

Part I

Comparative Advantage &

the Basis for Trade





Your First Model

Definition:

A **Model** is a simplified representation of reality.



Your First Model

Assumptions

- There are only **2 possible activities**.
- There are only **2 individuals**.
- When trading, there are
 - **no transaction costs** (negotiation/transportation costs),
 - **no other barriers** (import quotas, tariffs).

David Ricardo in 1817
“magic 4 numbers”



A. One Agent Economy

Meet Alberto

- 2 **productive activities** (Assumption 1):
 - collecting bananas and catching rabbits
- Performing an activity involves use of **resources**
 - 1kg bananas takes 1 hour to collect
 - 1kg rabbit takes 2 hours to catch
- The amount of resources used to perform a productive activity determines **productivity**



A. One Agent Economy

- Resources are scarce → often we operate in a *constrained* environment (i.e., **financial constraints, time constraints**)
- Alberto's time constraint:
 $24\text{h/day} - 8\text{h sleep}\smiley = 16\text{h}$

A. One Agent Economy

- Step 1: **Extreme scenarios**
 - 16h collecting bananas
 - $\rightarrow 16\text{kg bananas } (16\text{h} \times (1\text{kg}/1\text{h}))$
 - $\rightarrow 0\text{kg rabbit}$
 - 16h catching rabbit
 - $\rightarrow 0\text{kg bananas}$
 - $\rightarrow 8\text{kg rabbit } (16\text{h} \times (1\text{kg}/2\text{h}))$

A. One Agent Economy

- Step 2: **Intermediary scenarios**
 - 16h collecting bananas AND rabbits
 - $\rightarrow 8h \times (1\text{kg}/1\text{h}) = 8\text{kg}$ bananas
 - $\rightarrow 8h \times (1\text{kg}/2\text{h}) = 4\text{kg}$ rabbit
 - $\rightarrow 4h \times (1\text{kg}/1\text{h}) = 4\text{kg}$ bananas
 - $\rightarrow 12h \times (1\text{kg}/2\text{h}) = 6\text{kg}$ rabbit
 - $\rightarrow 1h \times (1\text{kg}/1\text{h}) = 1\text{kg}$ bananas
 - $\rightarrow 15h \times (1\text{kg}/2\text{h}) = 7.5\text{kg}$ rabbit
 - ...



A. One Agent Economy

- Step 3: Bring Step 1 and 2 together and create

Production Possibility Curve

A. One Agent Economy

Definition:

The **Production Possibility Curve** represents *all possible combinations* of bananas and rabbits that can be produced with Alberto's labour if he works *all the available hours* (i.e, the whole day).



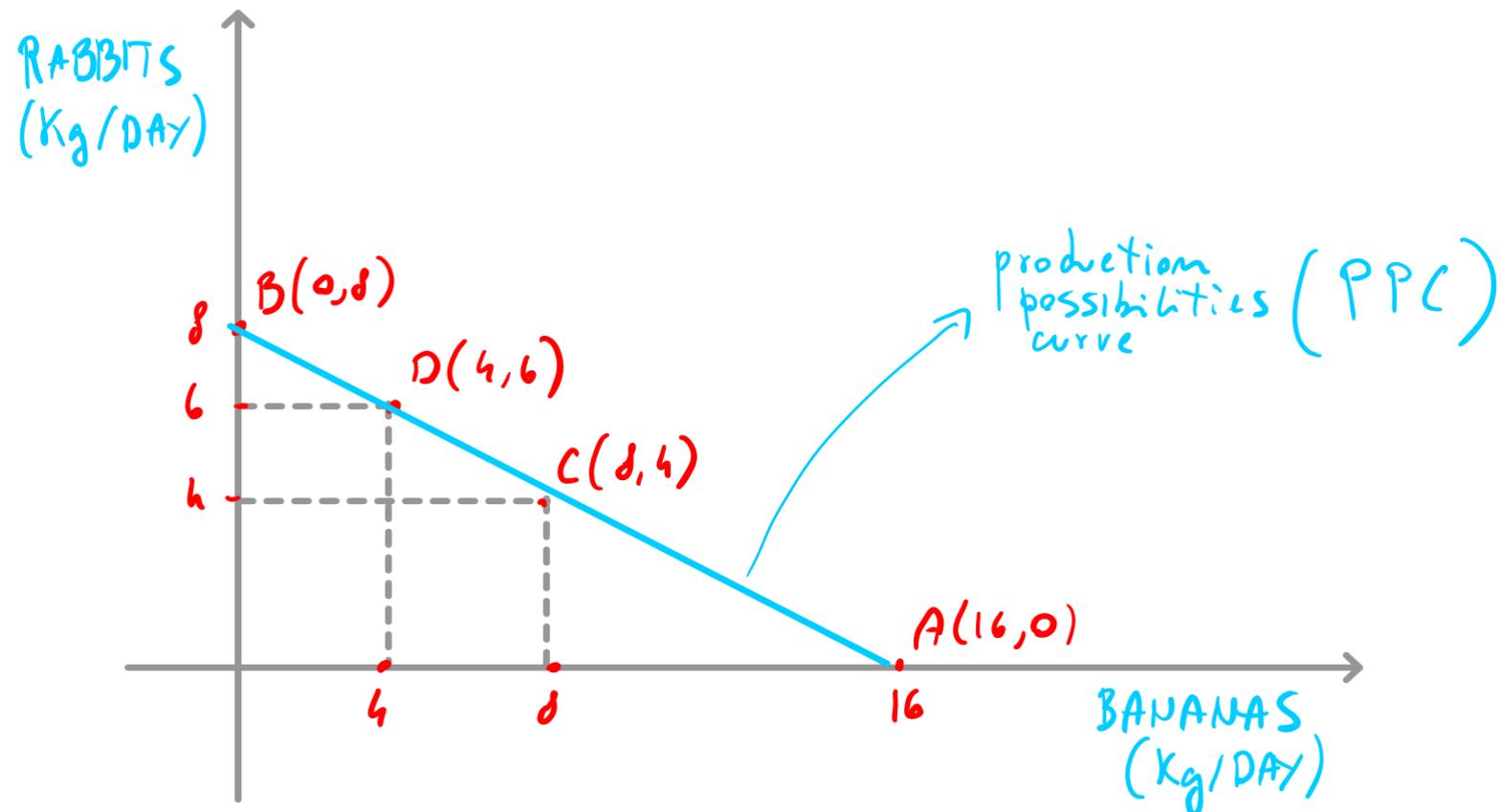
A. One Agent Economy

Definition (general):

The **Production Possibility Curve** captures *all maximum output possibilities* for two (or more) goods, given *a set of inputs* (or resources - i.e., time) *if inputs are used efficiently*.



A. One Agent Economy



A. One Agent Economy

Definition:

The **Production Possibility Curve** represents *all possible combinations* of bananas and rabbits that can be produced with Alberto's labour if he works **all the available hours** (i.e, the whole day).



... if all inputs (or resources) are used efficiently
(no time to waste)!!!



A. One Agent Economy

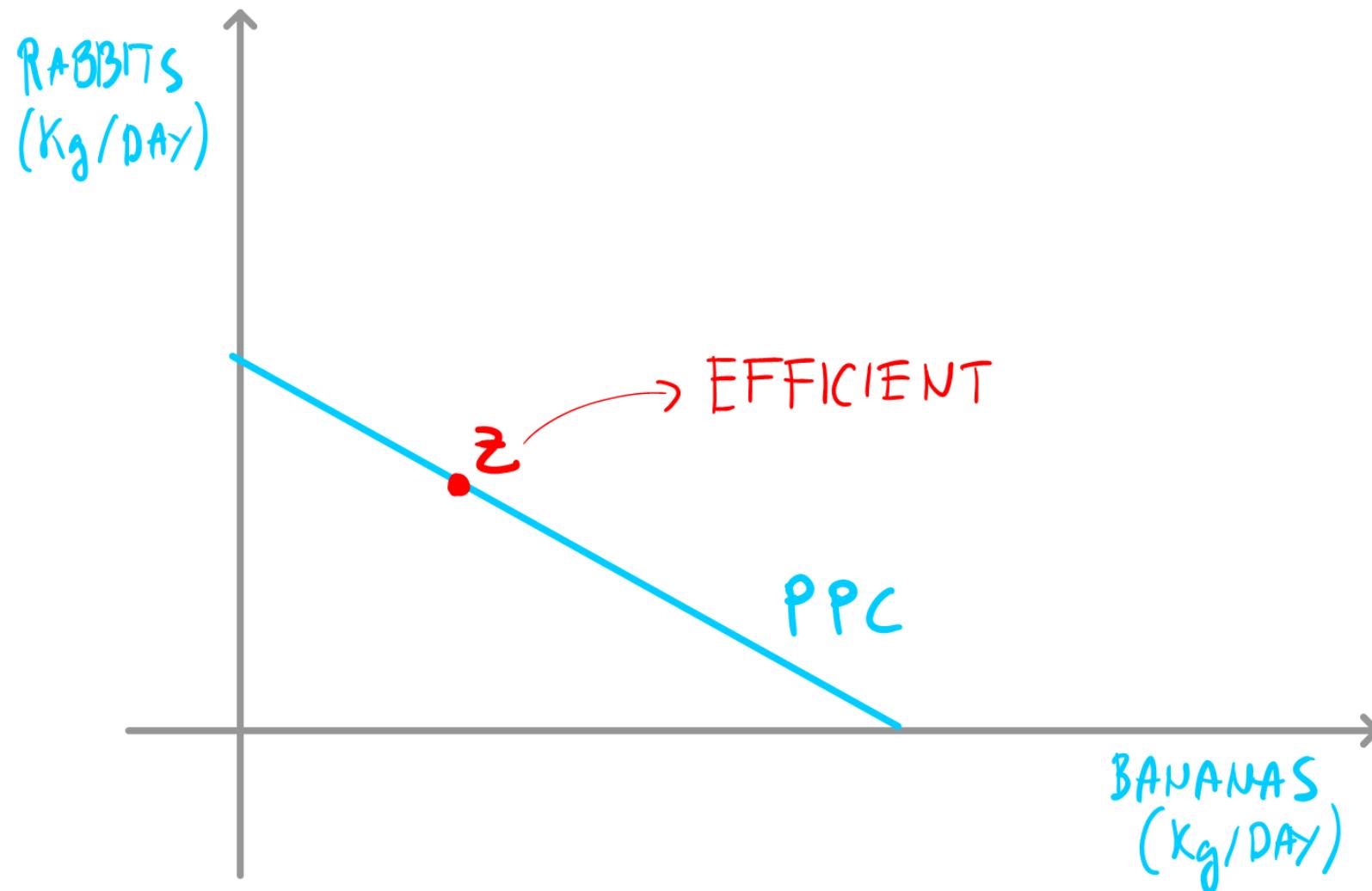
Definition:

An **Efficient Production Point** represents a combination of goods (bananas & rabbits) for which currently available resources (Alberto's time) **do not allow** an increase in the production of one good without a reduction in the production of the other.

All the points on the PPC are efficient.



A. One Agent Economy



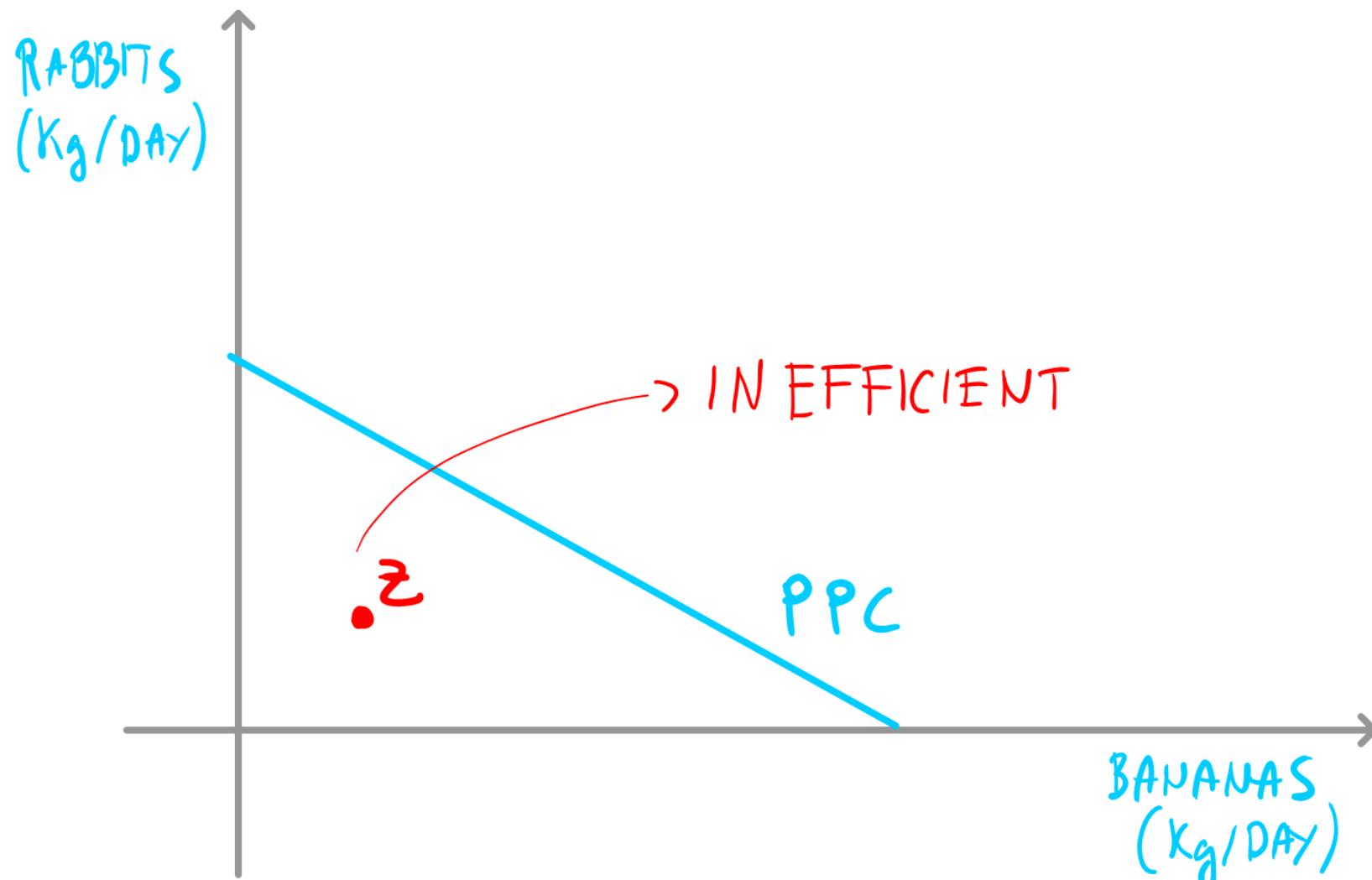
A. One Agent Economy

Definition:

An **Inefficient Production Point** represents a combination of goods (bananas & rabbits) for which currently available resources (Alberto's time) **allow** an increase in the production of one good without a reduction in the production of the other. *All the points below and to the left of the PPC are inefficient.*



A. One Agent Economy



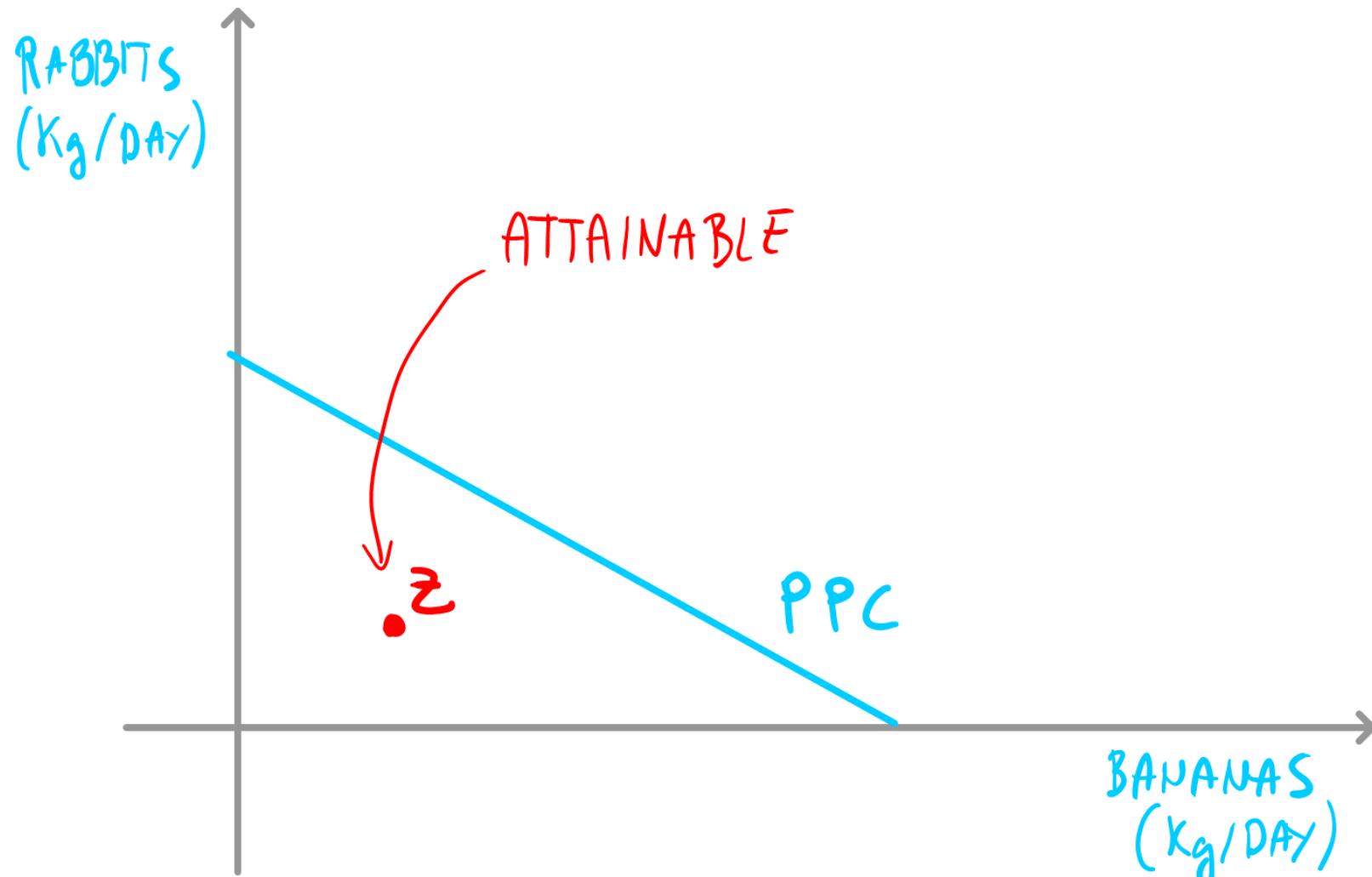
A. One Agent Economy

Definition:

An **Attainable Production Point** represents any combination of goods (bananas & rabbits) that **can** be produced with the currently available resources (Alberto's time). *All the points on the PPC or below and to the left of the PPC are attainable.*



A. One Agent Economy



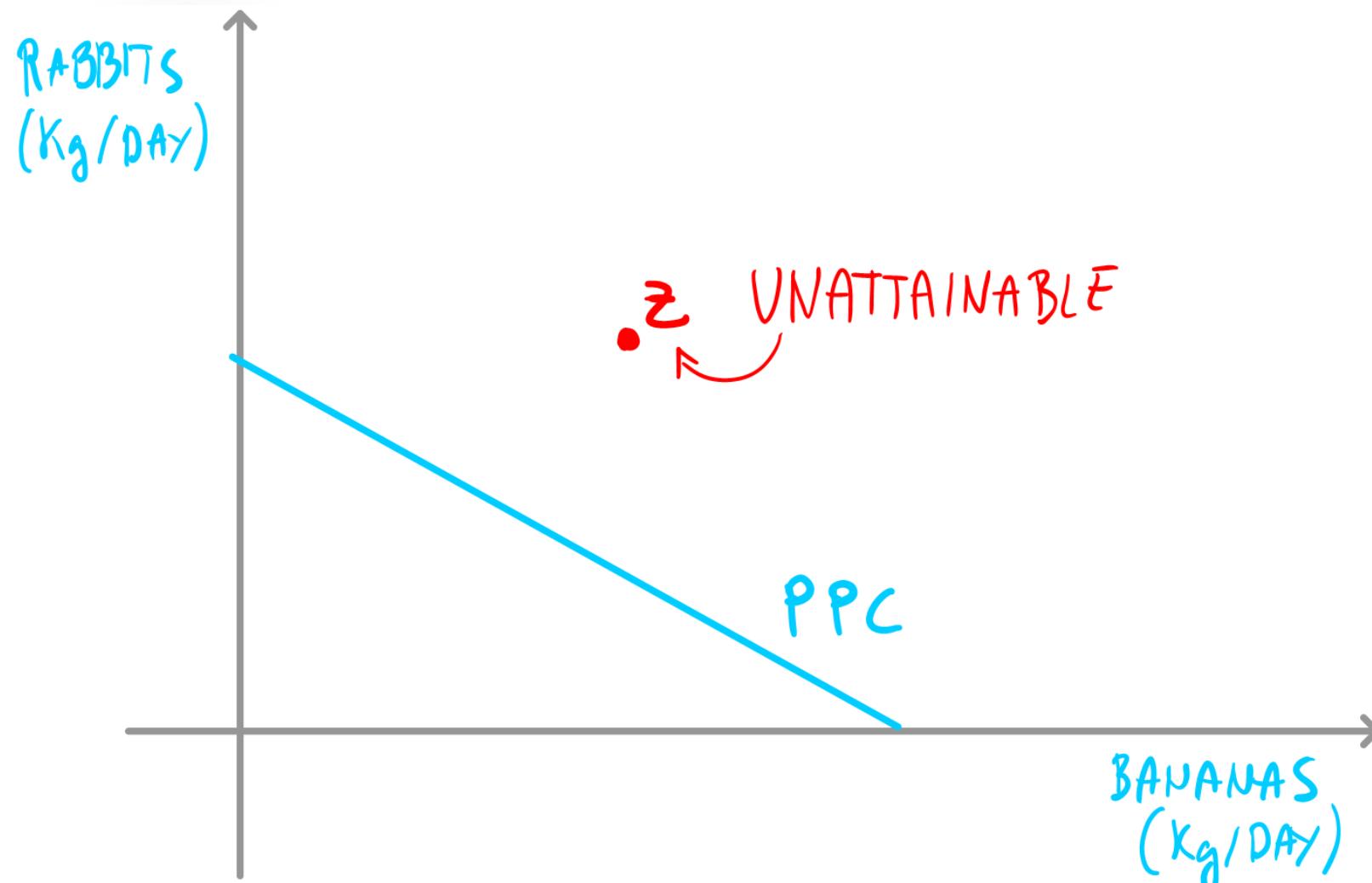
A. One Agent Economy

Definition:

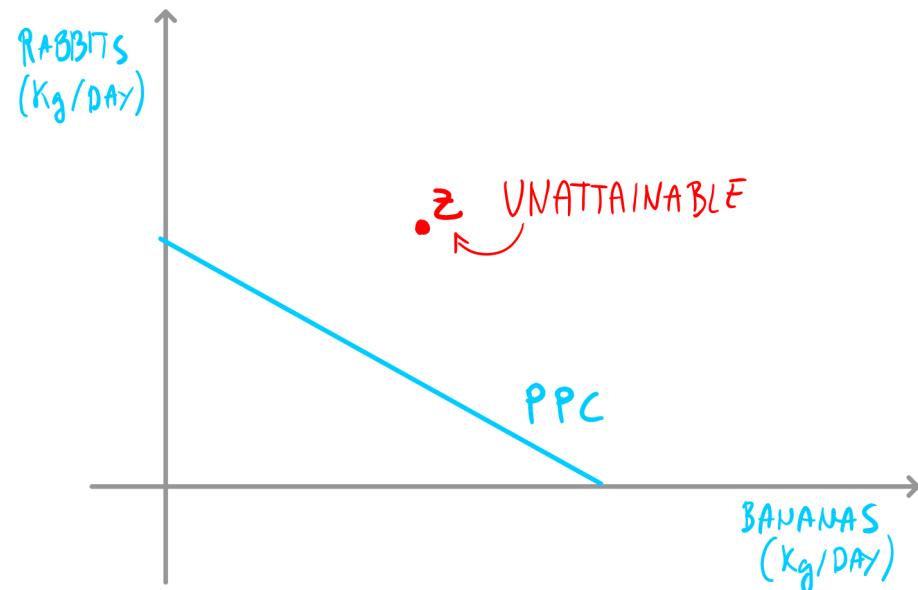
An **Unattainable Production Point** represents any combination of goods (bananas & rabbits) that **can not** be produced with the currently available resources (Alberto's time). *All the points that lie outside of the PPC are unattainable.*



A. One Agent Economy



A. One Agent Economy



- What if **consumption needs are higher than production possibilities?**

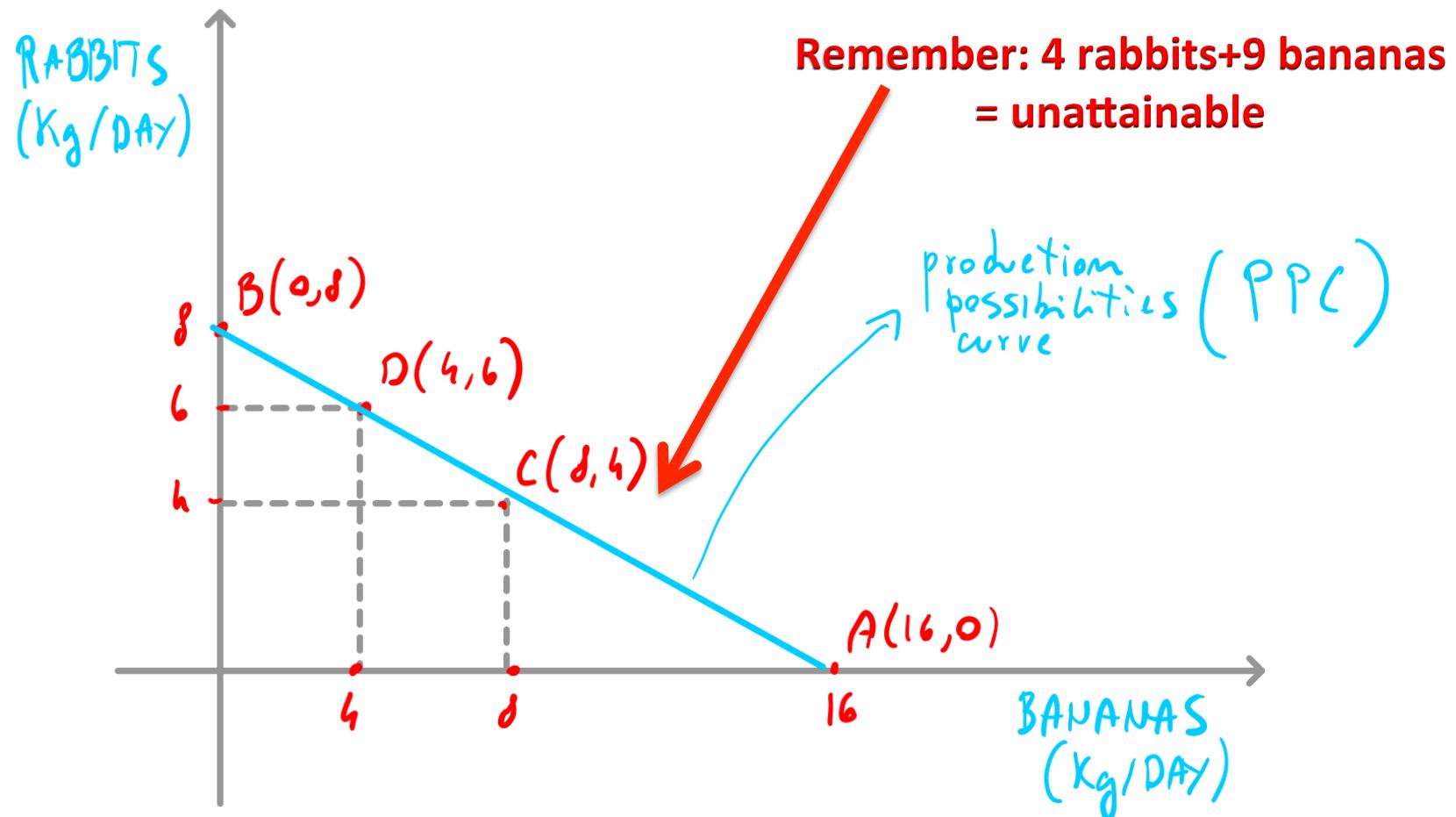
B. Two Agents Economy

Remember Alberto

- 2 **productive activities**:
 - collecting bananas and catching rabbits
- Performing an activity involves use of **resources**
 - 1kg bananas takes 1 hour to collect
 - 1kg rabbit takes 2 hours to catch
- **Consumption needs**: 4kg of rabbit & 9kg of bananas
(clearly unattainable!)



B. Two Agents Economy



B. Two Agents Economy

Enter Leo

- 2 **productive activities**:
 - collecting bananas and catching rabbits
- Performing an activity involves use of **resources**
 - 1kg bananas takes 4 hours to collect
 - 1kg rabbit takes 4 hours to catch
- **Time constraint** – productive for 16h per day

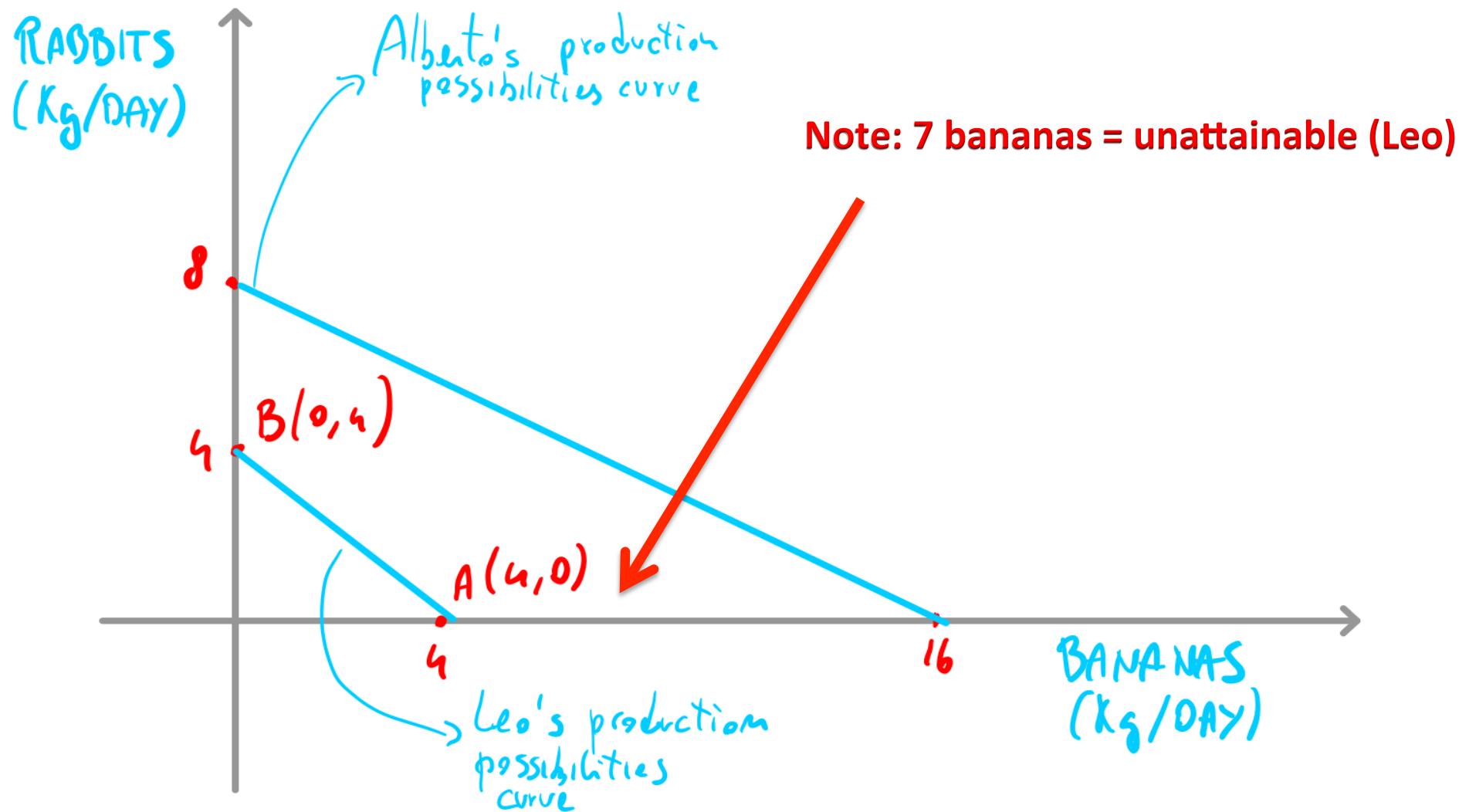


B. Two Agents Economy

- Leo's **Extreme scenarios**
 - 16h collecting bananas
 - $\rightarrow 4\text{kg bananas } (16\text{h} \times (1\text{kg}/4\text{h}))$
 - $\rightarrow 0\text{kg rabbit}$
 - 16h catching rabbit
 - $\rightarrow 0\text{kg bananas}$
 - $\rightarrow 4\text{kg rabbit } (16\text{h} \times (1\text{kg}/4\text{h}))$
- **Consumption needs:** 7kg bananas (clearly unattainable!)



B. Two Agents Economy



B. Two Agents Economy

**Can Leo help Alberto achieve
his consumption target?**

B. Two Agents Economy

	Time to get	
	1kg of bananas	1kg of rabbit
Alberto	1 hour	2 hours
Leo	4 hours	4 hours

Table 1.1: Productivities of Alberto and Leo expressed in terms of time required.



B. Two Agents Economy

Definition:

An agent (or an economy) has an **Absolute Advantage** in a productive activity (like collecting bananas or catching rabbits) when he/she can carry on this activity with less resources (i.e., less time) than another agent.



B. Two Agents Economy

	Time to get	
	1kg of bananas	1kg of rabbit
Alberto	1 hour	2 hours
Leo	4 hours	4 hours

Table 1.1: Productivities of Alberto and Leo expressed in terms of time required.



B. Two Agents Economy

Opportunity Cost!

B. Two Agents Economy

Definition:

The **Opportunity Cost** of a given action is the value of the next best alternative to that particular action.



B. Two Agents Economy

	Time to get	
	1kg of bananas	1kg of rabbit
Alberto	1 hour	2 hours
Leo	4 hours	4 hours

Table 1.1: Productivities of Alberto and Leo expressed in terms of time required.



B. Two Agents Economy

Opportunity costs of		
	1kg of bananas	1kg of rabbit
Alberto	0.5kg of rabbit	2kg of bananas
Leo	1kg of rabbit	1kg of bananas

Table 1.2: Productivities expressed
terms of opportunity costs.



B. Two Agents Economy

	Time to get	
	1kg of bananas	1kg of rabbit
Alberto	1 hour	2 hours
Leo	4 hours	4 hours

Table 1.1: Productivities of Alberto and Leo expressed in terms of time required.



B. Two Agents Economy

Opportunity costs of		
	1kg of bananas	1kg of rabbit
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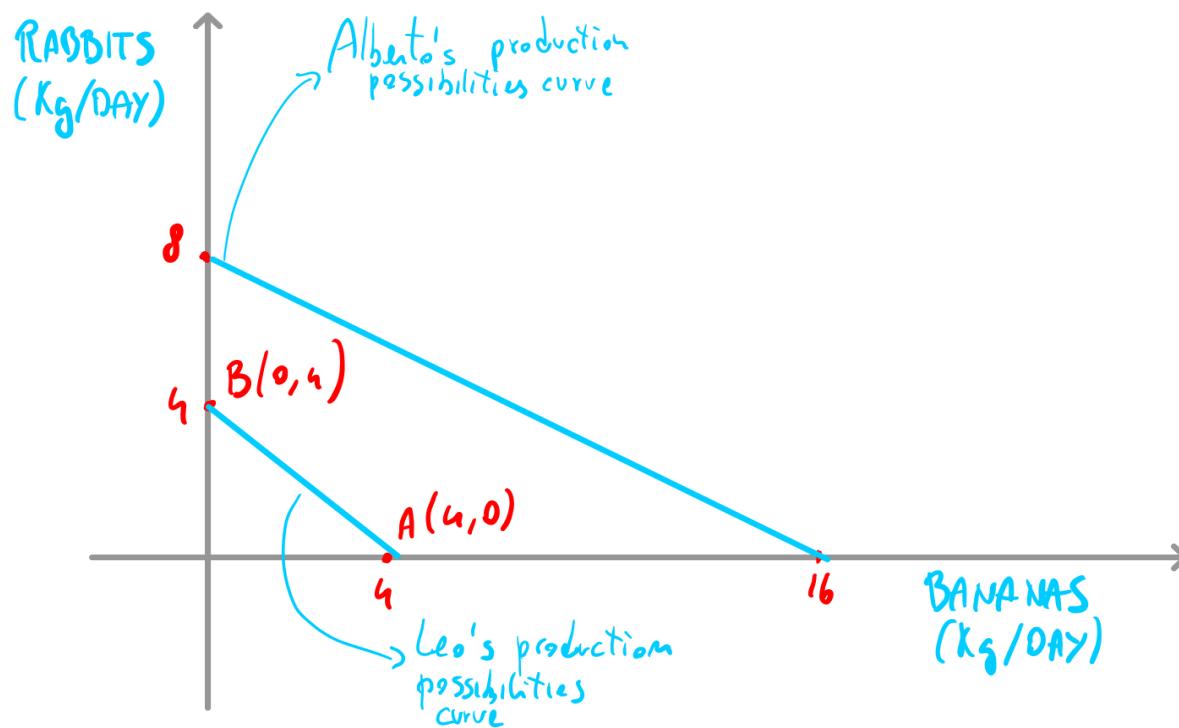
Table 1.2: Productivities expressed
terms of opportunity costs.



B. Two Agents Economy

Opportunity Cost made (super)easy:

OC = slope of the PPC !!



$$\begin{aligned} OC_{\text{bananas - Alb}} &= \\ &= (8/16)\text{kg rabbit} \end{aligned}$$

$$\begin{aligned} OC_{\text{bananas - Leo}} &= \\ &= (4/4)\text{kg rabbit} \end{aligned}$$

B. Two Agents Economy

Opportunity Cost made (super)easy:

$$OC_{\text{bananas}} = (\text{loss in rabbit/gain in bananas})$$

$$OC_{\text{rabbit}} = (\text{loss in bananas/gain in rabbit})$$

B. Two Agents Economy

Opportunity costs of		
	1kg of bananas	1kg of rabbit
Alberto	0.5kg of rabbit	2kg of bananas
Leo	1kg of rabbit	1kg of bananas

Table 1.2: Productivities expressed
terms of opportunity costs.



B. Two Agents Economy

Definition:

An agent (or an economy) has an **Comparative Advantage** in a productive activity (like collecting bananas or catching rabbits) when he/she has a **lower opportunity cost** of carrying this activity than another agent.



B. Two Agents Economy

Opportunity costs of		
	1kg of bananas	1kg of rabbit
Alberto	0.5kg of rabbit	2kg of bananas
Leo	1kg of rabbit	1kg of bananas

Table 1.2: Productivities expressed
terms of opportunity costs.



B. Two Agents Economy

	No specialization		Specialization	
	bananas	rabbits	bananas	rabbits
Alberto	12	2	16	0
Leo	3	1	0	4
Total	15	3	16	4

Table 1.3: Gains from specialisation.
Both Alberto and Leo are better off
when they specialize according to their
comparative advantage.

**Gains from
specialization ☺**

B. Two Agents Economy

Principle of Comparative Advantage:

Everyone is better off if each agent (or each country) **specializes** in the activities for which they have a comparative advantage. *The gains from specialization grow larger as the difference in opportunity cost increases!*



B. Two Agents Economy

Now we're ready:

Can Leo help Alberto achieve his consumption target AND also reach his own consumption target?

YES! IF

- **ALBERTO SPECIALIZES IN BANANAS &**
- **LEO SPECIALIZES IN RABBITS &**
- **THEY TRADE! BUT AT WHAT PRICE?**



B. Two Agents Economy

THEY TRADE! BUT AT WHAT PRICE?

- Alberto specializes in bananas → will want to sell to Leo at
 - $\text{price}_{\text{bananas}} \geq \text{Alberto's cost of collecting bananas}$ OR
 - $\text{price}_{\text{bananas}} \geq \text{Alberto's OC}_{\text{bananas}} (=0.5\text{kg rabbit})$
- Leo specializes in rabbits → will want bananas as long as
 - $\text{Price}_{\text{bananas}} \leq \text{Leo's cost of collecting bananas himself}$ OR
 - $\text{Price}_{\text{bananas}} \leq \text{Leo's OC}_{\text{bananas}} (=1\text{kg rabbit})$

$0.5\text{kg rabbit} \leq \text{price}_{\text{bananas}} \leq 1\text{kg rabbit}$



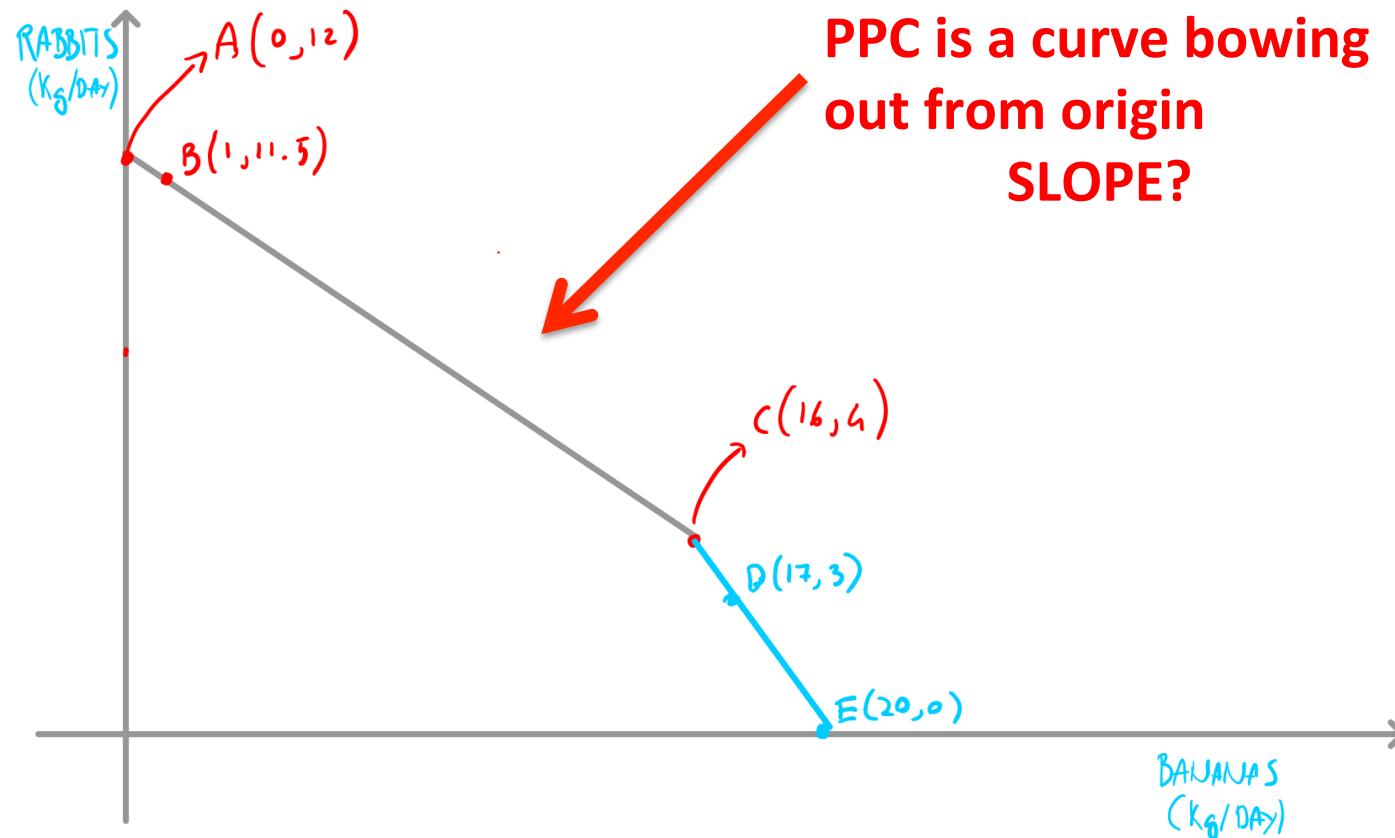
C. Economy PPC in Two-Agent Economy

Alberto and Leo together ☺

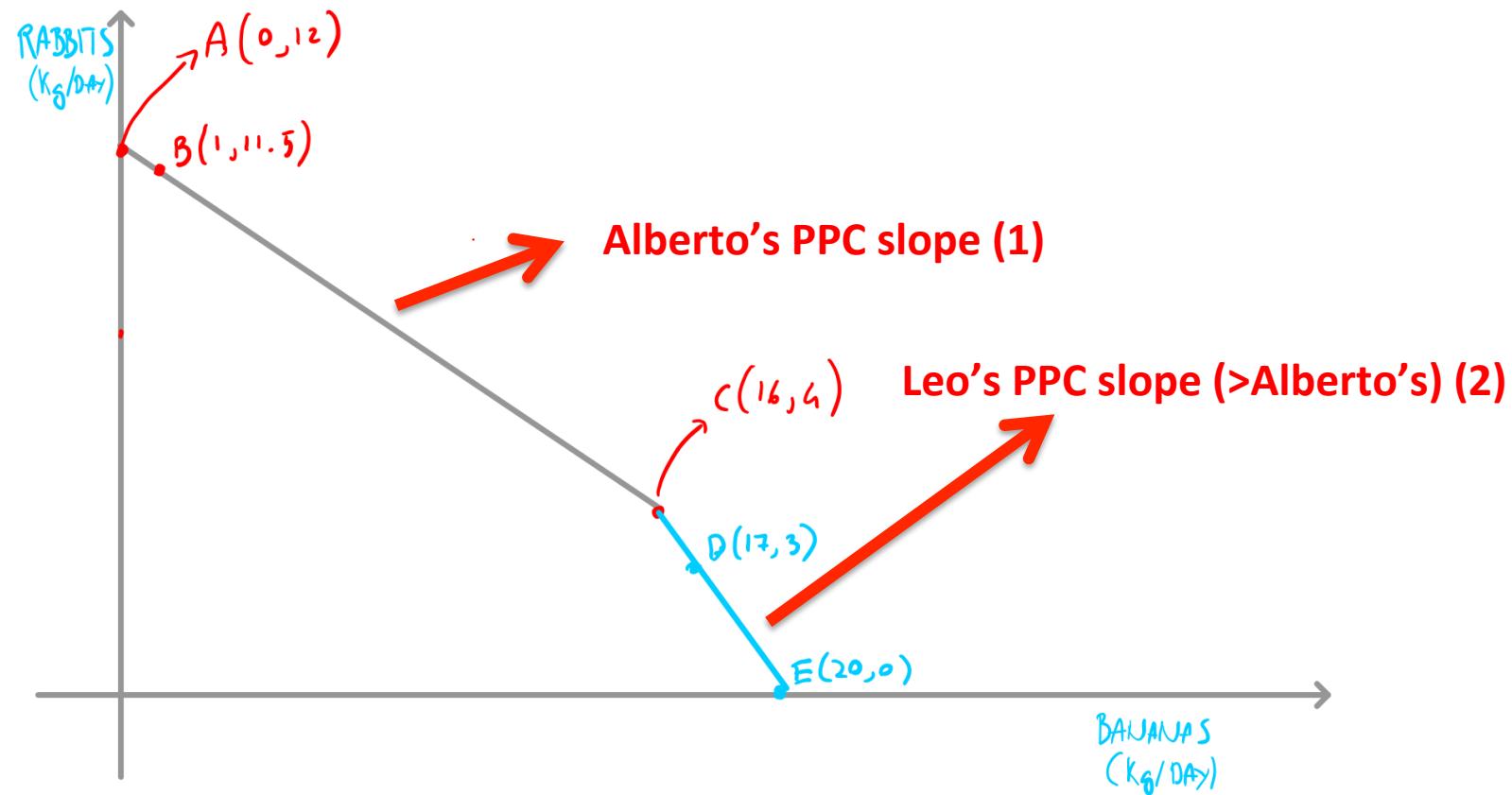
- Find the total amount of rabbit that Leo & Alberto can produce if they *spend all their time catching rabbits*
- Start producing bananas – Alberto 1st kg (why?)
- Continue to produce bananas (“exhaust” Alberto and only then move to Leo – why?)
- Find the total amount of bananas that Leo & Alberto can produce if they *spend all their time collecting bananas*



C. Economy PPC in Two-Agent Economy



C. Economy PPC in Two-Agent Economy



C. Economy PPC in Two-Agent Economy

**Principle of Increasing Opportunity Cost
(Low Hanging Fruit):**

In the process of increasing the production of any good, *first employ those resources with the lowest opportunity cost* and only once these are exhausted turn to resources with higher cost.



C. Economy PPC in Two-Agent Economy

Principle of Increasing Opportunity Cost (Low Hanging Fruit):

In the process of *increasing the production* of any good, *first employ those resources with the lowest opportunity cost* and only once these are exhausted turn to resources with higher cost.

Need to have **resources available:**
Capital / Labour / Technology



C. Economy PPC in Two-Agent Economy

The main factors driving **economic growth** (i.e., push the economy PPC out and to the right) are:

- ↑ in **infrastructure** → factories, equipment,
- ↑ in **population** → labour force,
- Advancements ↑ in **knowledge & technology**
→ education, R&D, IT, communications tech.

D. Trading Between Economies: Why Trade?

A country's **economic welfare** does not depend on what it produces (PPC), **but on what it consumes (CPC)!**

Consumption Possibility Curve (CPC)



D. Trading Between Economies: International Trade

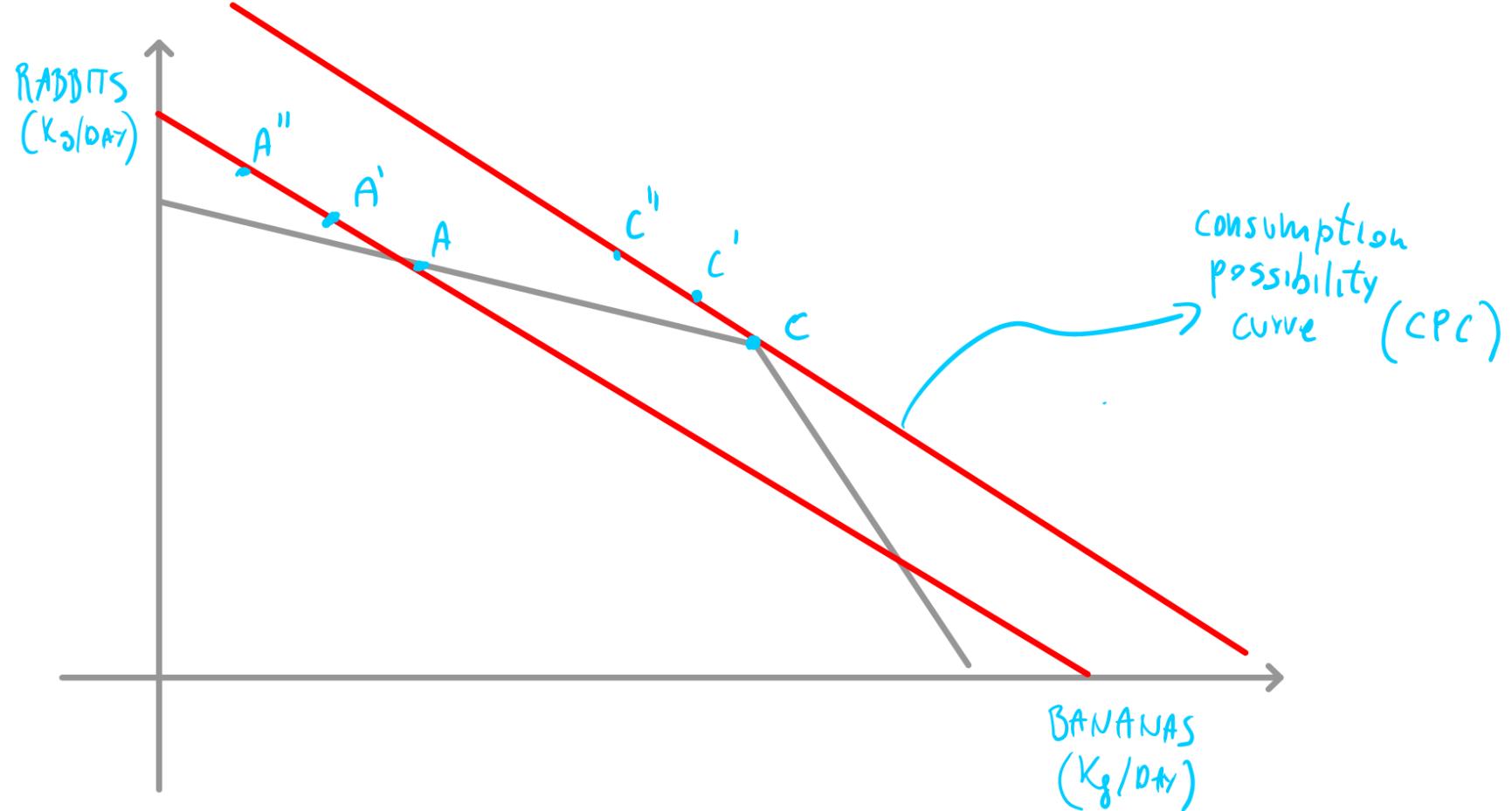
Definition:

The **Consumption Possibility Curve** represents *all possible combinations* of two goods that the agents in an economy can consume.

PPC Vs CPC



D. Trading Between Economies: International Trade



D. Trading Between Economies: International Trade

Definition:

The **Consumption Possibility Curve** represents *all possible combinations* of two goods that the economy can feasibly consume when it is open to international trade.

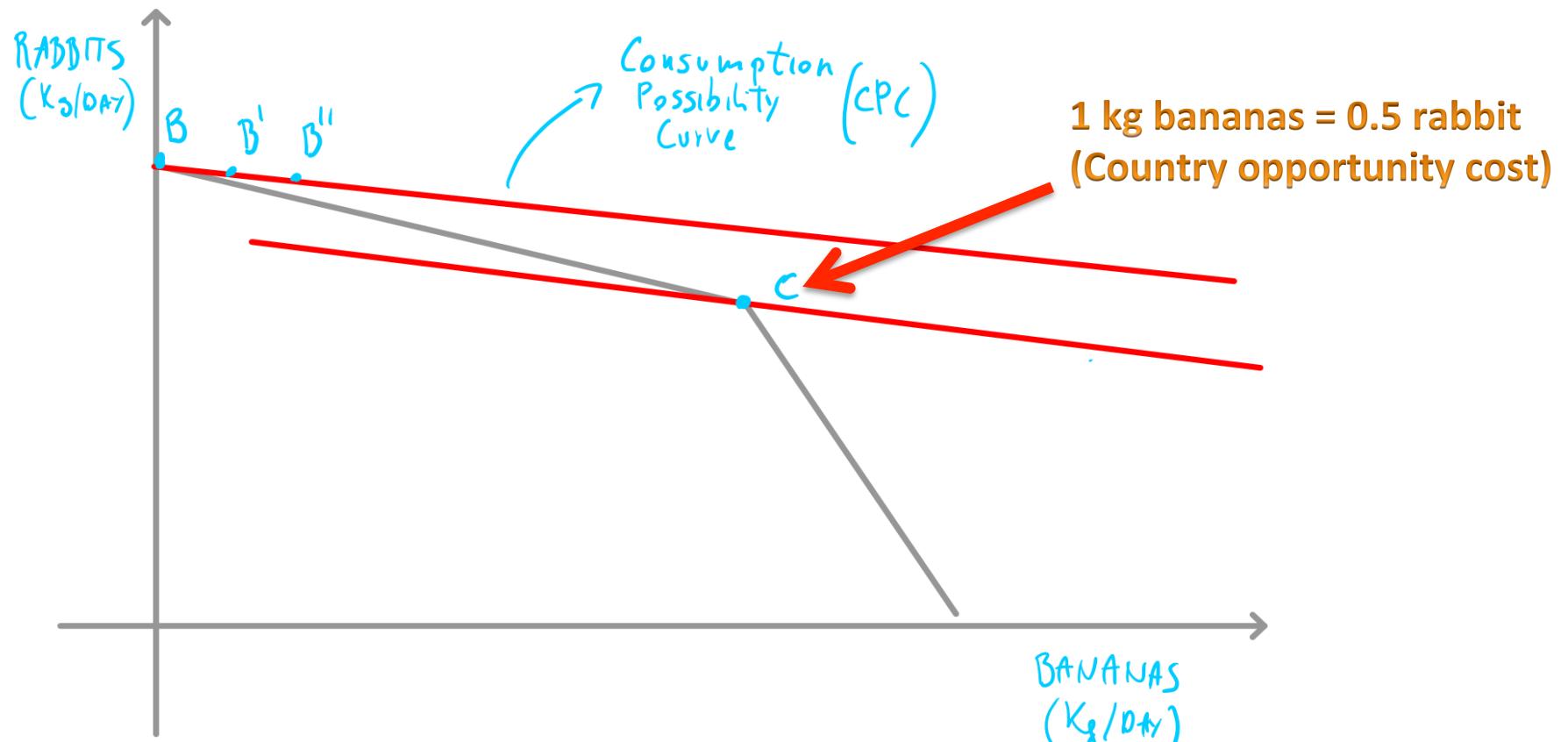


depends on international (world) prices



D. Trading Between Economies: International Trade

Say 1kg bananas = 0.2 rabbit (international world price)



D. Trading Between Economies: International Trade

- **Close economy** (no trade)
→ **PPC and CPC are identical**
- **Open economy** (trade on the intern. market)
→ **CPC is to the right and above the PPC**

Consumption opportunities in an open economy are always **wider** than in a closed one!

What **should** an economy consume? **DEPENDS!**

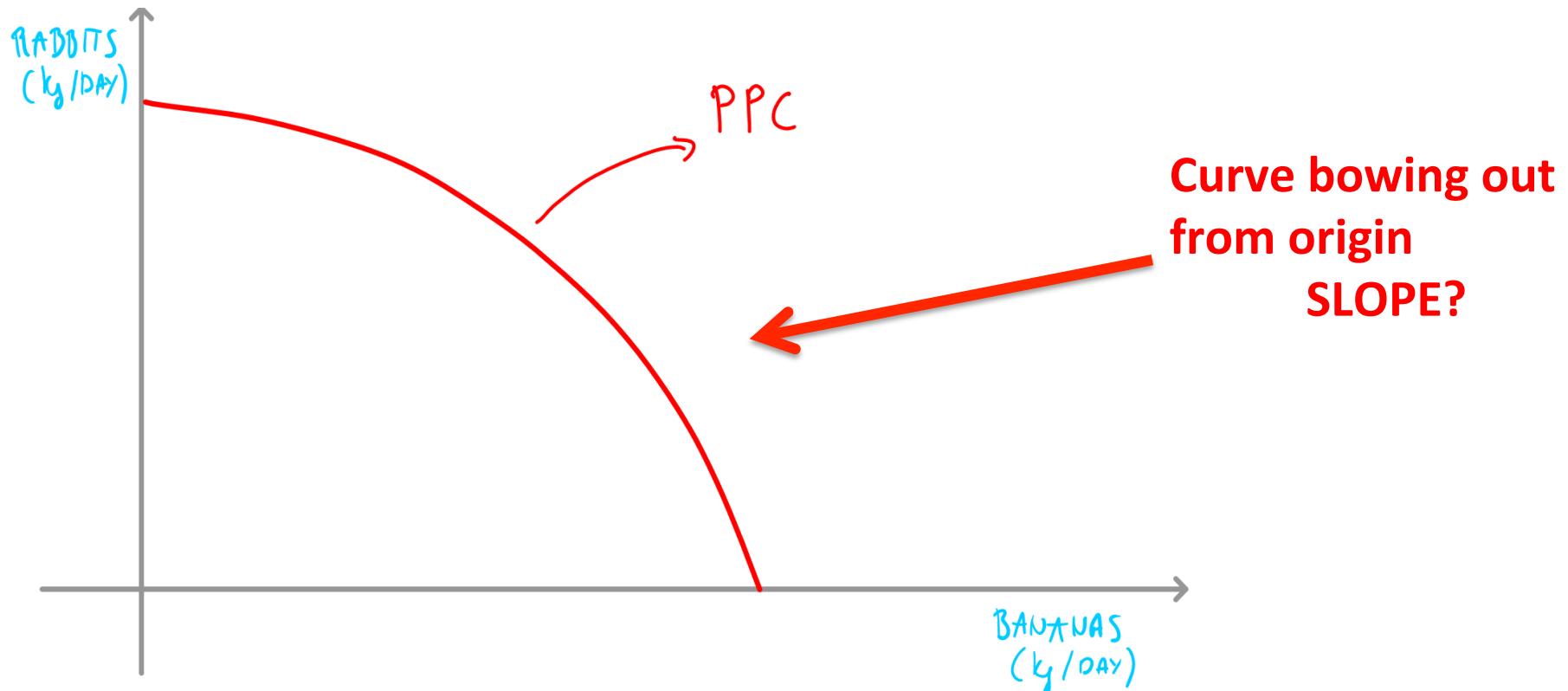
Needs & Wants = Preferences



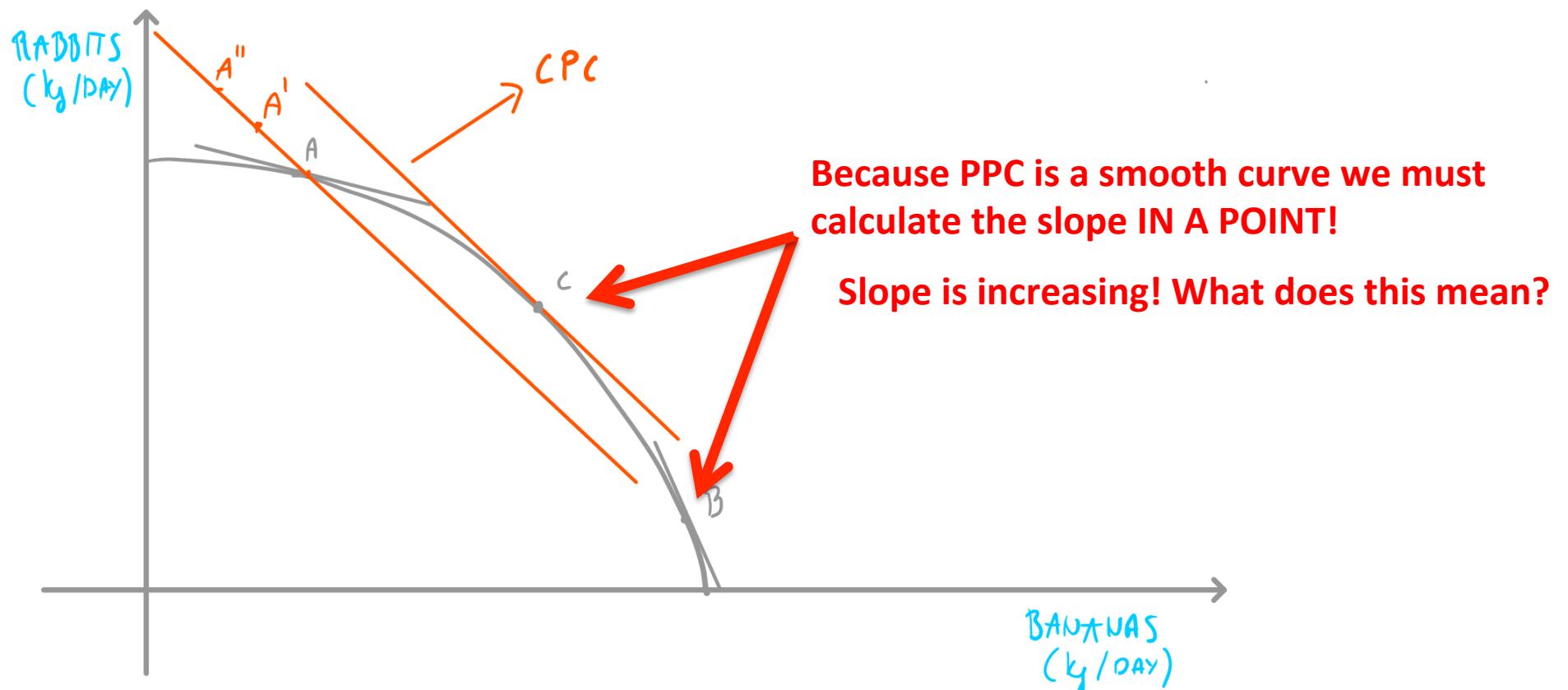
E. Economy-wide PPC in a Many-Agent Economy

Everything we discussed so far still applies! ☺

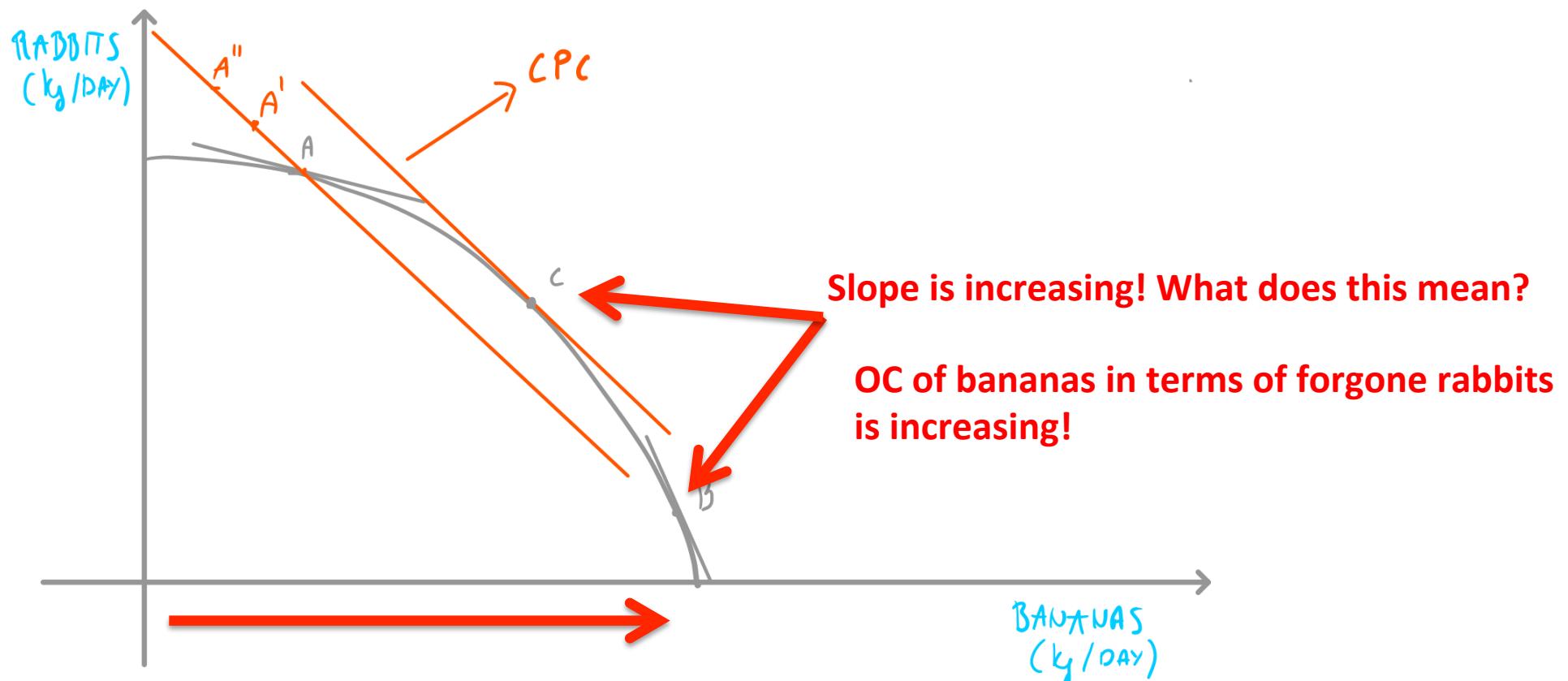
E. Economy-wide PPC in a Many-Agent Economy



E. Economy-wide PPC in a Many-Agent Economy



E. Economy-wide PPC in a Many-Agent Economy



F. Classic Critiques to the Model

We assumed

- **no psychological cost** associated to performing the same activity the entire day → Boredom doesn't kill you!
- **no transaction costs** connected with trading (i.e., negotiation costs, transportation costs, etc)
- **no import quotas or tariffs** → would limit the gains from specialization by making specialization (beyond a certain level) pointless
- **no change in preferences** for goods/services in which a country specializes in and no accounting for social norms that might prevent trading



PLAYCONOMICS

PRINCIPLES OF MICROECONOMICS

