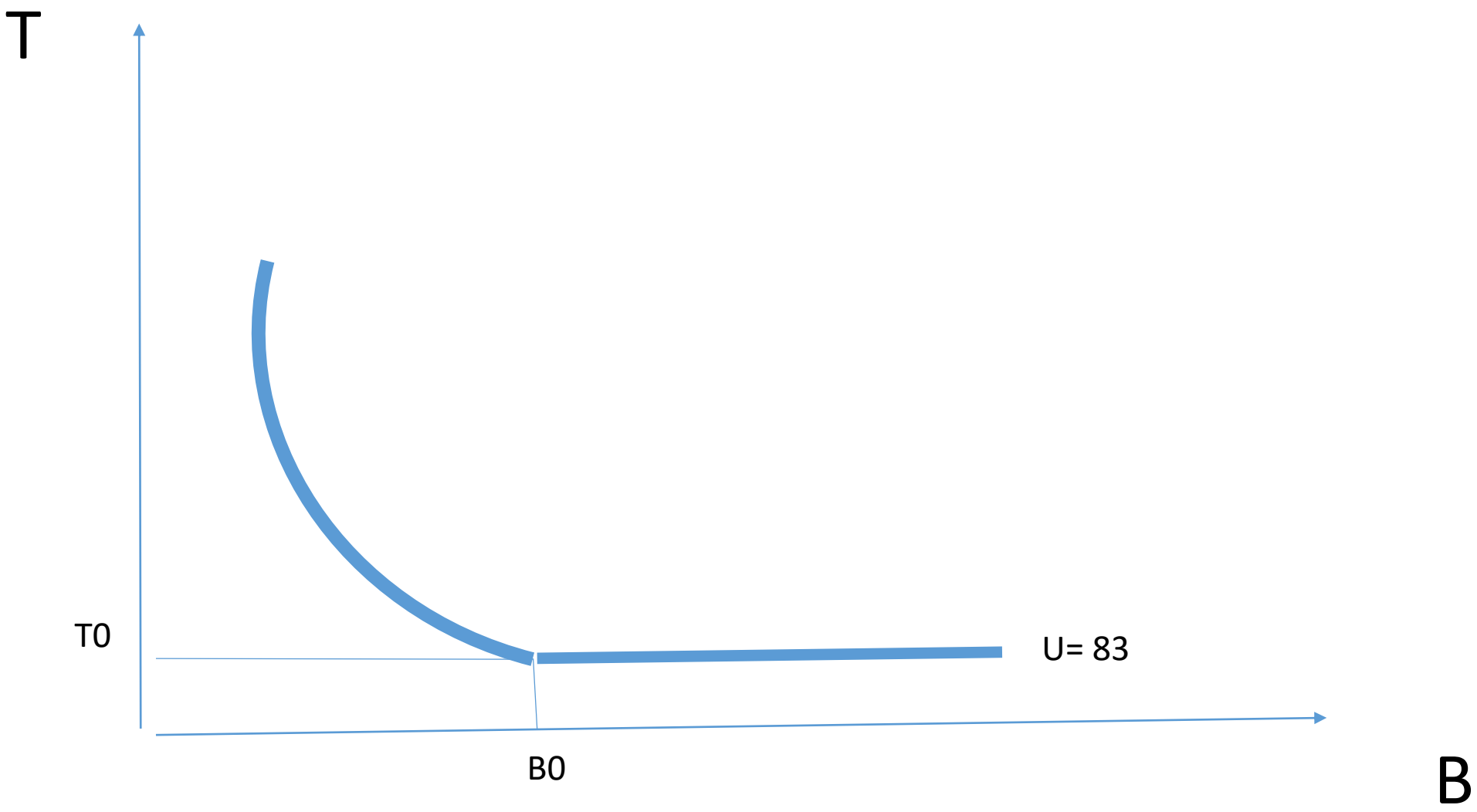
How are B and T?



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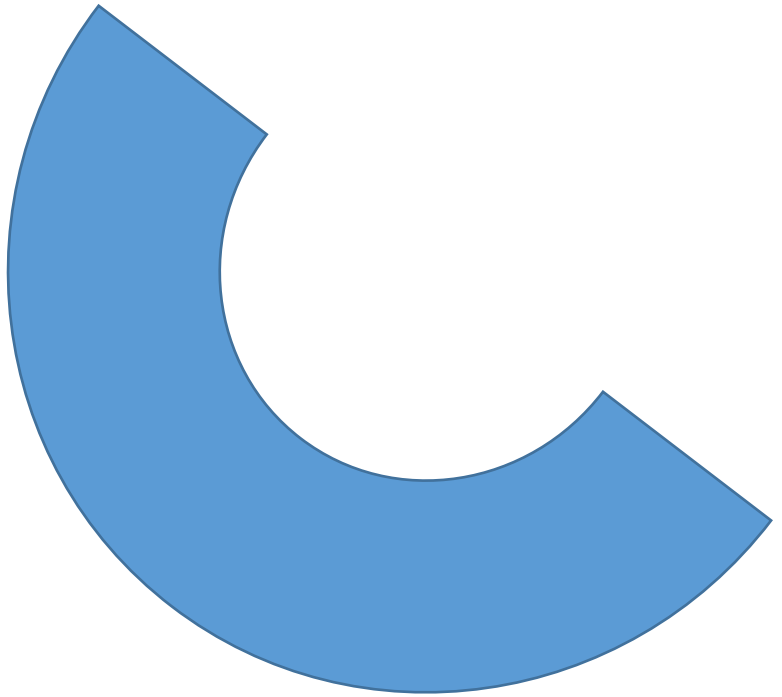
Thick curves? Satiation



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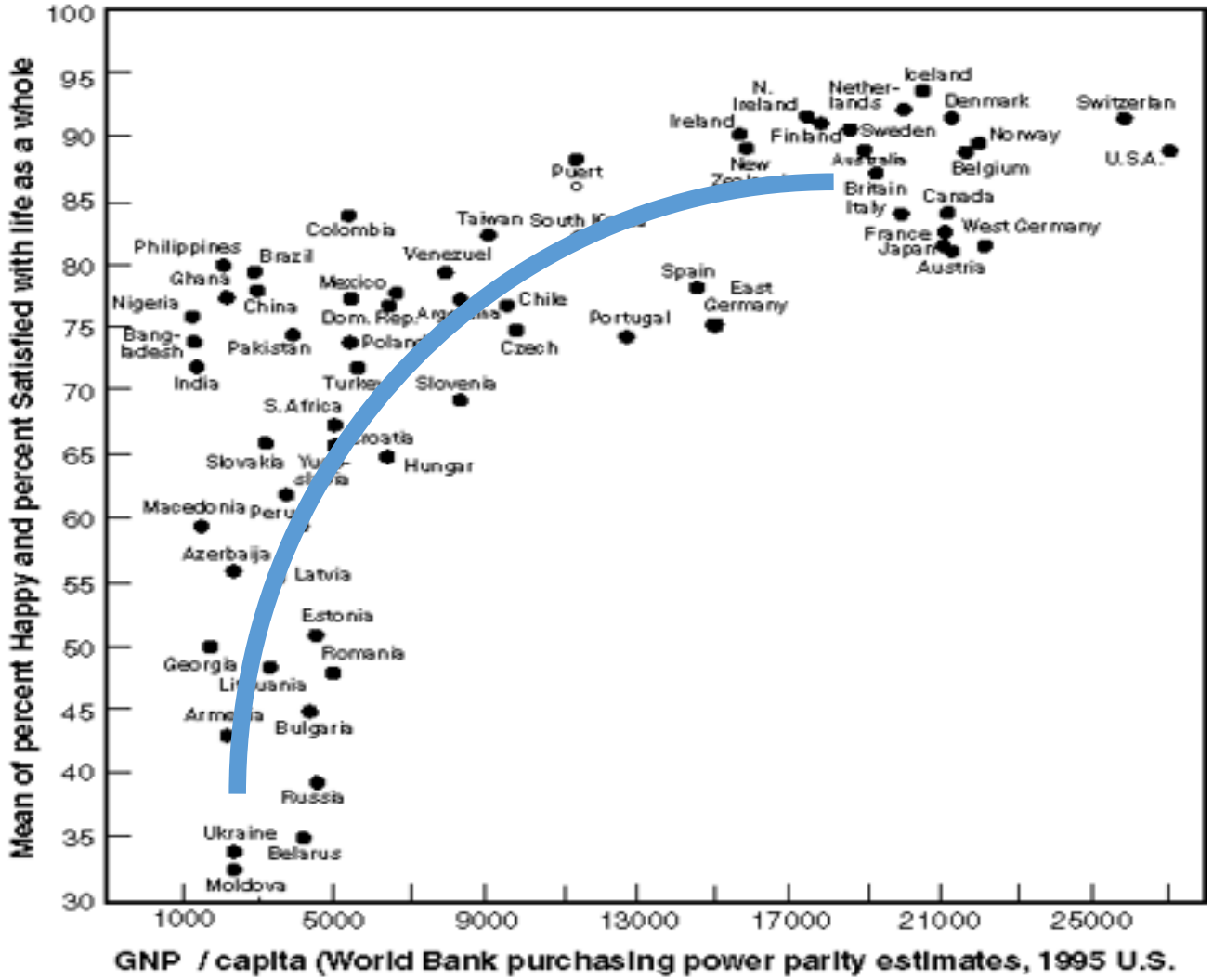
Does Money Buy Happiness?



The Ultimatum Game. Ready?

The organizer (Piga): proposes 100 million euro to be shared;

The proposer: Proposes to the counterpart how to divide it;

The counterpart: After hearing the offer of the proposer, he/she can accept or reject it (in this latter case the 100 million return to Piga).

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Overconsumption (of bads)

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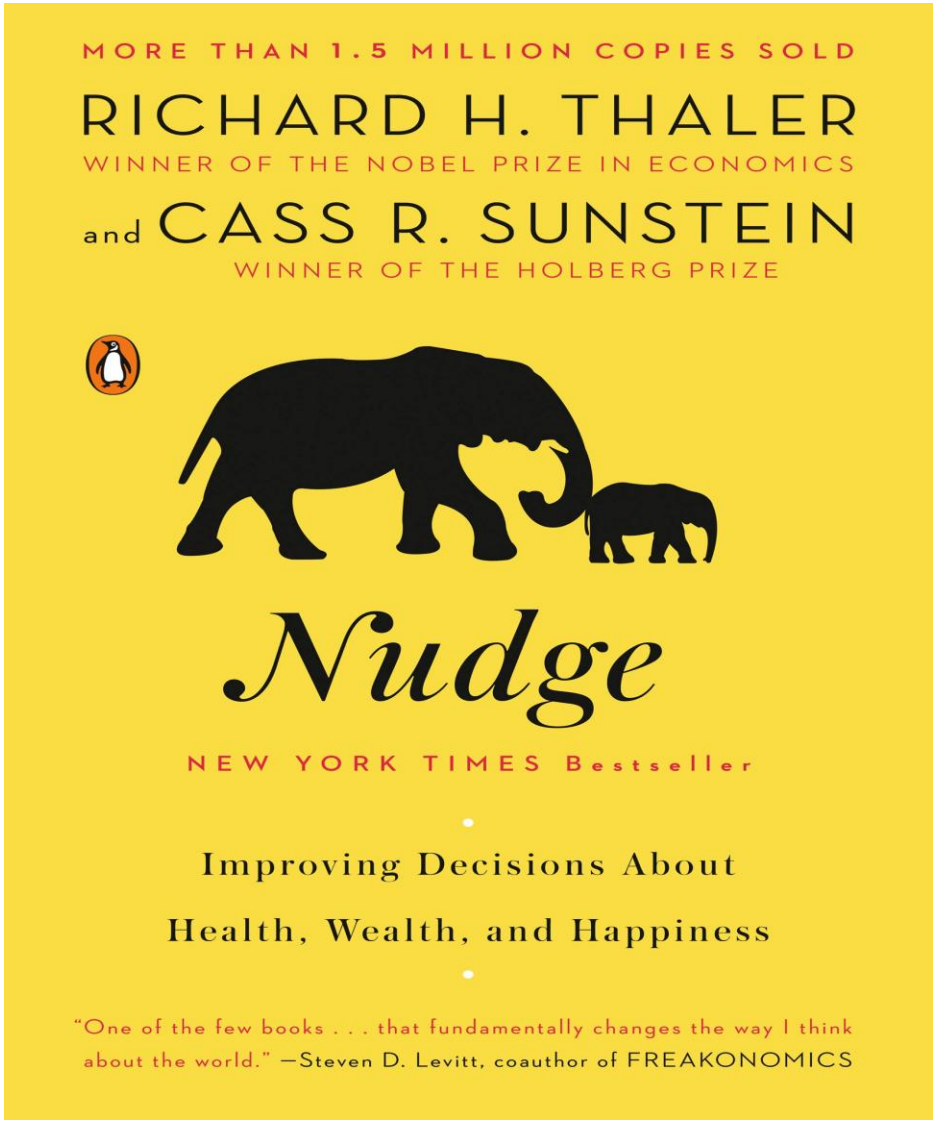
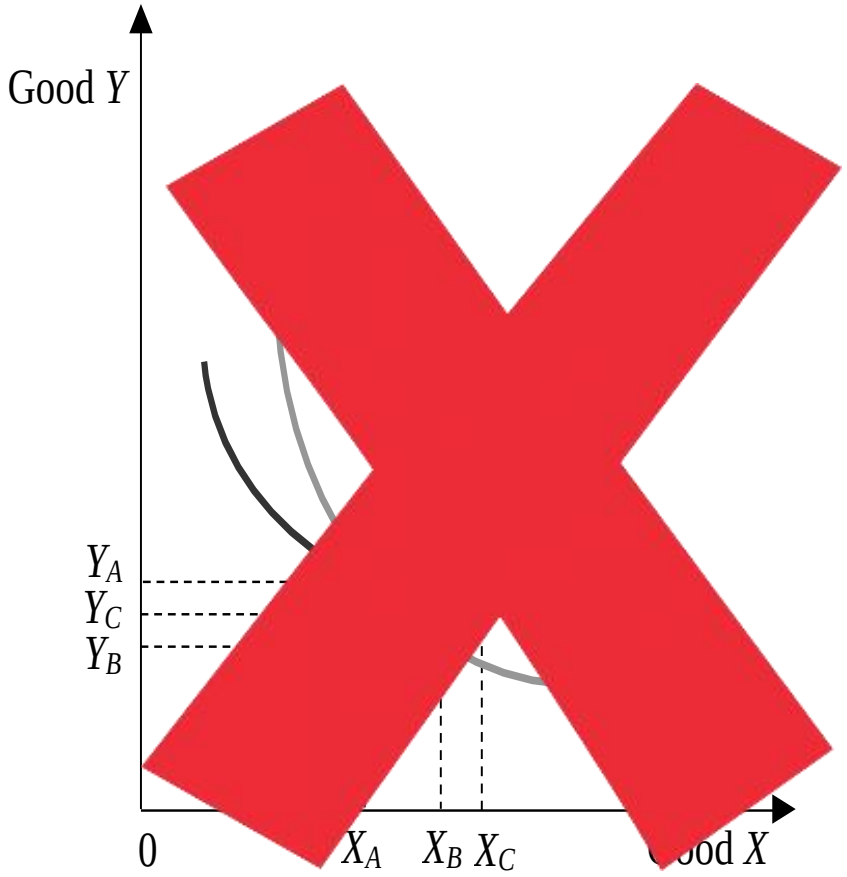
Paternalistic-Libertarian

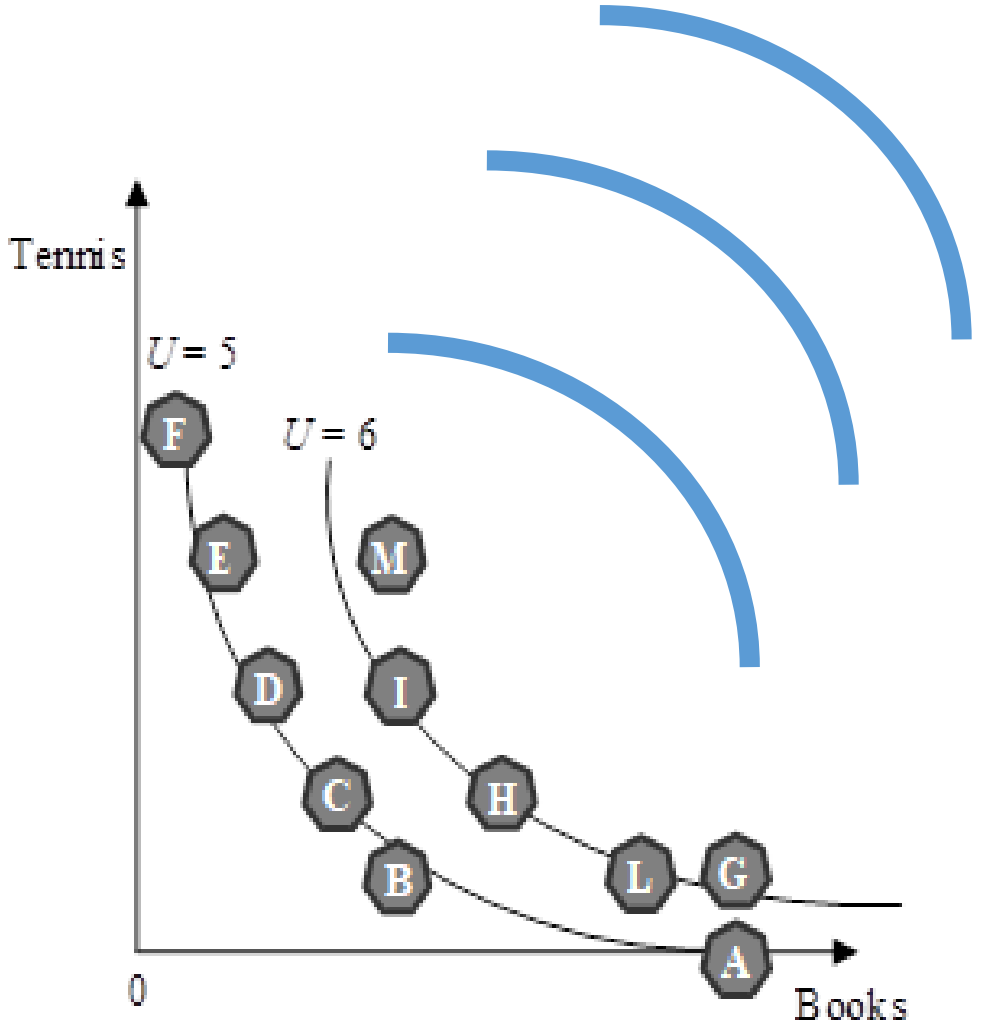


Can indifference curves intersect?

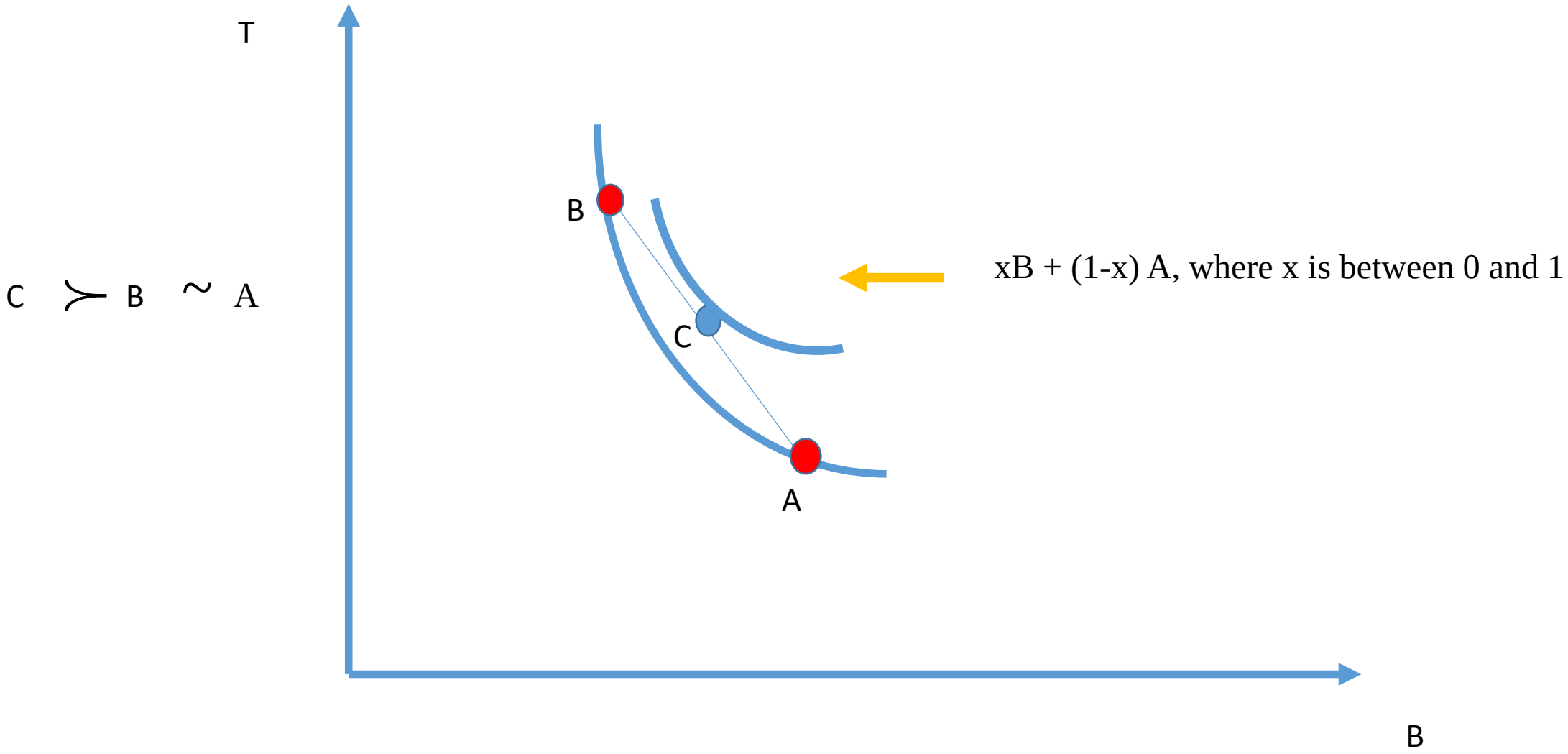


The Indifference Curve? Convex Toward the Origin

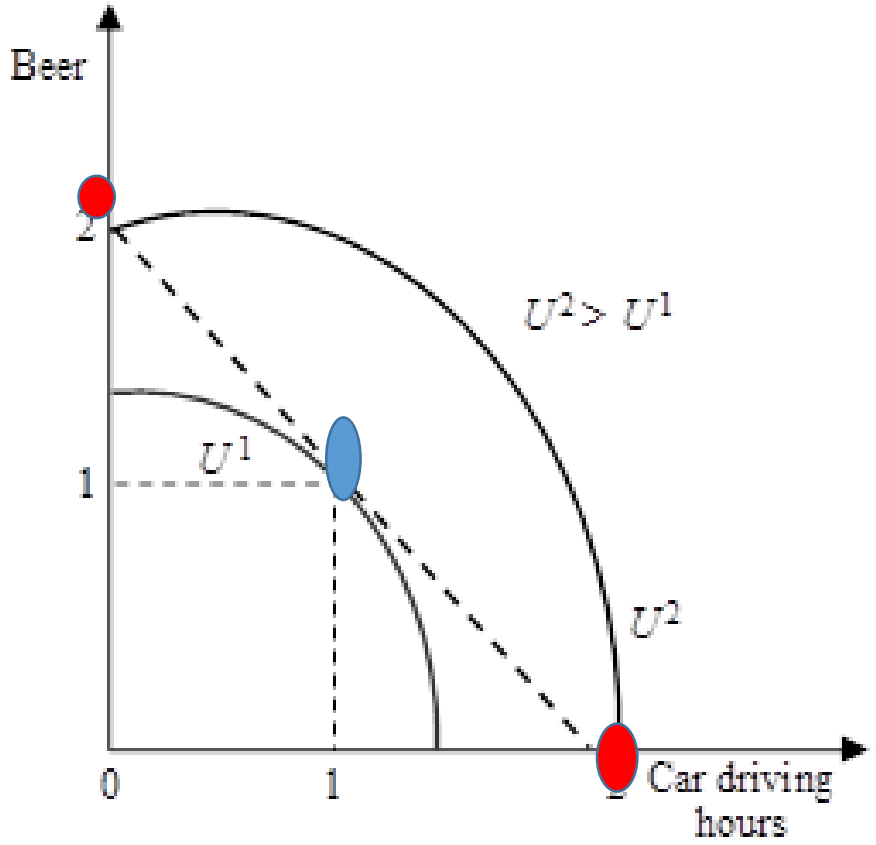
Basket	Books (quantity B)	Tennis (hours T)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?



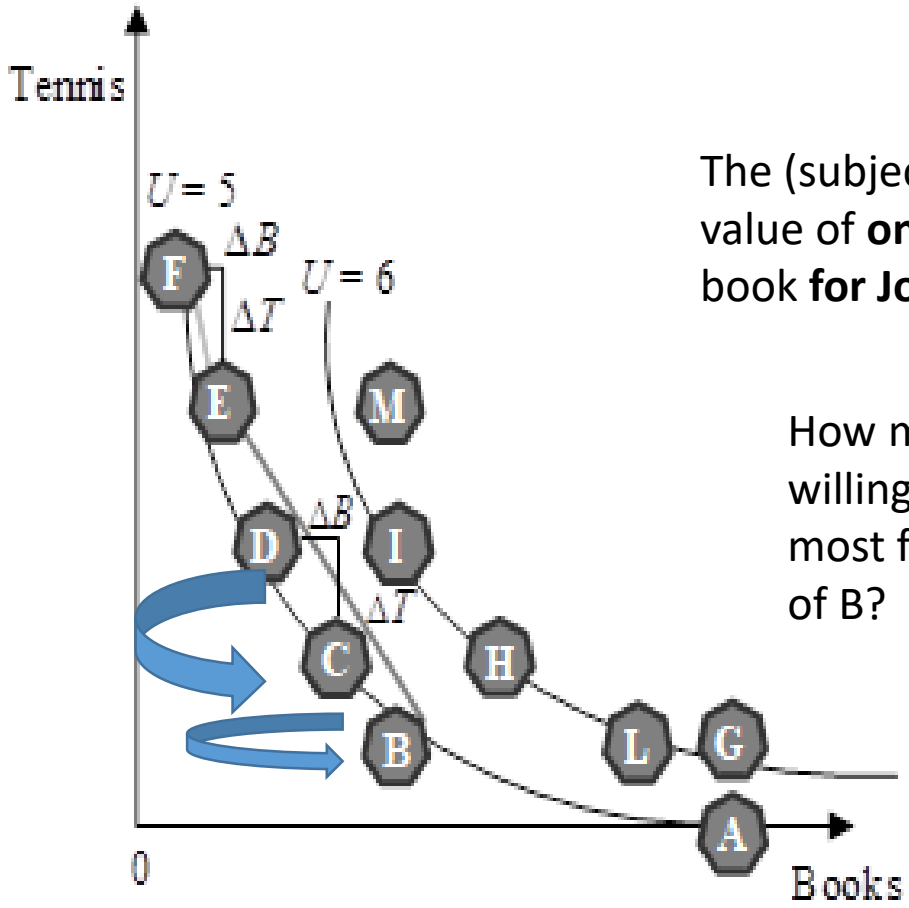
Convex curves



Curves that are concave toward the origin exist!



Curves not just decreasing but convex toward the origin



The (subjective) value of **one** more book **for John?**

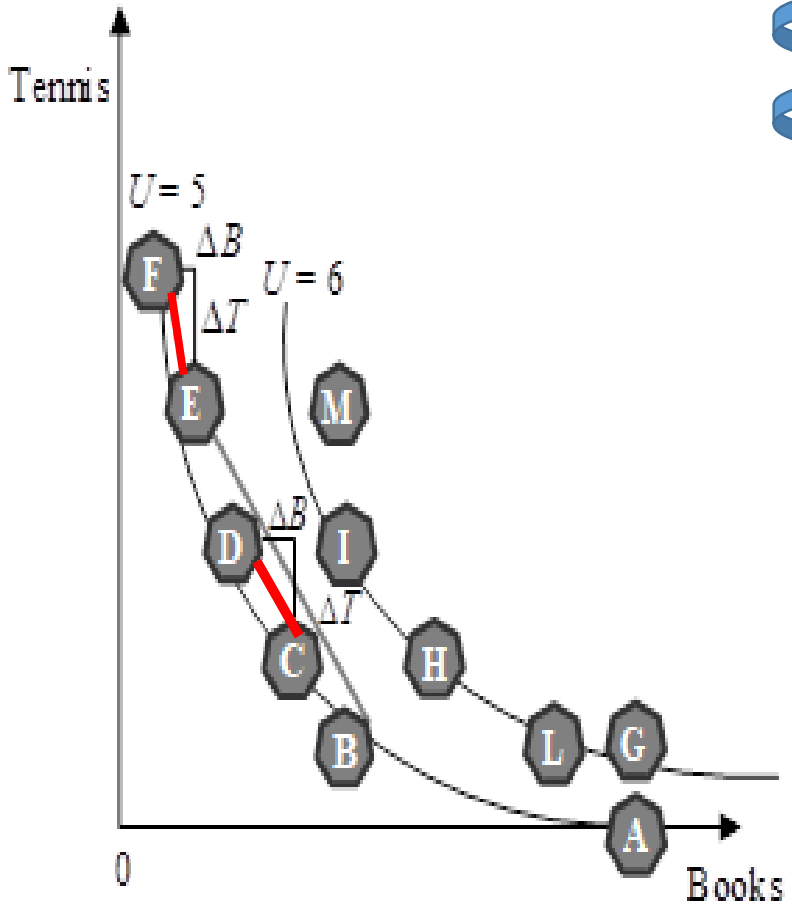
How much is **John** willing to give up at most for 1 more unit of B?

Basket	Books (quantity B)	Tennis (hours T)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

Subjective additional value of 1 unit of B

Moving from F to E, as we stay on the same indifference curve, **ΔB more books have the same value for us of ΔT tennis lessons**: which means that in that point (basket) **one more book is worth (ΔT/ΔB) tennis lessons for John**. (ΔT/ΔB), the value of one more unit of books in terms of tennis lessons for our consumer (hence a conception of **marginal subjective value**: how many tennis lessons John **is willing to give up** for one more unit of a book when he holds a certain amount of books), **decreases** with the increase in the consumption of books as you can see by going now from basket D to basket C. In fact (ΔT/ΔB) is nothing but the **slope of the hypotenuse** of the third side of the triangle (first FE and then DC) and this slope, due to **the convexity of the indifference curve**, is decreasing in absolute value.

If ΔB more books ≡ ΔT tennis
[ΔB/ΔB] more book(s) ≡ [ΔT/ΔB] Tennis
1 more book ≡ ΔT/ΔB Tennis



Basket	Books (quantity B)	Tennis (hours T)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

From F to E:
ΔB=+1 ; ΔT = -3

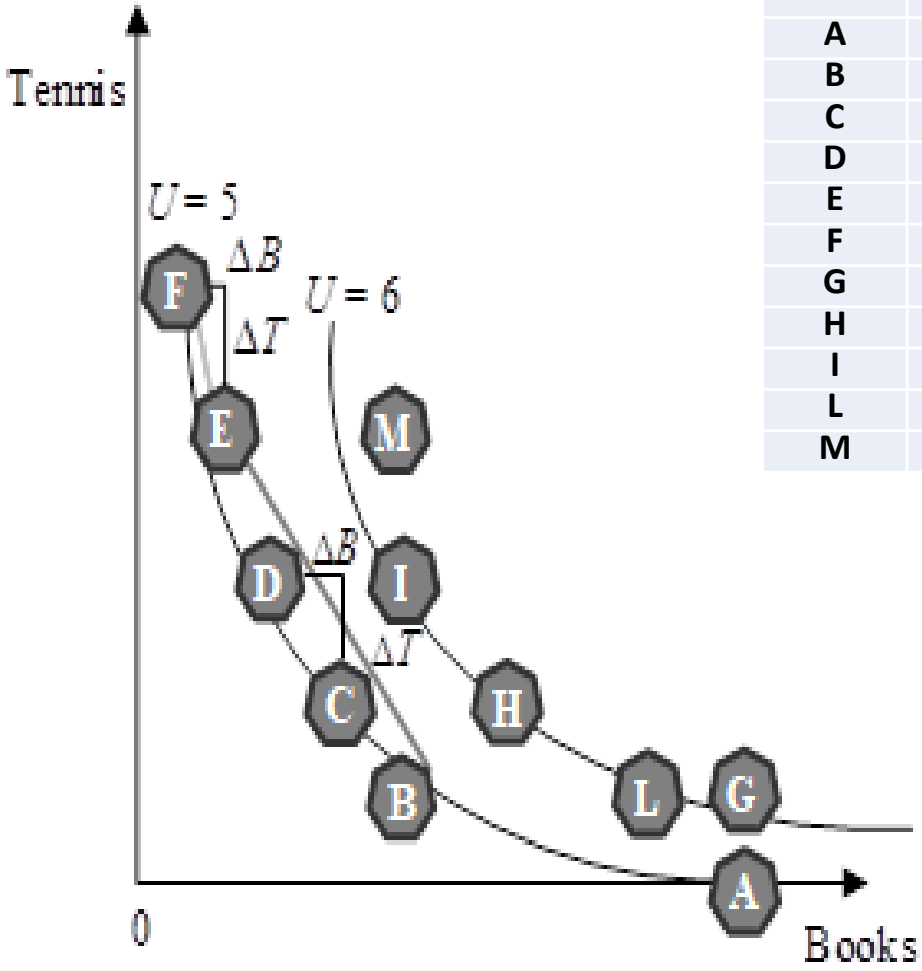
From D to C:
ΔB = +1 ; Δ T= -1

|ΔT/ΔB| ↘
when B↗

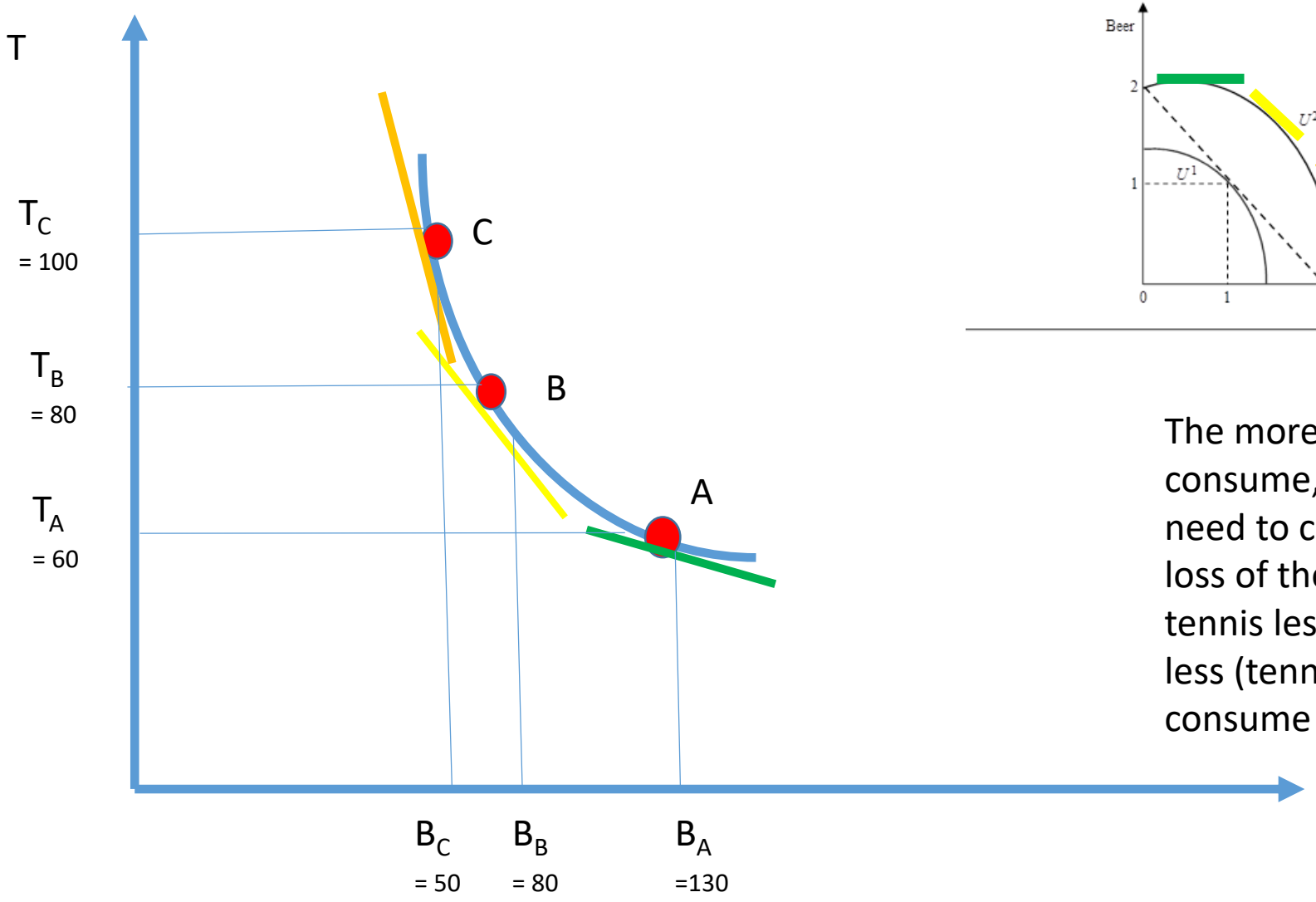
The marginal subjective value

If we let (ΔB) **converge towards zero**, the ratio ΔT/ ΔB becomes the **slope of the indifference curve** at the point considered. This slope of the indifference curve tells us how much we must decrease (since it is a negative number) the consumption of the good tennis lesson with an **infinitesimal increase** of the good books to remain indifferent to the previous situation. Hence, **the opposite of this slope** tells us, for a given amount of books and tennis lessons, **the value attributed by the specific consumer John to an infinitesimal additional unit of books in terms of tennis lessons**, and is called a **marginal rate of substitution MRS**.

Basket	Books (quantity B)	Tennis (hours T)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?



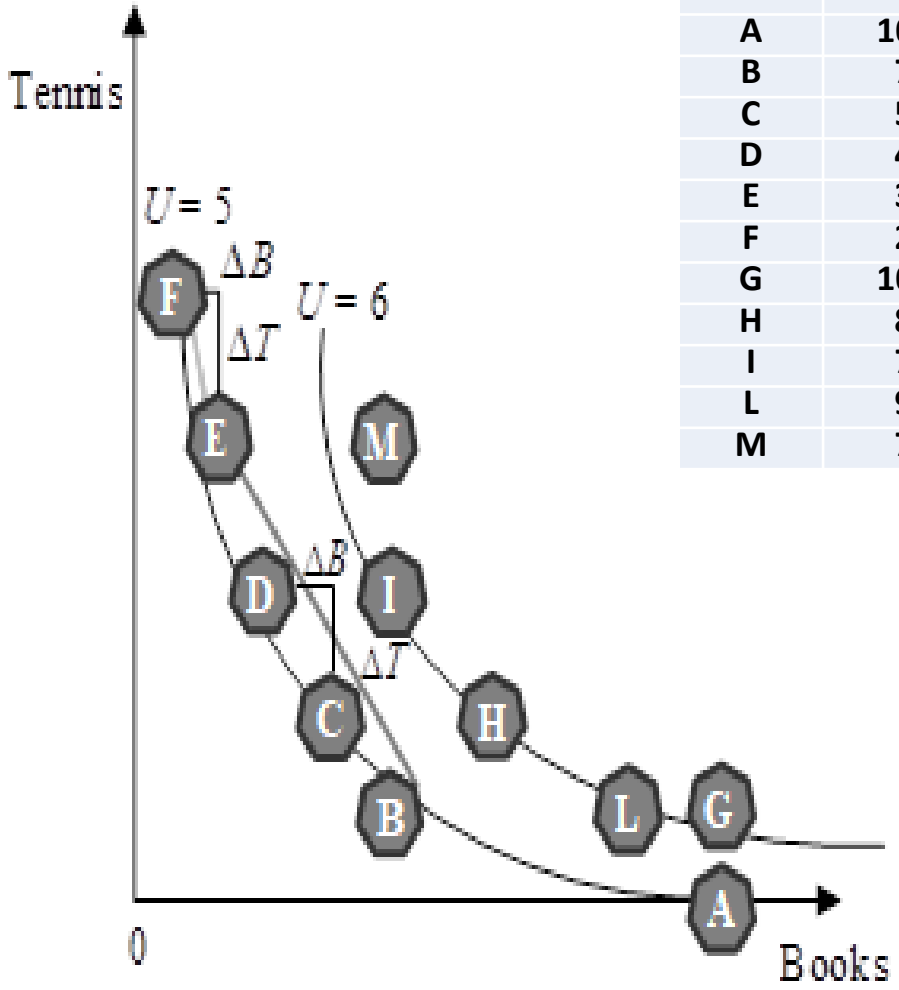
Convex curves: the slope declines as B grows



The more books (less tennis) I consume, the more books I will need to compensate me for the loss of the same amount of tennis lessons: books matter less (tennis more), per unit as I consume them more (less).

Slope of the indifference curve vs. MRS

The **slope** of the indifference curve dT/dB is **negative**, since the indifference curve is decreasing (downward-sloping), therefore the marginal substitution rate will be given by **(-dT/dB)**, coinciding with the opposite of the slope of the indifference curve. Please verify that the convexity towards the origin implies an indifference curve with a negative second derivative; this means that the **slope of the curve decreases as the variable increases on the x-axis**.



Basket	Books (quantity B)	Tennis (hours T)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

Marginal Rate of Substitution MRS and marginal use value

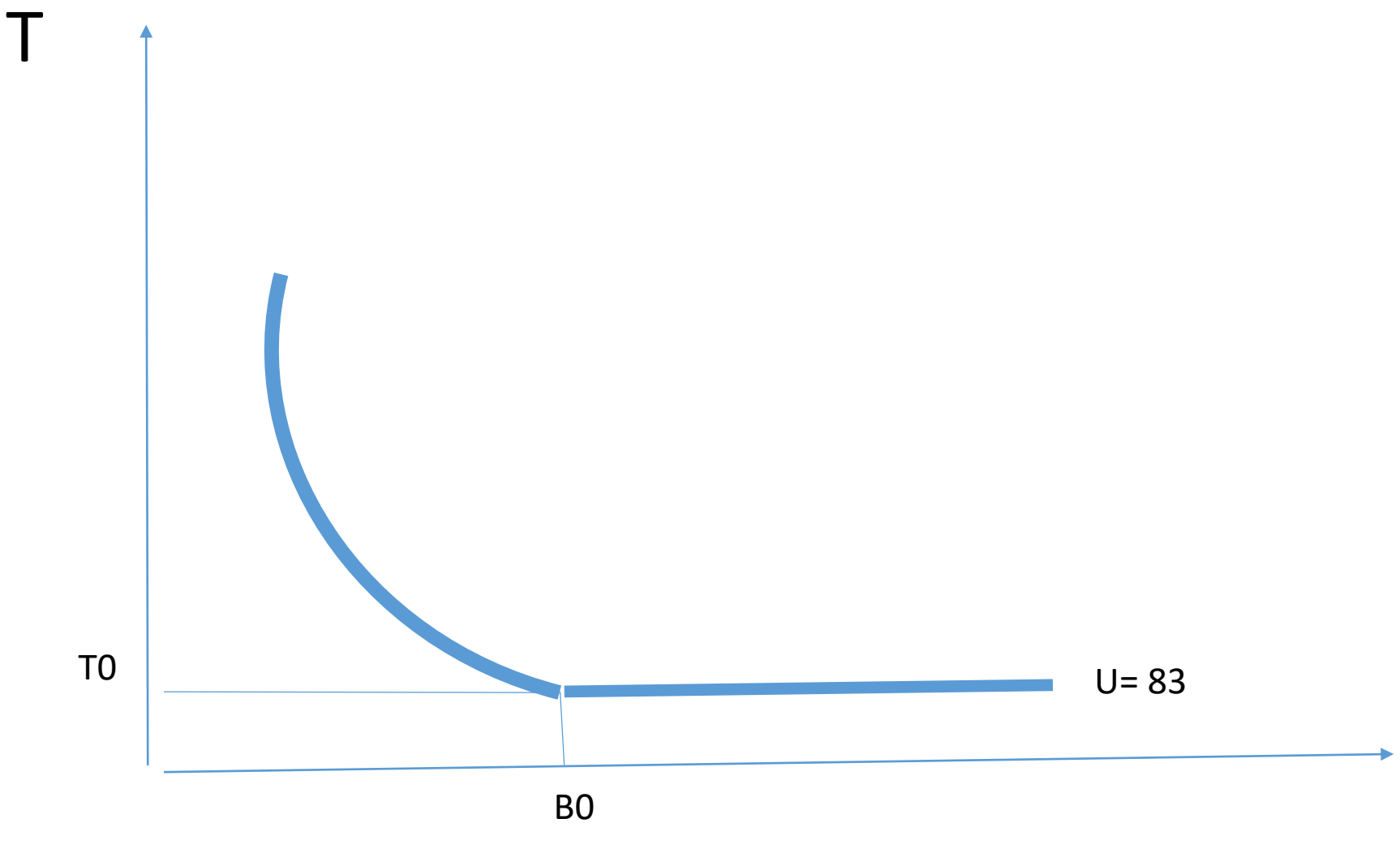
MRS of good B in terms of good T: the value of one more unit (a marginal increment) of the good B in terms of another good T, that is, how much we are **willing** to give up of another good T in order to come into possession **of one more unit** of that good B of which we already consume a certain amount.

PS: We are NOT talking about the exchange value, i.e. the price!

The convexity of preferences, which, as we have explained is an **assumption**, means that this **marginal value** is **decreasing** as the consumption of the good in question increases.

As the consumption of good A increases, we are **willing to give up** less and less of the other good B in order to consume **one additional unit** of good A.

Again. MRS?



Non satiation?
MRS positive!

Where is the use value/marginal benefit?

A walk in the forest toward our optimal basket

L $\succ$ B Why?

B $\sim$ A

?

Thus …

L $\succ$ A

Why?

?

Basket	Books (quantity B)	Tennis (hours T)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	✗
M	7	5	?

Where is the price/ marginal cost?

1

Where is the use value/marginal benefit?

3

U(L)= ?

The exchange

At the roots of the reason for exchanging:

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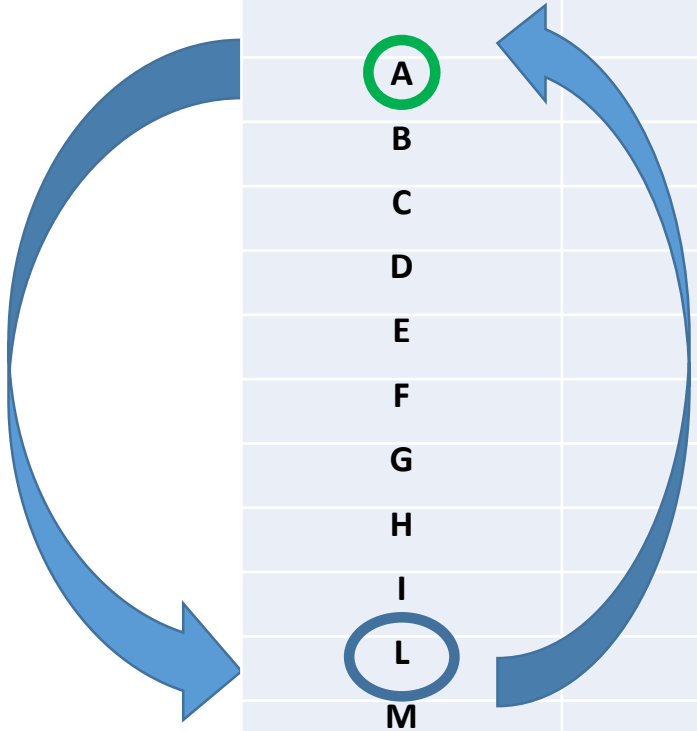
Do we have a counterpart?



Basket	Books (quantity B)	Tennis (hours T)	Utility
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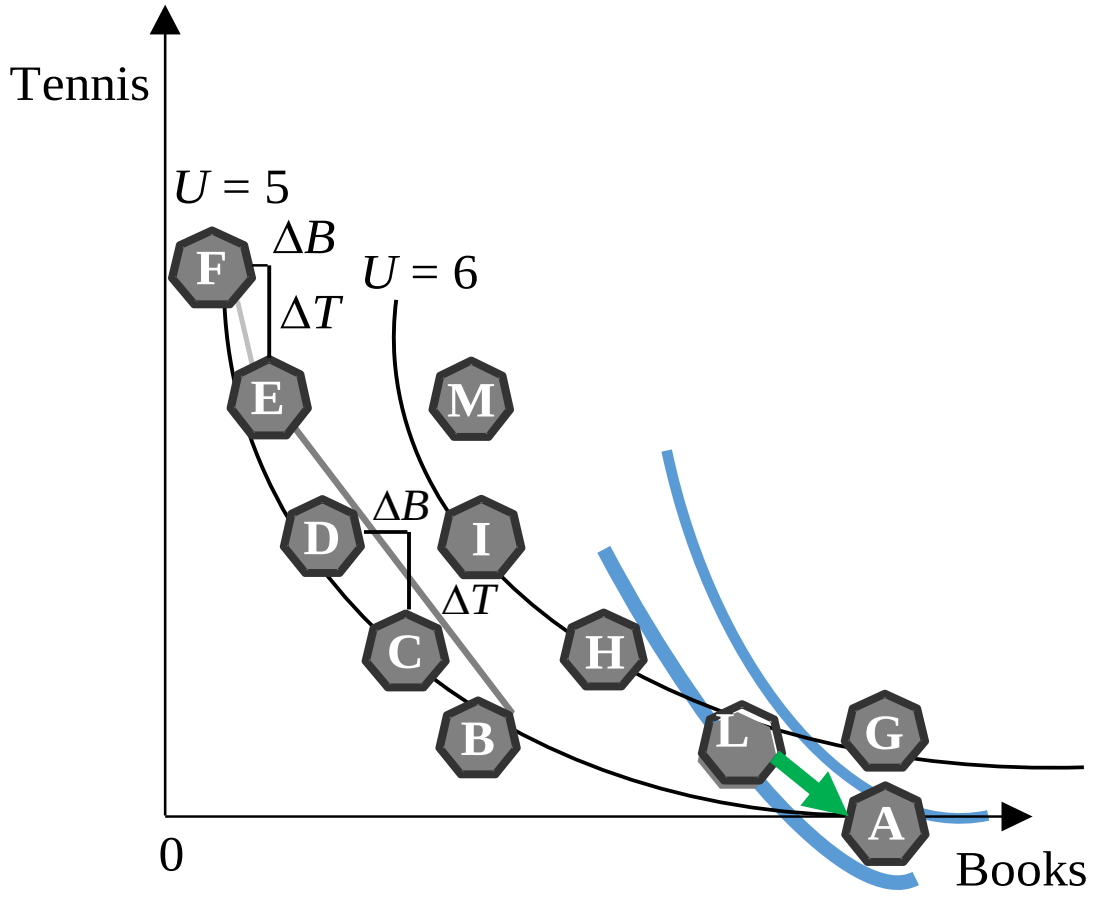
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

Another consumer (supplier?)



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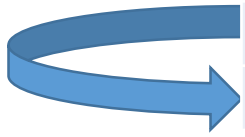
When do we stop trading?

Basket	Books (quantity B)	Tennis (hours T)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

?



P_L/P_T?

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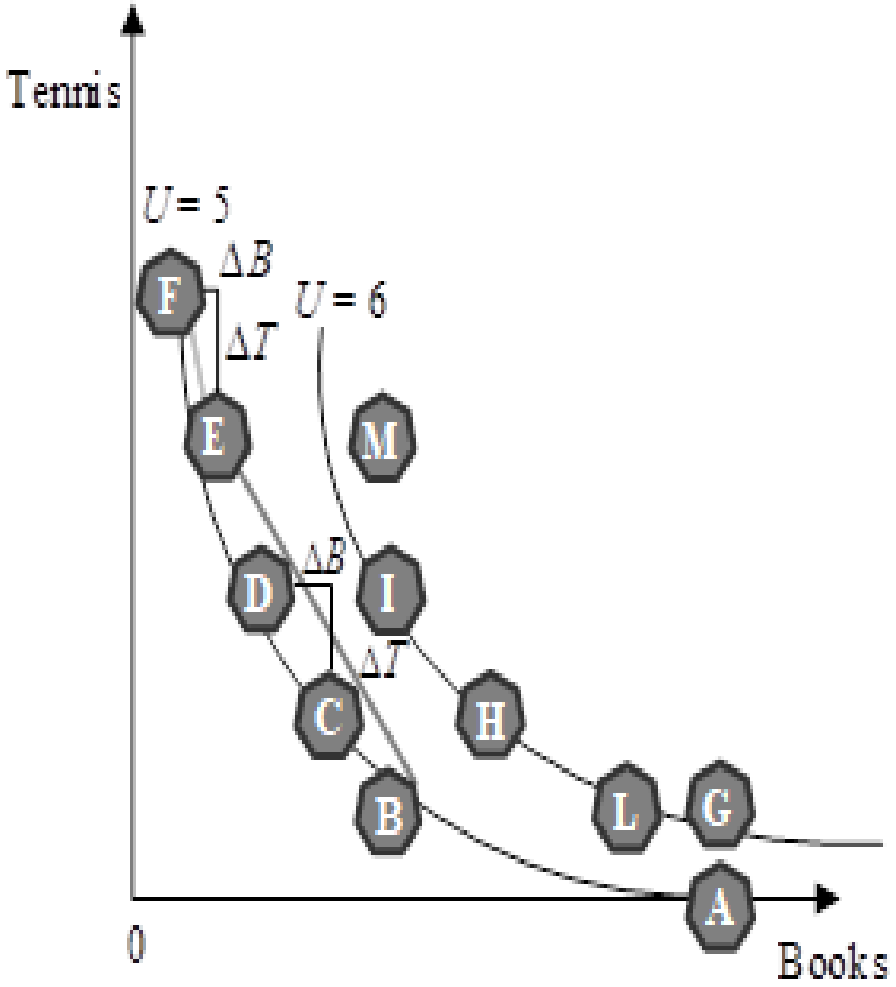
From L to M

M $\succ$ L ?

M $\succ$ I
I ~ G
G $\succ$ L
M $\succ$ L !

therefore
U(M) > 6
5 <U(L) <6



Basket	Books (quantity B)	Tennis (hours T)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

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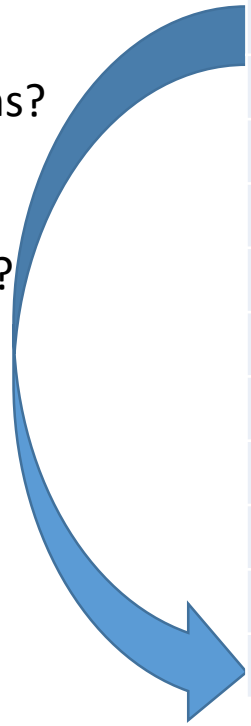
Toward the optimal basket

Passing from A to L, do I have the resources?

And from L to M?
And if at L we were asked 10 books for 4 tennis lessons?

What if there is no counterpart at those prices?



Basket	Books (quantity B)	Tennis (hours T)	Utility
A	10	0	5
B	7	1	5
C	5	2	5
D	4	3	5
E	3	5	5
F	2	8	5
G	10	1	6
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

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The budget constraint

P_B = 50 euro
P_T = 100 euro (relative price?)
I, monetary income, equals 500 euro

Consumer is a a *price-taker*

Constraint?

$I \geq P_B \times B + P_T \times T$

$I = P_B \times B + P_T \times T$

$500 = 50 \times B + 100 \times T$

A: affordable?
L: affordable?
M: affordable?
(and if P_T were to go down to 30 €?)

$$I = (P_B \times B) + (P_T \times T)$$

$$I - (P_B \times B) = (P_T \times T)$$

$$T = \left(\frac{I}{P_T}\right) - \left(\frac{P_B}{P_T}\right) \times B$$

and in our example:

$$T = \left(\frac{500}{100}\right) - \left(\frac{50}{100}\right) B = 5 - \left(\frac{1}{2}\right) B$$

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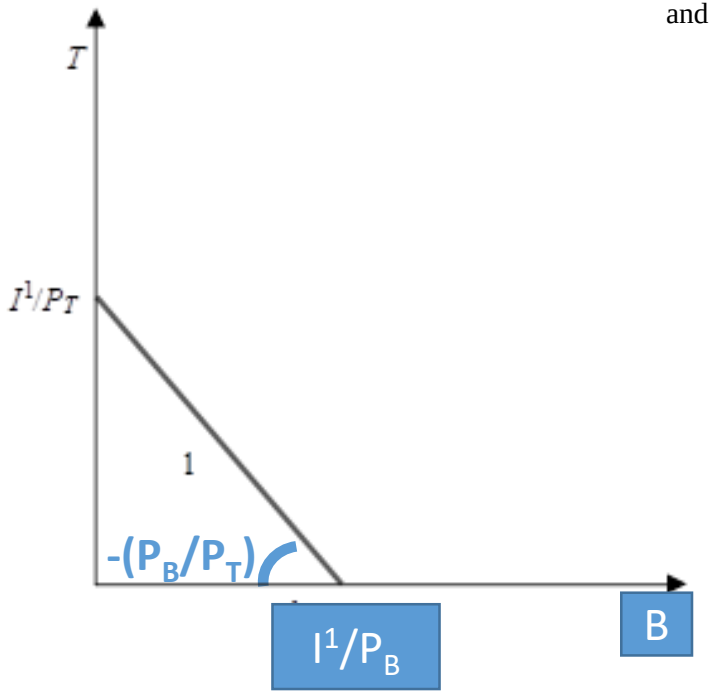


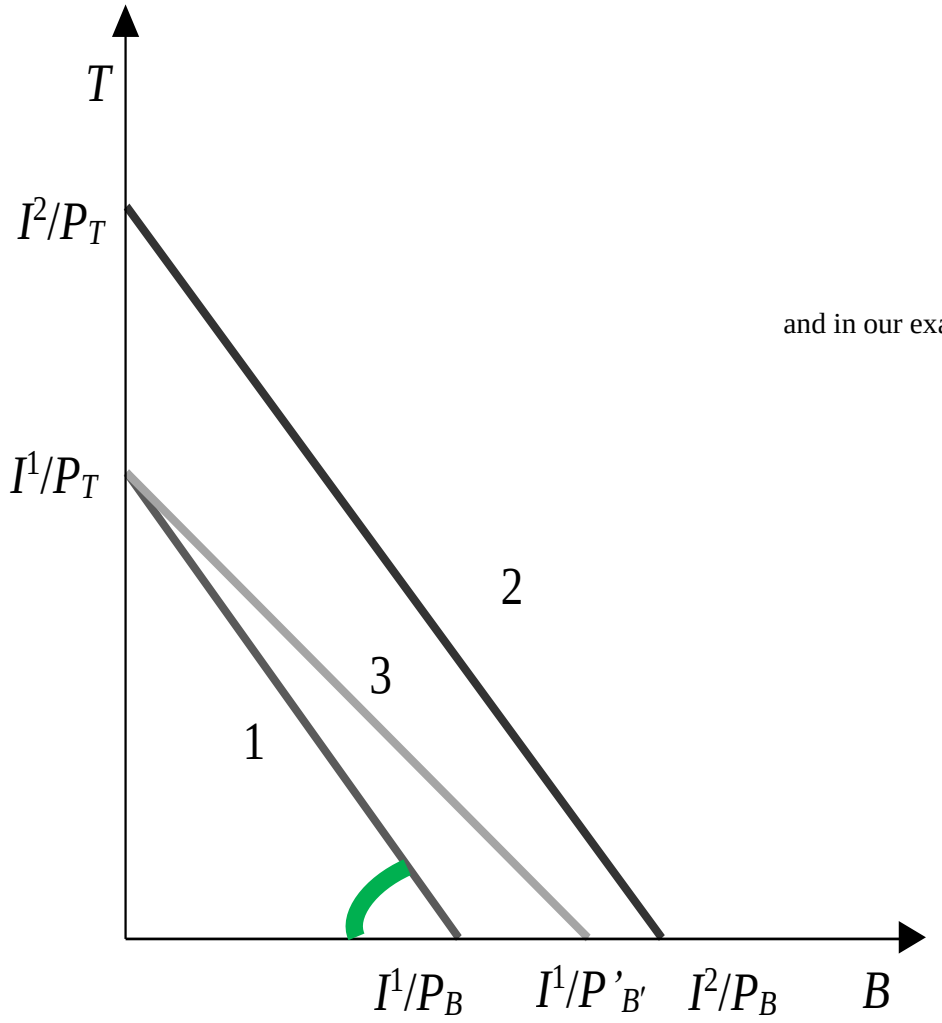
and in our example:

$$T = \left(\frac{500}{100}\right) - \left(\frac{50}{100}\right)B = 5 - \left(\frac{1}{2}\right)B$$

The budget constraint tells us for a given desired consumption of books ... the maximum amount of tennis lessons we can consume given our income and the absolute and relative cost of goods.

Decreasing!
Intercepts?
Area below? Area above?
Slope?

The budget constraint: shifts and tilting



$I = (P_B \times B) + (P_T \times T)$

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and in our example:

$$T = \left(\frac{500}{100}\right) - \left(\frac{50}{100}\right) B = 5 - \left(\frac{1}{2}\right) B$$

From «1» to «2» what changes?

Income. Or?

From «1» to «3» what changes?

Price. Of which good?

Books, right.

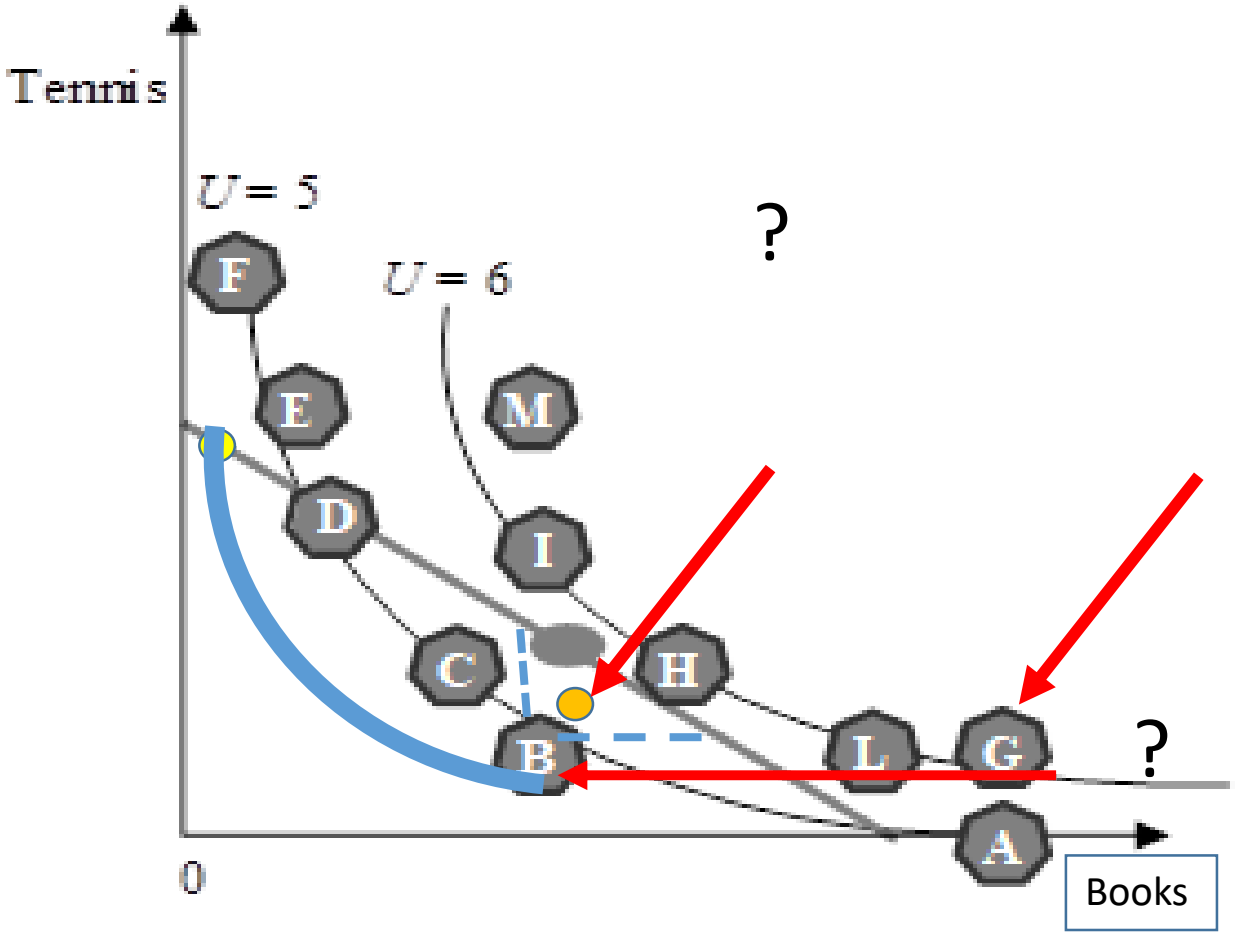
Are we richer?

What about hyperinflation?

John's choice

P_B = 50 euro
P_T = 100 euro (relative price?)
I, monetary income, equals 500 euro

In B we do not spend all the income.
But not all baskets for which John spends the whole income are preferred to B! (see yellow point).
But there is at least one available basket (see orange point) for which B is dominated.



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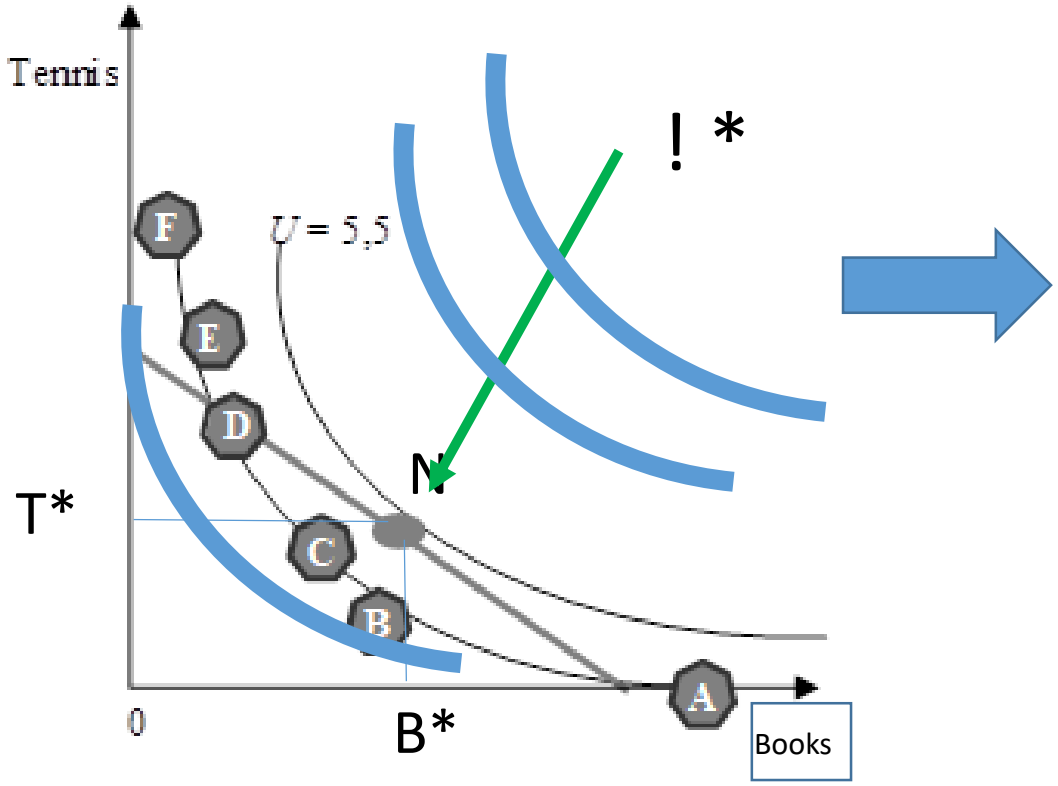
H	8	2	6
I	7	3	6
L	9	1	?
M	7	5	?

G?
B? C?
D?

Optimum point and conditions (preferred basket)



$$I = (P_B B^*) + (P_T T^*)$$

$$\text{MRS}\,(B^*, T^*) = \frac{P_B}{P_T}$$

$$I = (P_B B) + (P_T T)$$

$$\text{MRS} = \frac{P_B}{P_T}$$

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And if they… differ?

$$MRS = -\frac{\partial T}{\partial B} = 3 > \left(\frac{P_B}{P_T}\right) = \frac{1}{2}$$

You have **a basket** such that what above holds which exhausts your income. Are you at an optimum point of choice?

So you can do better. How?

Now to try to give up 1 tennis lecture (-1T). With the remaining money, what can you buy?

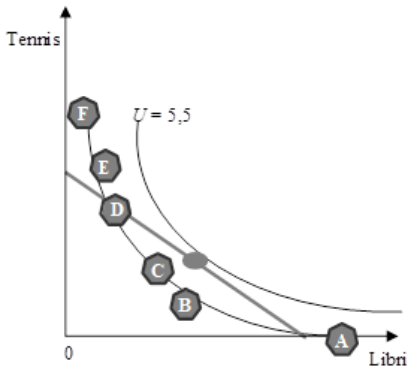
2 books (+2B). A new basket.

But how much were you willing to pay for those 2 books?

6 tennis lessons! **How do you feel now?**

Your basket has changed … and you are **better off. That initial basket is not the optimal one (usually), you can do better.**

3 strange statements on the value of a good



$$I = (P_B B^*) + (P_T T^*)$$

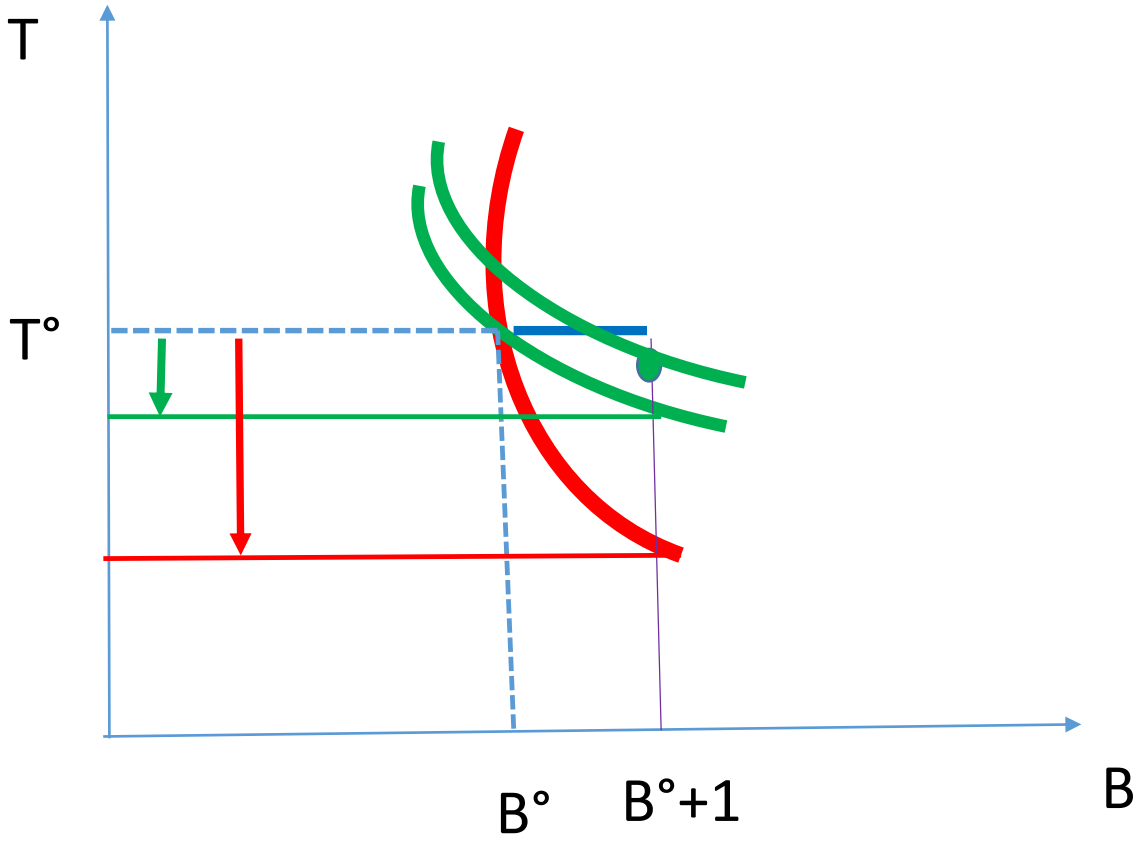
$$\text{MRS}\ (B^*, T^*) = \frac{P_B}{P_T}$$

The MRS is thus observable.

Exchange value of one additional unit of a good (appropriately defined) = = Subjective value of one additional unit of a good (appropriately defined)

MRS in equilibrium must be the same across all consumers.

The sportswoman and the intellectual



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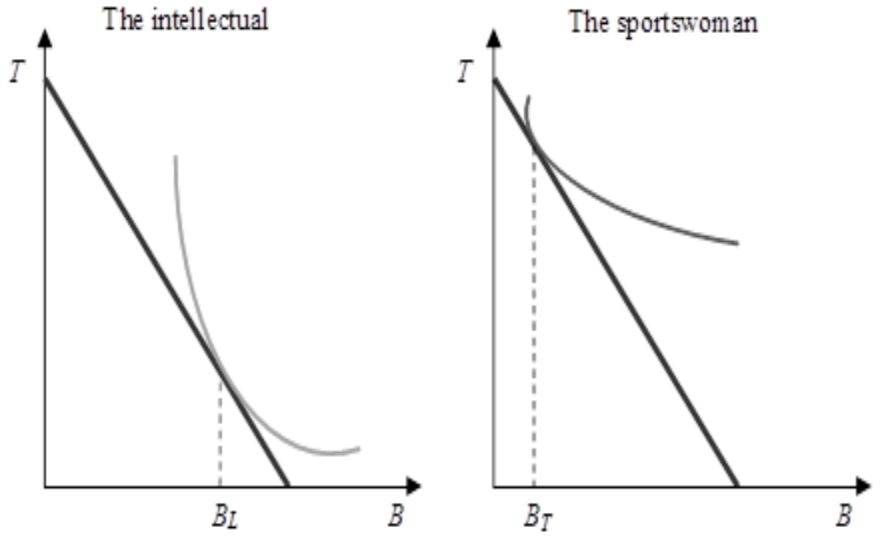
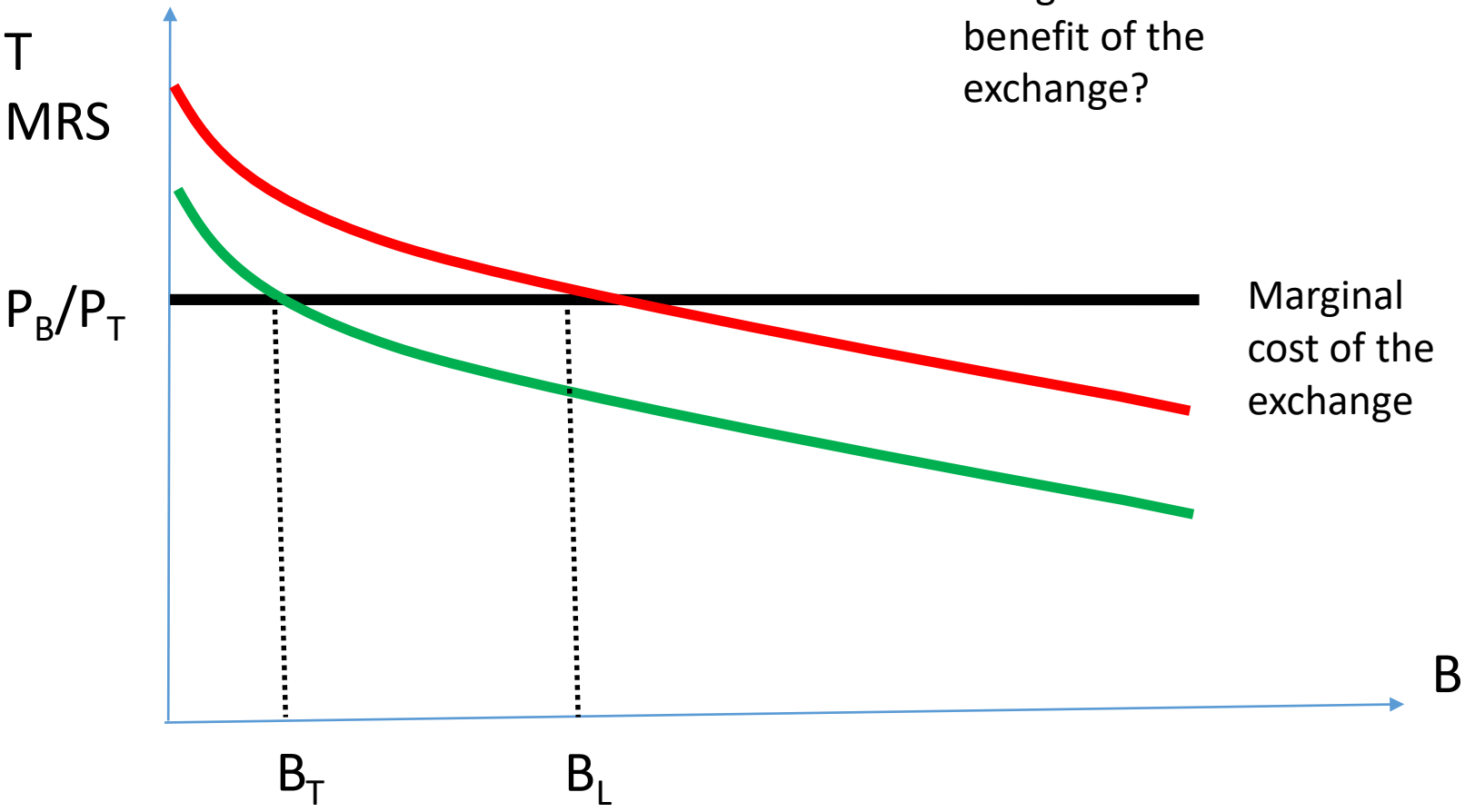
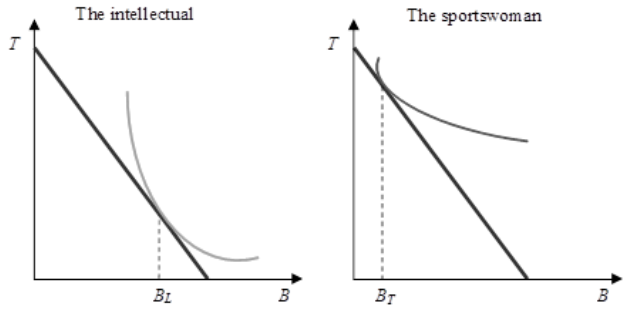


The sportswoman and the intellectual





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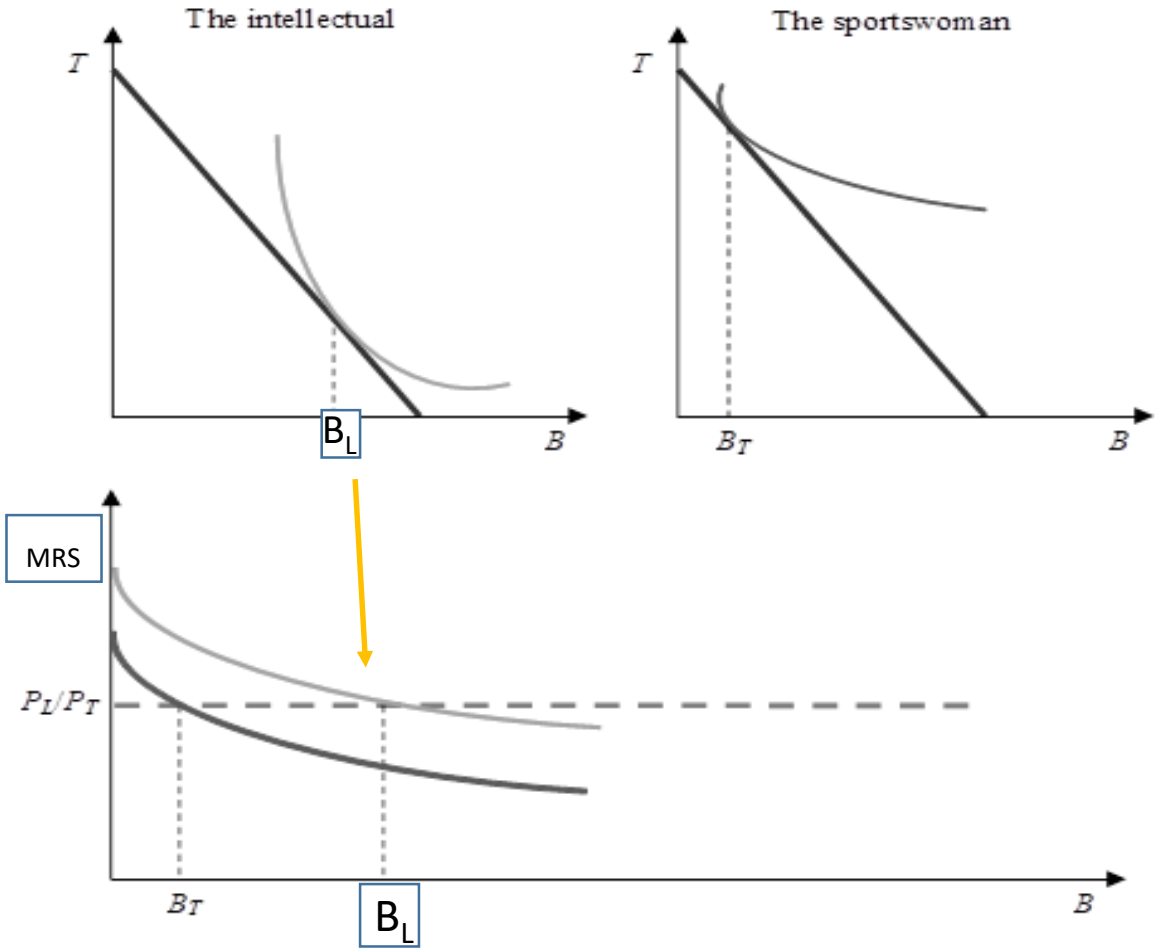
The sportswoman and the intellectual

$$I = (P_B B^*) + (P_T T^*)$$

MRS $(B^*, T^*) = \frac{P_B}{P_T}$

A sufficient condition.

Is it a necessary one?



The consumer demands units of goods until her marginal benefit is greater than her marginal cost of the exchange.

What is the name of the marginal benefit of the exchange?

And of the marginal cost of the exchange?

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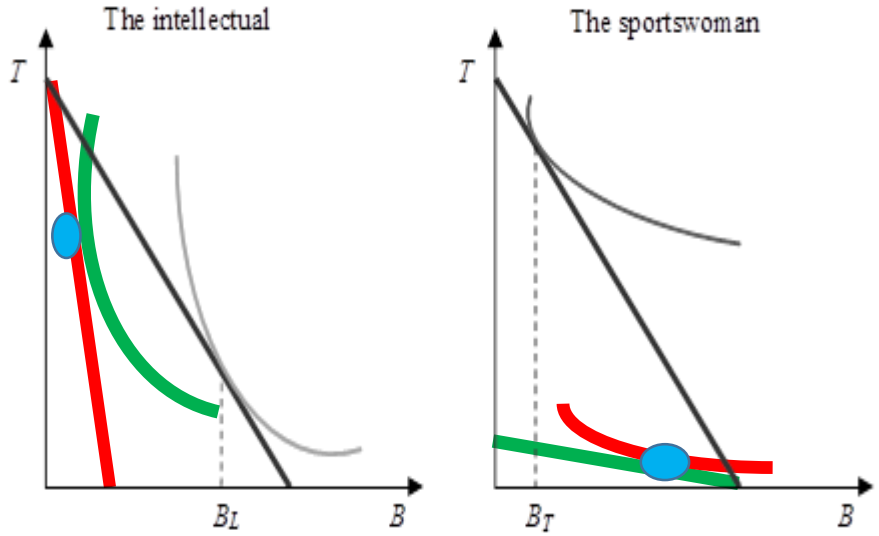
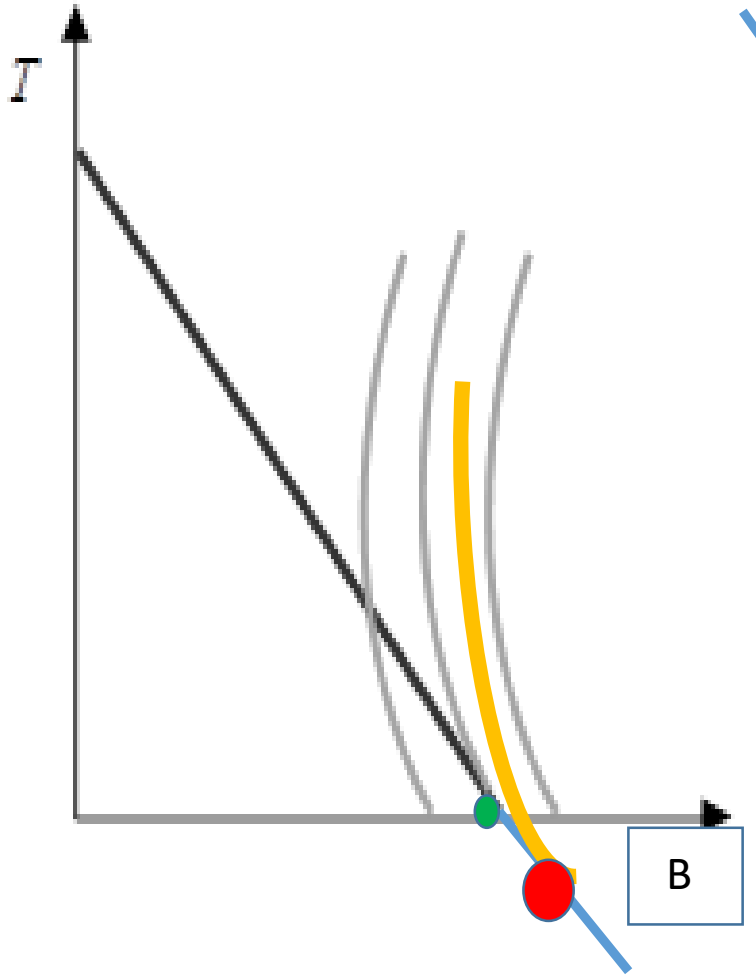
Alcaraz, the intellectual; Sandel, the tennisplayer



Sufficient condition: but necessary?

$$MRS = -\frac{\partial T}{\partial B} = 3 > \left(\frac{P_B}{P_T}\right) = \frac{1}{2}$$



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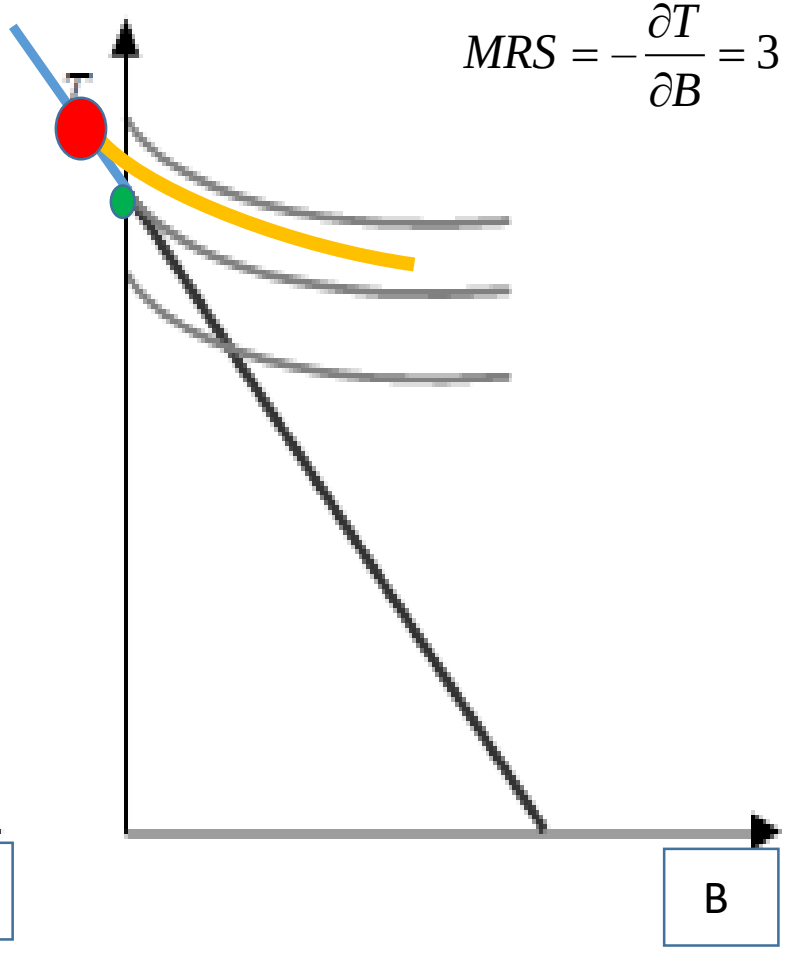

Rationality, again

The relativity illusion.

a) only via Web, 59 $;
b) only print, 125 $;
c) print and web, 125 $.

25% chooses a) and 75% c).

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Rationality, again

The relativity illusion.

a) only via Web, 59 $;
b) only print, 125 $;
c) print and web, 125 $.

25% chooses a) and 75% c).

Now suppose choice had been only:

a) only via Web, 59 $;
c) print and web, 125 $.

% of «a» is… well above 25%

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Rationality, again

25€

?

18€

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Rationality, again

643€

?

636 €

Rationality, again: the initial effect

2 (similar) large groups.
Noisy noise: 10 € vs. 90 €

a) 10 € : 33 €;
b) 90 € : 73 €;

MRS and p??

Rationality, again

The famous «0» price

Rationality, again

Social norms and market norms:
mentioning prices (see Sandel).

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Emotional Attachments

Martin Shubik, «The Dollar Auction Game: A Paradox in Non-Cooperative Behavior and Escalation»,
Journal of Conflict Resolution (March 1971)

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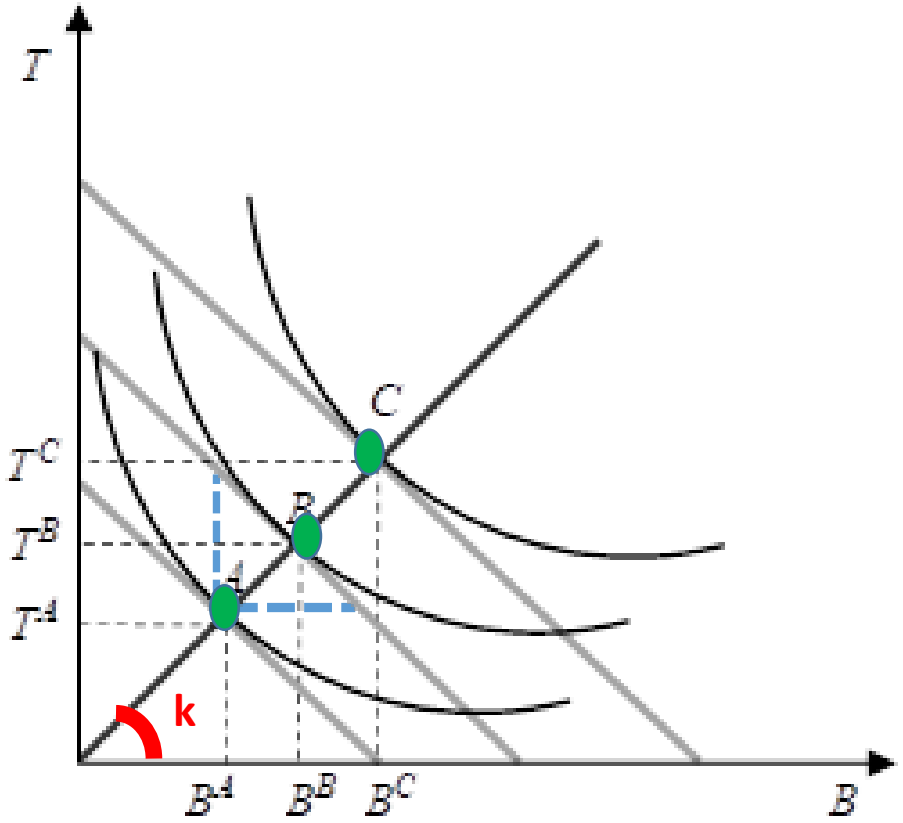
Emotional Traps

Martin Shubik, «The Dollar Auction Game: A Paradox in Non-Cooperative Behavior and Escalation»,
Journal of Conflict Resolution (March 1971)

CHAPTER 3

Changes in individual income and superior goods



$$T^* = kB^*$$

$$T^*/B^* = k$$

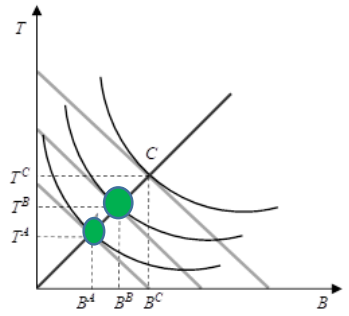
T and B are superior goods.

John's income elasticity for B and T?

Positive!

Homothetic Preferences

$$T^* = kB^*$$



$$I_a = P_B\, Ba + P_T\, \mathbf{Ta} = P_B\, Ba + P_T\, \mathbf{k\, Ba}$$

$$B_a = \frac{I_a}{(P_B + P_T k)}$$

$P_B\, B_a = (P_B\, I_a)/(P_B + P_T\, k)$
$(P_B\, B_a)/(I_a) = [P_B/(P_B + P_T\, k)]$

The share of income spent on good B is inversely related to k. And for T?

If we now double income from I_a to $2\, I_a$ ($=I_b$), with this type of preferences, the new preferred basket (Bb,Tb) will be such that:

$$I_b = 2\, I_a = P_B\, Bb + P_T\, \mathbf{Tb} = P_B\, Bb + P_T\, \mathbf{k\, Bb}$$

Homothetic Preferences

$2\ I_a = P_B\ Bb + P_T\ Tb = P_B\ Bb + P_T\ k\ Bb$

and since we know, from the previous budget constraint multiplied by 2, that

$2\ I_a = 2\ (P_B\ Ba + P_T\ k\ Ba)$

$I_a = P_B\ Ba + P_T\ \mathbf{Ta} = P_B\ Ba + P_T\ \mathbf{k\ Ba}$

The share of income spent on one good does not change when income changes.

It must be true that **Bb = 2 Ba**:

$P_B\ Bb + P_T\ k\ Bb = 2\ (P_B\ Ba + P_T\ k\ Ba)$

$Bb\ (P_B + P_T\ k) = 2\ Ba\ (P_B + P_T\ k)$

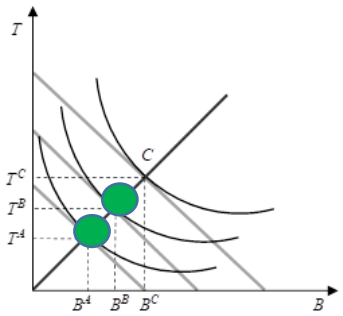
$Bb\ \cancel{(P_B + P_T\ k)} = 2\ Ba\ \cancel{(P_B + P_T\ k)}$

Bb = 2 Ba and thus that **Tb = 2 Ta**

since

$Ta/Ba = Tb/Bb = k$

$Tb/Ta = Bb/Ba$



$(P_B\ B_a)/(I_a) = [P_B/(P_B + P_T\ k)]$

$(P_B\ 2\ B_a)/(2I_a) = [P_B/(P_B + P_T\ k)]$

$(P_B\ B_b)/(I_b) = [P_B/(P_B + P_T\ k)]$

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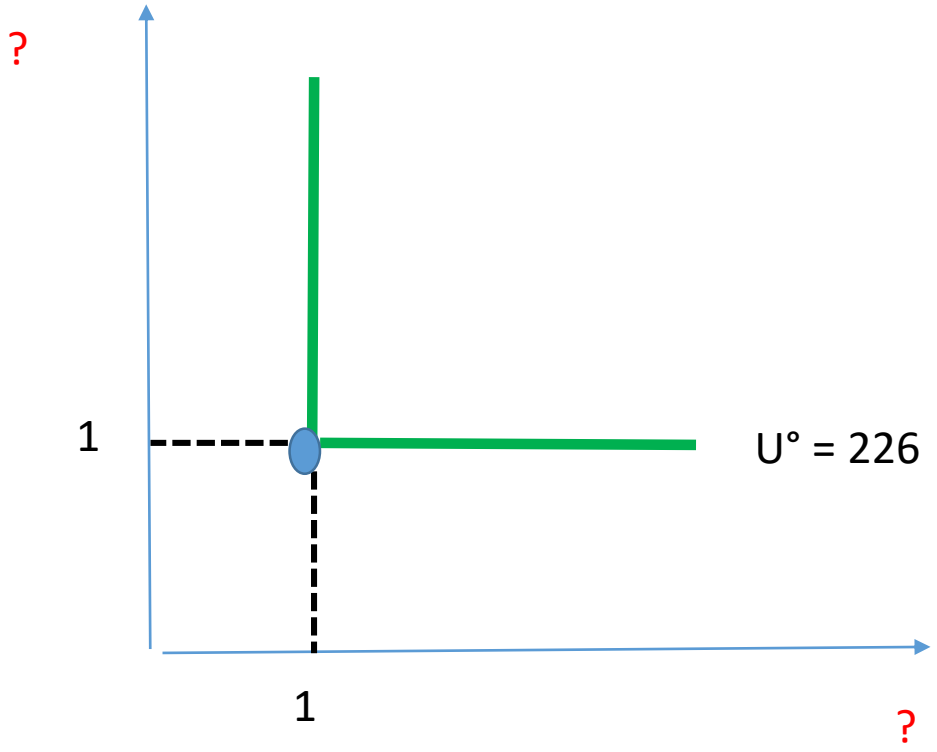
Perfect complements

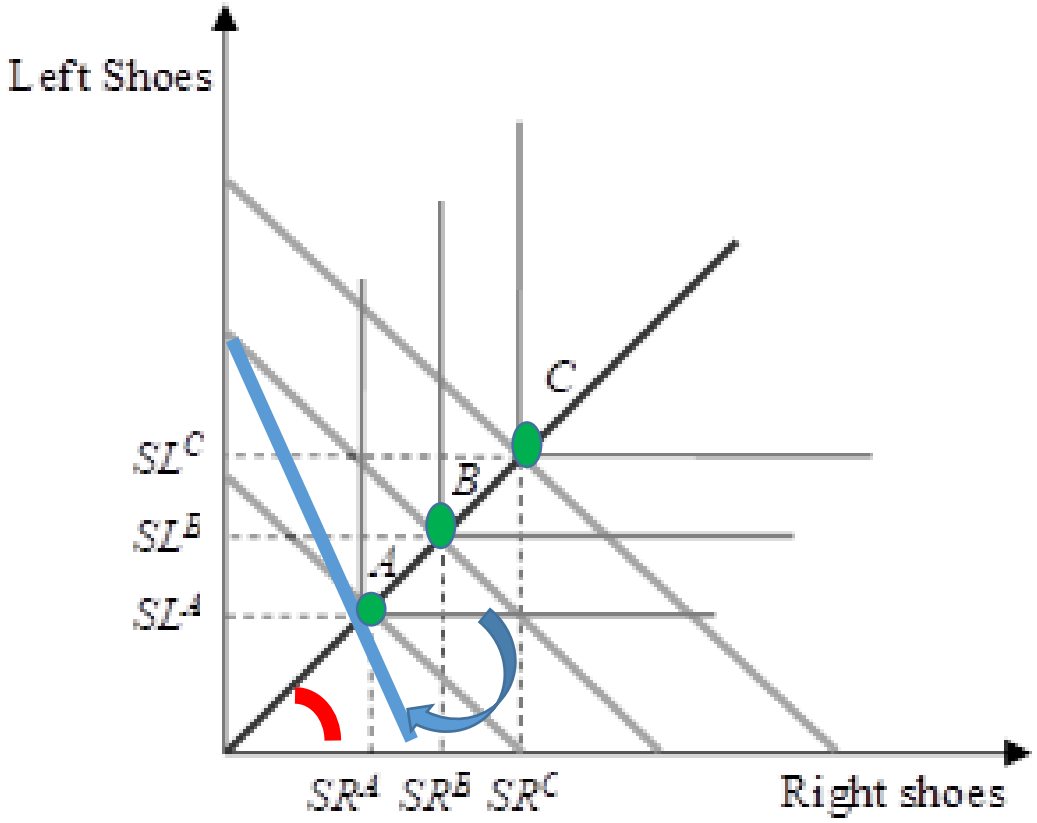


?

Perfect complements and homothetic preferences

Why «complements»?

We wish to consume them in a ratio k=1



k=1

2 goods are called complements when the price of one changes and the quantity desired of the other changes in the same direction of the quantity of the good whose price has changed.

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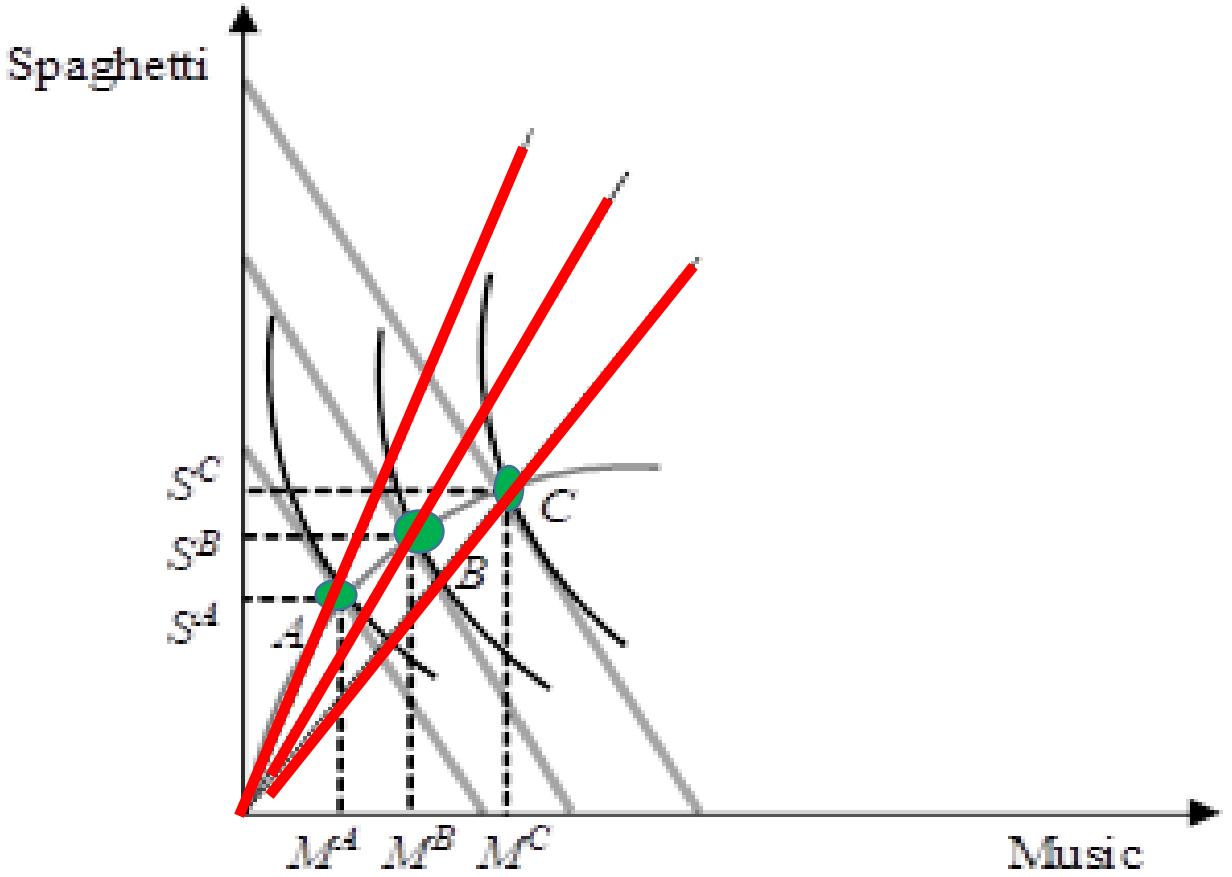
Necessary and luxury goods

Superior?

Superior!



M luxury good

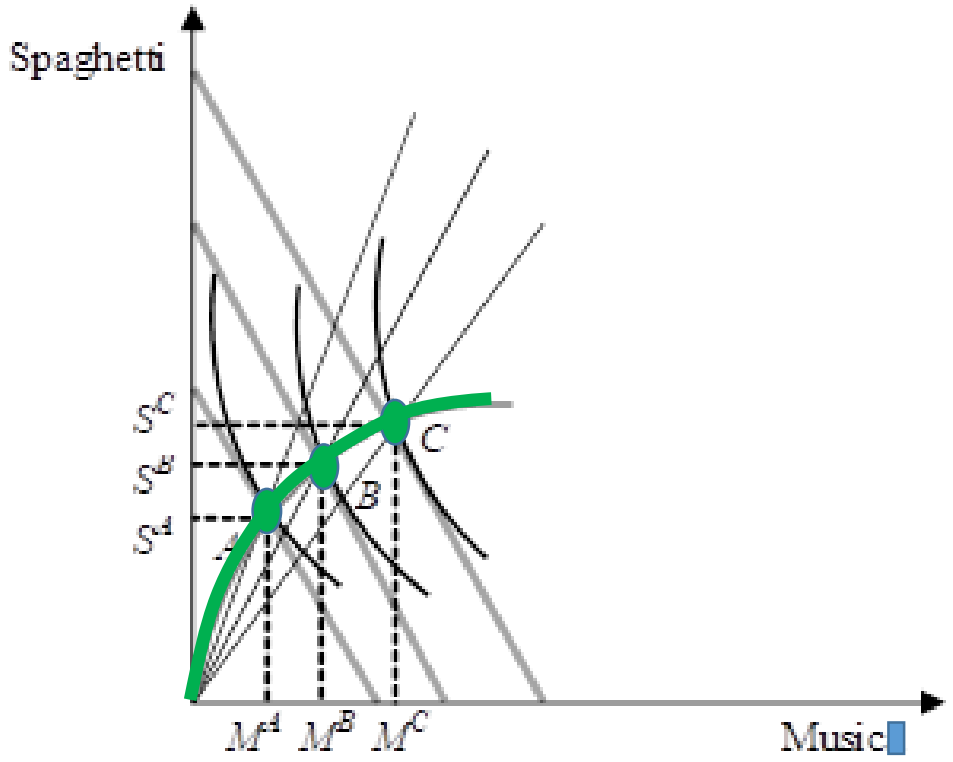
S necessary good

The richer I become, the more I orient my ratio (k) toward …

M

and less toward S

Income Expansion Path



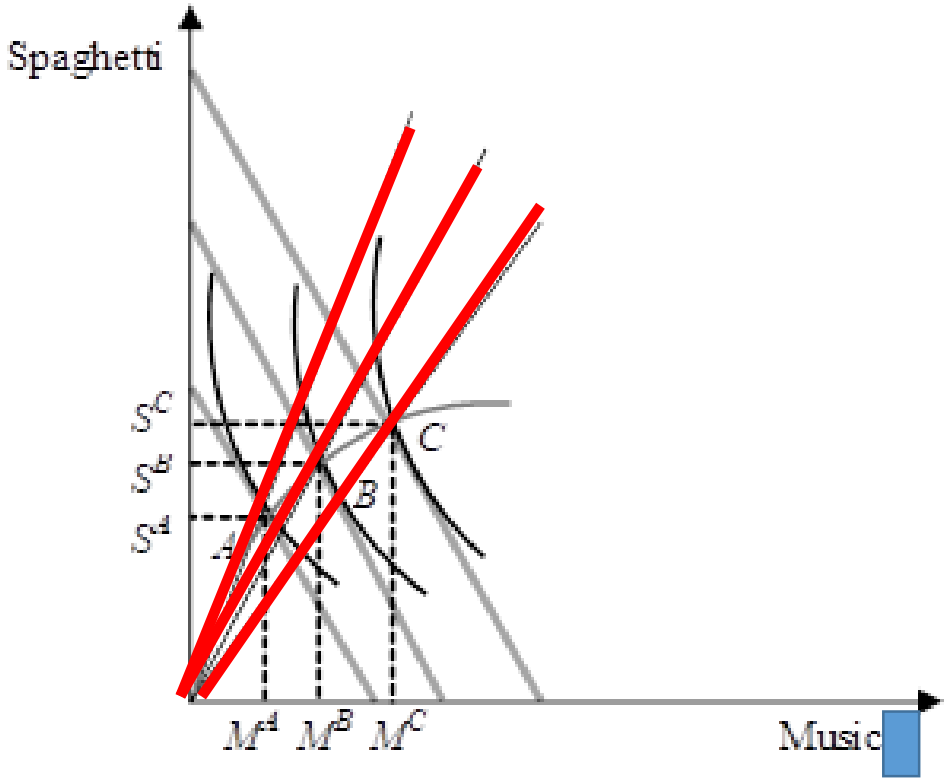
Shares of spending: stable or changing?

Homothetic:
$k = S^*/M^*$

Non-homotethic:
$k = k\,(S^*/M^*)$

So, what happens to the share of income dedicated to spending on a luxury good (M) as John grows richer?

What happens to the share of income dedicated to spending on a necessary good (S) as John grows poorer?



$(P_M M_a)/(I_a) = [P_B/(P_B + P_T k)]$

For M?
It grows
And for S?
It declines!

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Necessary Goods and elasticity of demand to …

$$\delta\left(\frac{PQ}{I}\right)/\delta I < 0$$

What is missing?

Not Q, Q(I)!

U’ = δQ/δI
V’ = δI/δI = 1

(U/V)’ = (U’V-UV’)/V²

$$P\left[\left(\frac{\delta Q}{\delta I}\right)I - Q\right]\times\frac{1}{I^2} < 0$$

$$\left(\frac{\delta Q}{\delta I}\right)I - Q < 0$$

$$\left(\frac{\delta Q}{\delta I}\right)I < Q$$

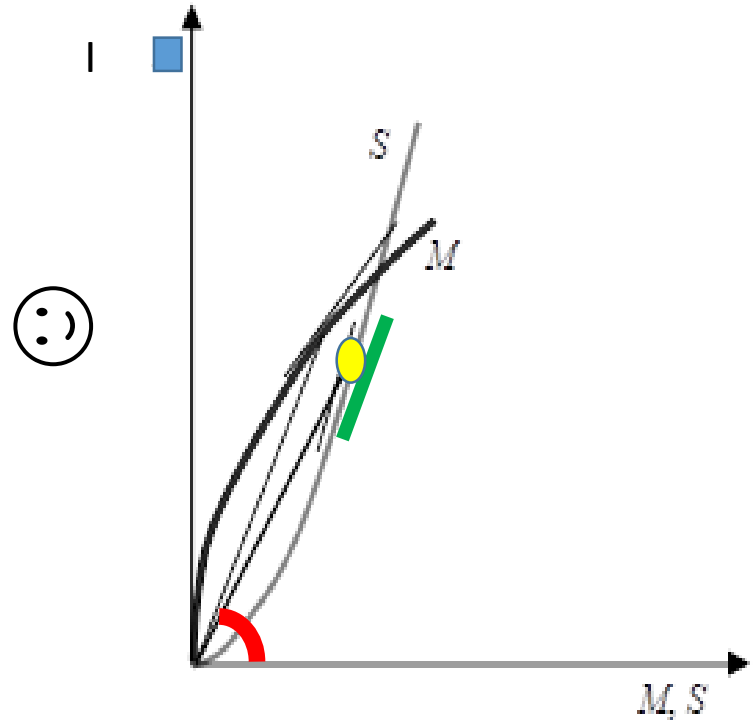
$$\left(\frac{\delta Q}{\delta I}\right) < \frac{Q}{I}$$

$$\frac{\left(\frac{\delta Q}{Q}\right)}{\left(\frac{\partial I}{I}\right)} < 1$$

Elasticity (to income) of M? Of S?

READY? YOUR FIRST DEMAND CURVE (WITH RESPECT TO INCOME)

Engel Curve or Income demand curve



For necessary goods:

$$\left(\frac{\delta Q}{Q}\right)\times\left(\frac{I}{\partial I}\right)<1$$

$$\left(\frac{\delta Q}{\delta I}\right)<\frac{Q}{I}$$

For luxury goods?

$$\left(\frac{\delta I}{\delta Q}\right)>\frac{I}{Q}$$

For each level of income, the Engel curve, or inverse demand curve with respect to income, tells us how much John desires to consume.

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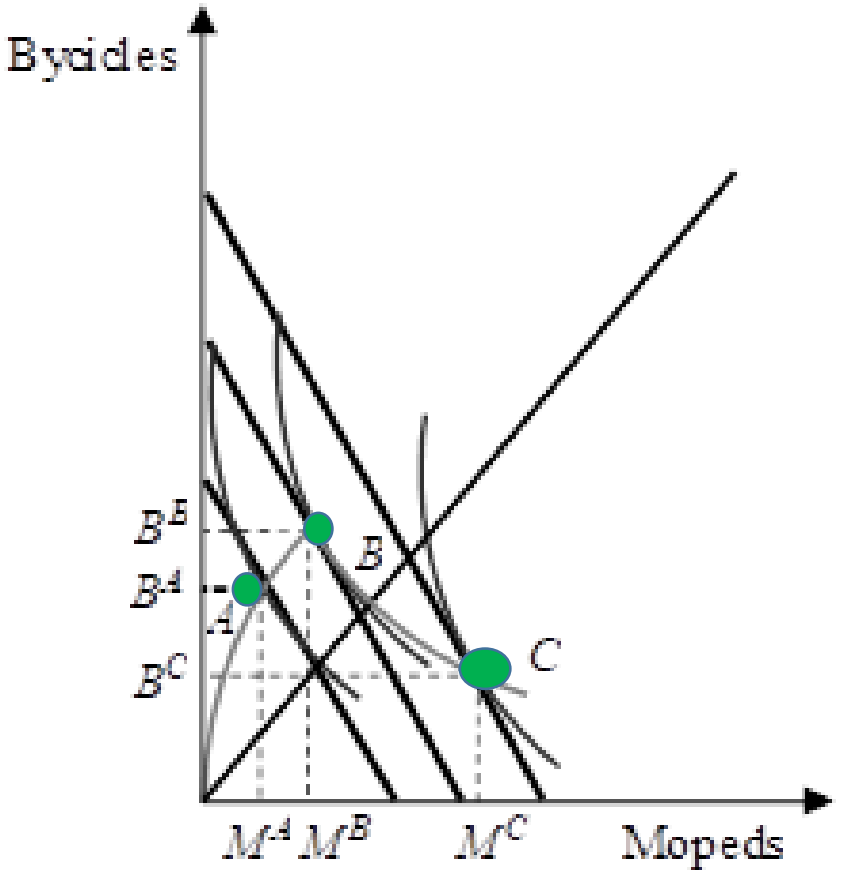
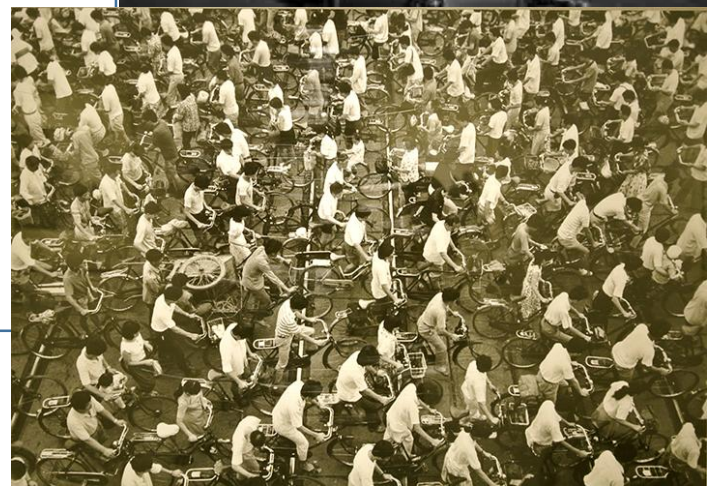
From superior to inferior goods





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From superior to inferior goods to ….