2. Personalized prices (Industrial Organization+Public Economics)

With *private goods*: the same price but different quantities according to the preferences.

Price discrimination by governments

With public good: same level is obtained by all consumers. However, since consumers have different preferences, then efficiency should arise if:

- Assuming that they pay the same price, they should be free to consume different quantities of G (but that cannot be possible by definition)

- Since equal consumption is a condition, then they should be induced to consume this equal amount by letting them to pay different prices.

Price set according the willingness to pay (MRS) of each consumer in order to provide the individual incentive to effectively consume the same level of G

Ex. Consumers with a low valuation of G should pay a price lower than consumers with a high valuation in order to be induced to consume the same quantity

Three-stage (repeated) game

First stage: Government announces the cost share of the public good each consumer must bear

Second stage: consumers observe the government`s choice and set the level of public good they wish.

Third stage: Government observes consumers' decisions and may (or not) provide the public good

Equilibrium strategy (or Lindahl Equilibrium):

Government's strategy:
•**_First stage_**: _announcing the share equal to the $MRS_{G,x}$_
•**_Second stage_**: _doing nothing_
•**_Third stage_**: _providing the level G required by the consumers at the second stage if both have required the same level, otherwise no provision and a new cost-announcement is done_

Consumer's strategy:
•**_First stage_**: _doing nothing_
•**_Second stage_**: _requiring the same level of G at the given cost share._
•**_Third stage_**: _doing nothing_

Focus on the characteristics of the equilibrium allocation:
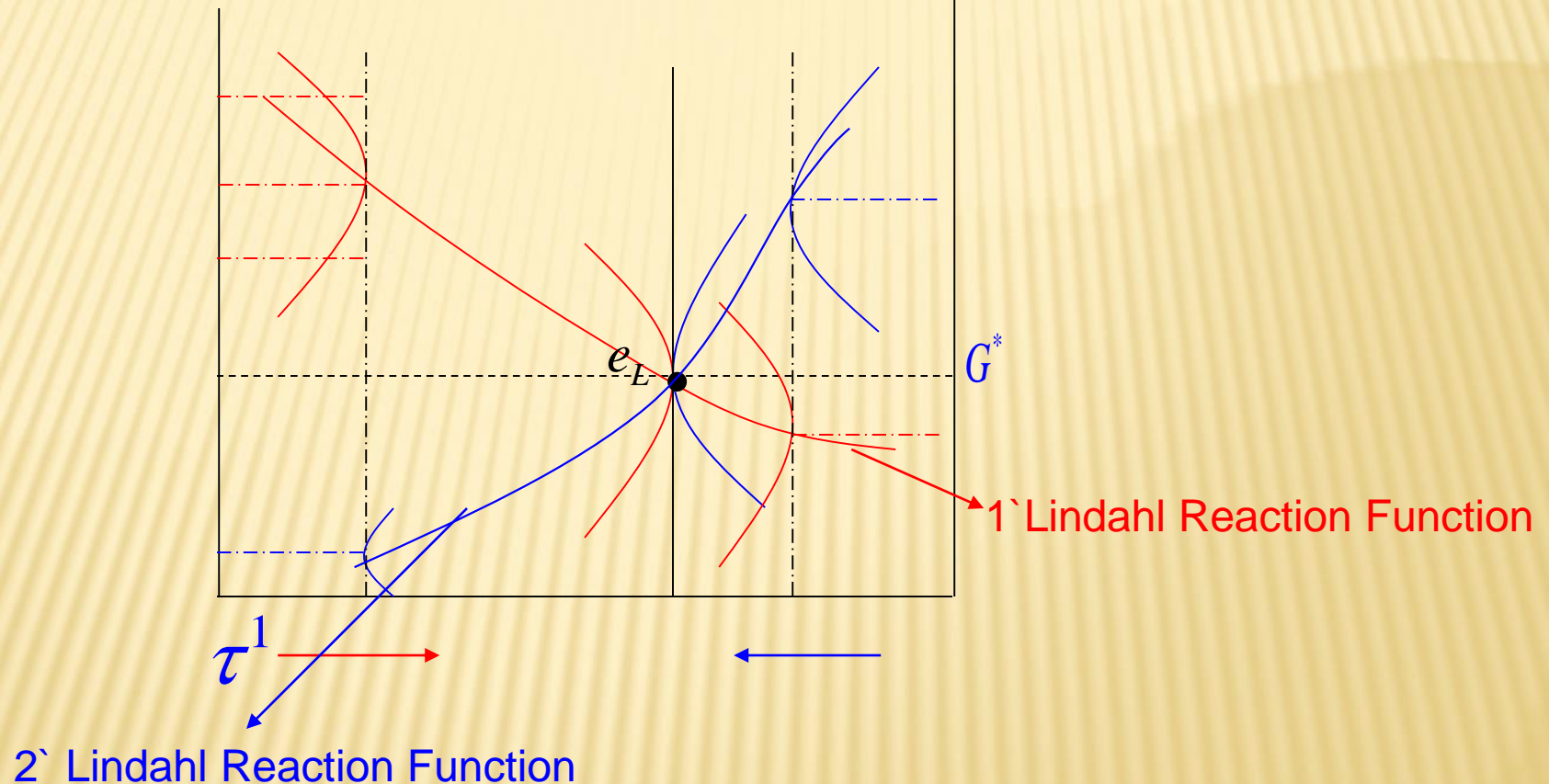
Second stage

$$M^h = x^h + \tau^h G^h$$

$$\sum_{h=1}^{2} \tau^h = 1$$

➤ **Equilibrium with**

The highest possible indifference curve for 1 (2) is northwest (east)

e_L

G^*

1`Lindahl Reaction Function

τ^1

2` Lindahl Reaction Function

Each individual sets his level of G as solution of the following maximization:

$$\max_{G^h} U^h\left(M^h - \tau^h G^h, G^h\right) \qquad h = 1,2 \qquad \text{FOC} \quad \frac{U_G^h}{U_x^h} = \tau^h$$

Summing the FOCs gives the equilibrium condition

$$\frac{U_G^1}{U_x^1} + \frac{U_G^2}{U_x^2} = MRS_{G,x}^1 + MRS_{G,x}^2 = \tau^1 + \tau^2 = 1$$

Lindahl equilibrium strategy is efficient

The marginal benefit for the economy (sum of the each consumer's marginal benefit) is equalized to the marginal cost of public good by the personalized prices

Personalized prices equalize the individual valuations of the public goods to the cost of production in a way that an uniform pricing cannot

Incentives to deviate from the equilibrium strategy:

For consumers:
no incentive to deviate because:
- 1) any different *G* would be on an indifferent curve associated with a lower utility (clearly no longer on the BR),

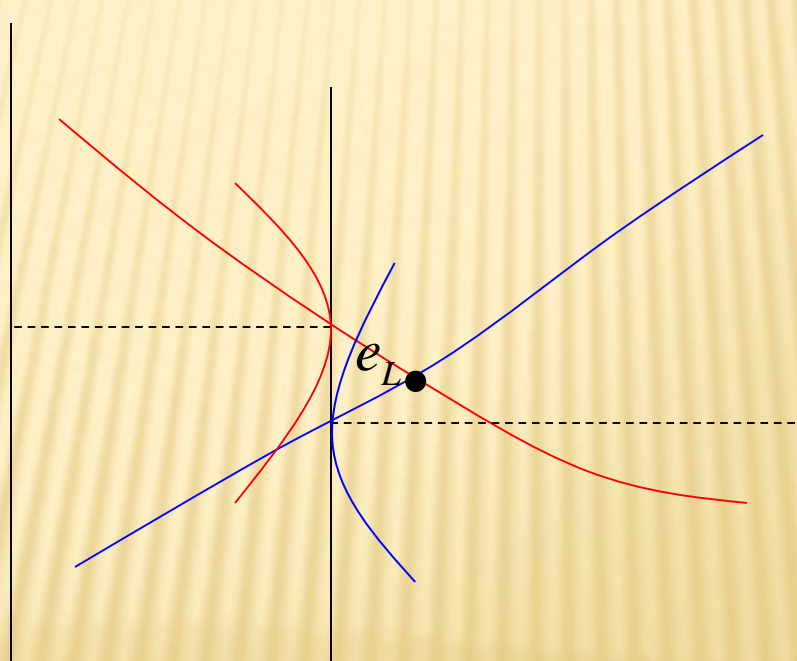- 2) government strategy entails no provision when consumers require different level of *G*
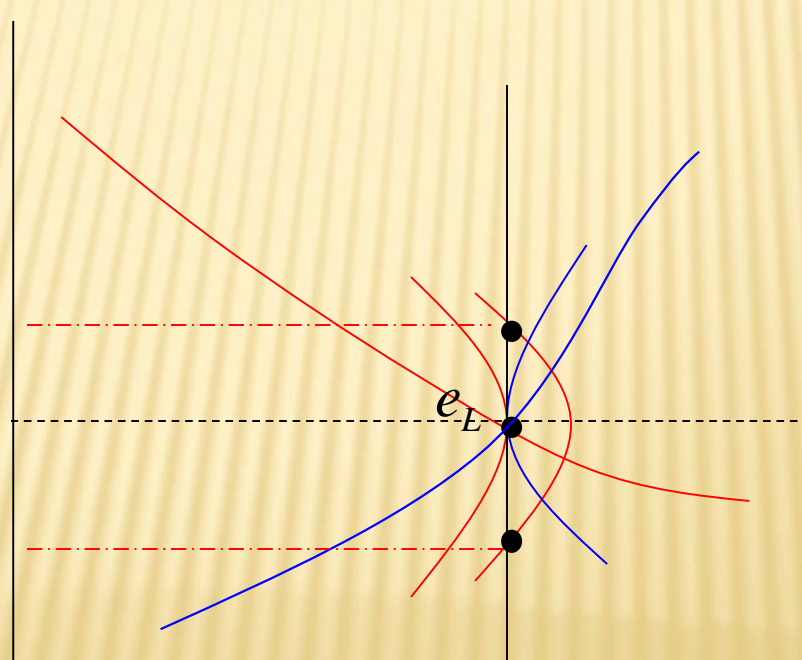
For government:

announcing costs different from the MRSs (from the equilibrium level) implies individuals asking for different level of *G*..

But then..

according to the government strategy, at the third stage no public good will be provided

Example: assume the same valuations for public good, same MRS

$$MRS^1_{G,x} = MRS^2_{G,x}$$

The Equilibrium strategy (or Lindahl Equilibrium) will be:

Government's strategy:
•**First stage**: _announcing the_ same share
•**Second stage**: _doing nothing_
•**Third stage**: _providing the level G required by the consumers at the second stage if both have required the same level, otherwise no provision and a new cost-announcement is done_

Consumer's strategy:
•**First stage**: _doing nothing_
•**Second stage**: _requiring the same level of G at the given share_
•**Third stage**: _doing nothing_

The highest possible indifference curve for 1 (2) is northwest (east)

e_L

1`Lindahl Reaction Function

2` Lindahl Reaction Function
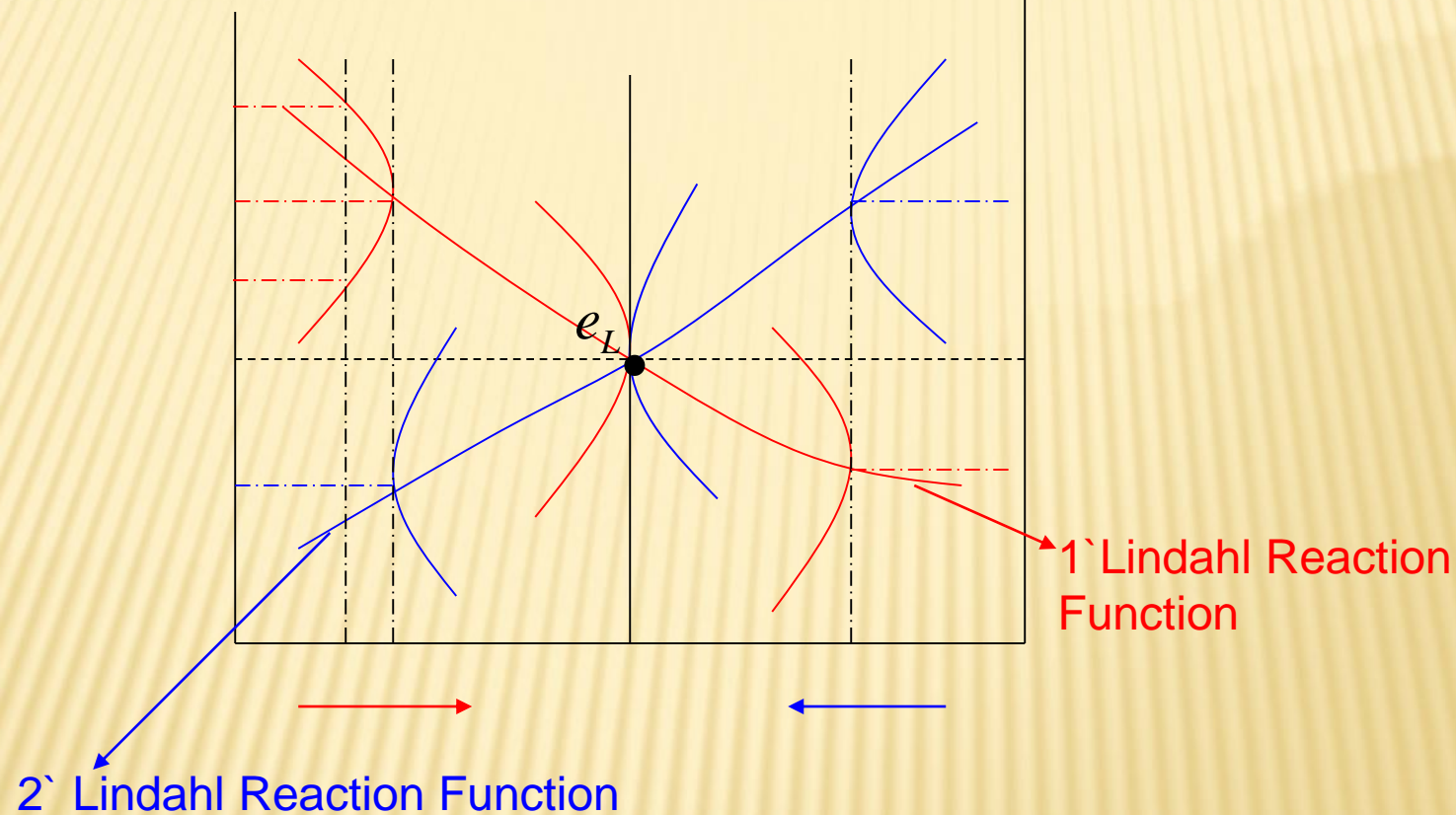
Drawbacks for the personalized prices

1. It could be very difficult determining all the prices in a multi-consumer economy

2. *Asymmetric information* about the consumers` preferences: incentive not to honestly reveal their reaction functions as response to the announcement of the costs share (incentive to announce preferences different from the true ones)

   Assume consumers 1 acts honestly and consumer 2 knows that, and he also knows the reaction function of 1
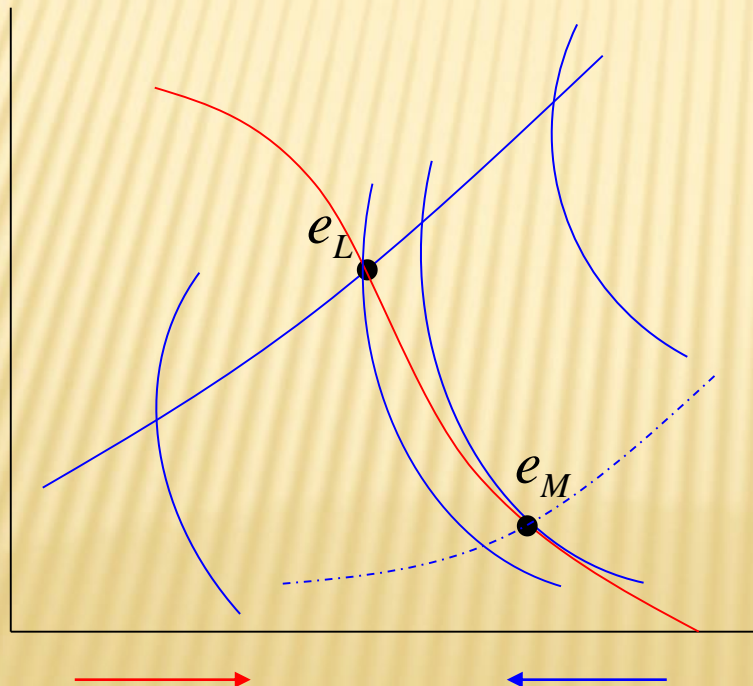
Consumer 2 has the incentive to claim its preferences to be given by the Lindahl reaction dashed line…associate to a lower cost

In e_M consumer 2 is clearly better off than in e_L

e_L

Equilibrium when relaxing the assumption of honest announcement (**<u>underprovision</u>**)
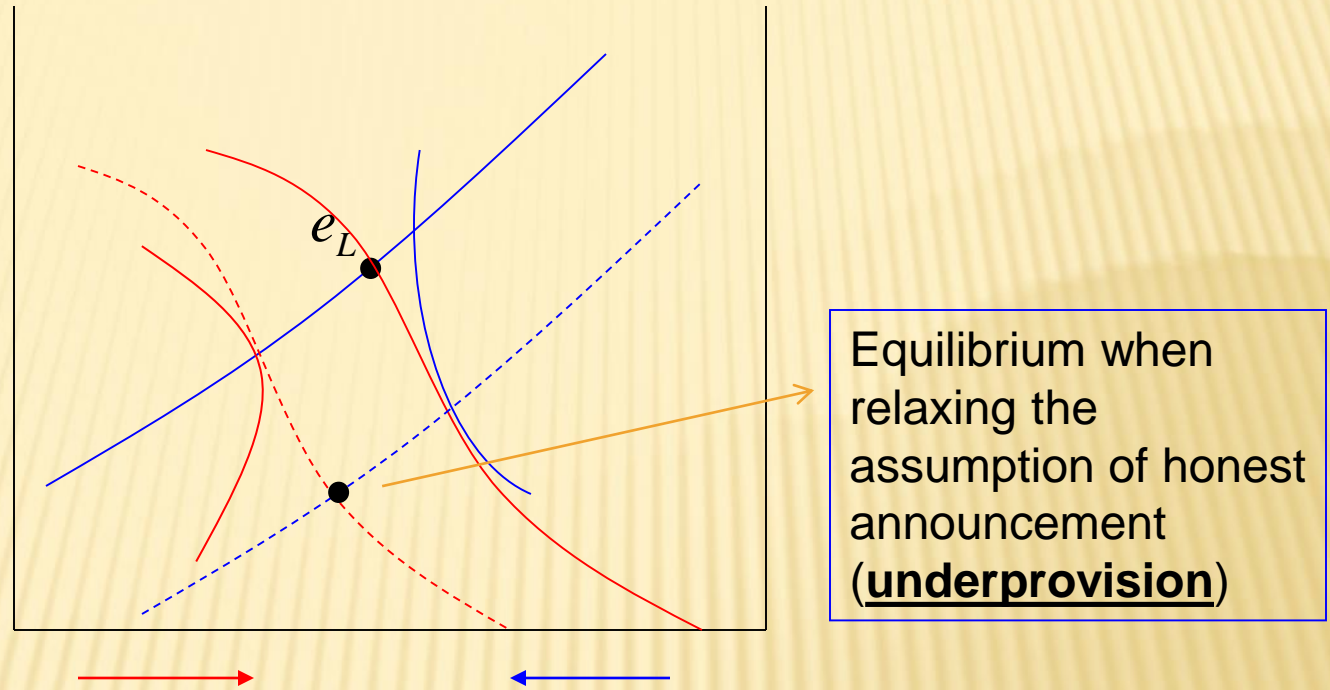
❑ If the government exactly knew the preferences of all consumers (their reaction functions) the Lindahl result would be an equilibrium because the government could detect the dishonest announce and use a punishment enforcing the Lindahl outcome as an equilibrium

❑ But when government doesn't know these preferences the only way to enforce the Lindahl outcome as an equilibrium is assuming the honest announcement (strong assumption)