

Wage Traps as Causes of Income Stagnation in Poor Countries

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Research on wage traps

■ Definition

We speak of a wage trap when the labor market features **multiple equilibria**, one of which generates **labor incomes that fall short of subsistence needs**.

■ Pertinent research in labor economics

Outward sloping labor supply; „S-shaped“, „inverted S“; „Z-shaped“.

e.g. Krueger (1962); Barzel and McDonald (1973); Dessing (2002)

■ Pertinent research in development economics

In context of child labor; emphasis on remedies

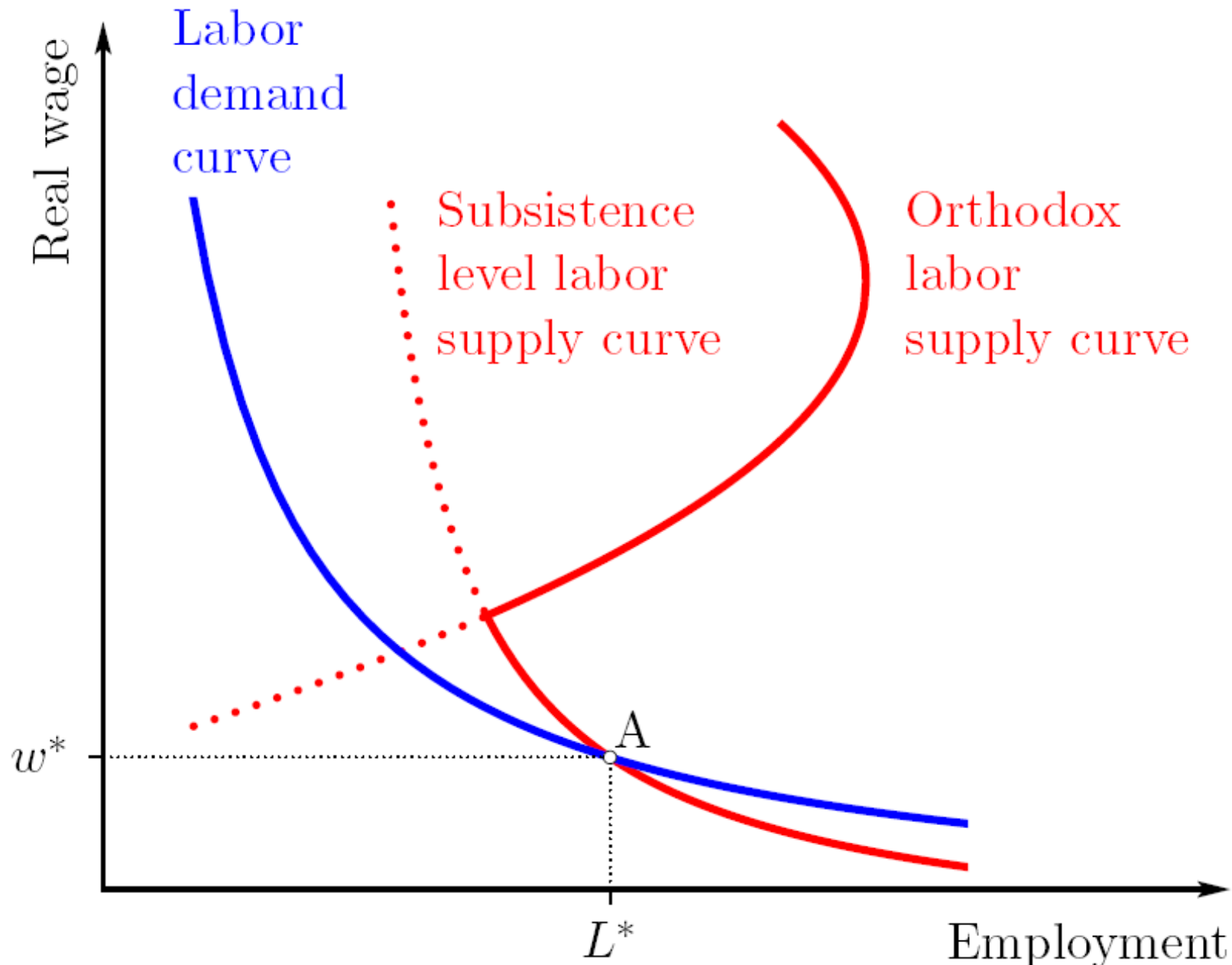
e.g. Basu and Van (1998); Basu (1999); Basu (2000); Dessing (2002)

The general (Z-shaped) labor supply curve

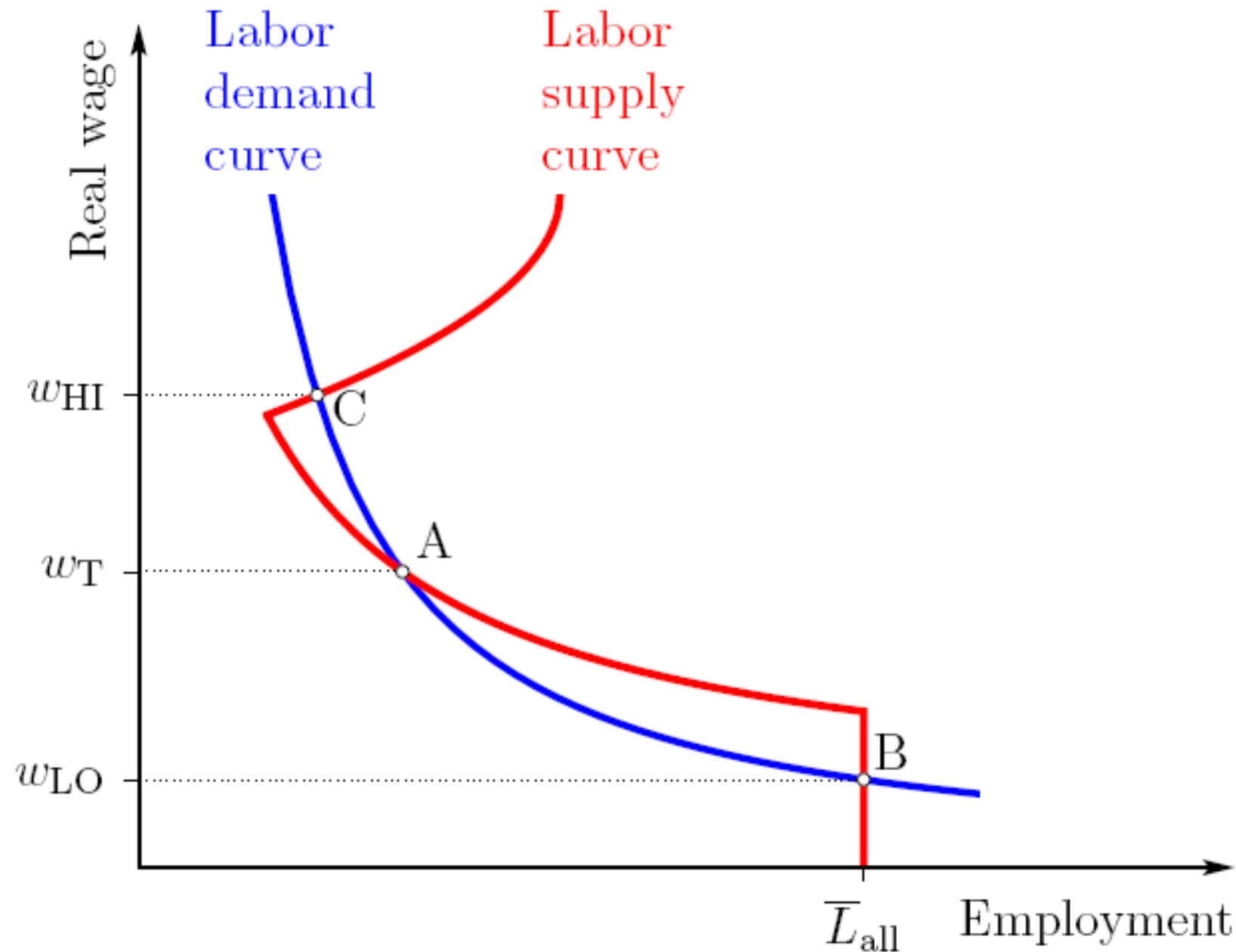
■ Three distinct segments

- backward-bending (negatively sloped at high wage rates)
- normal (positively sloped at medium wage rates)
- outward-sloping (negatively sloped) at subsistence-level labor income

The case of one subsistence-level equilibrium



The case of multiple near-subsistence equilibria



Household utility function (I)

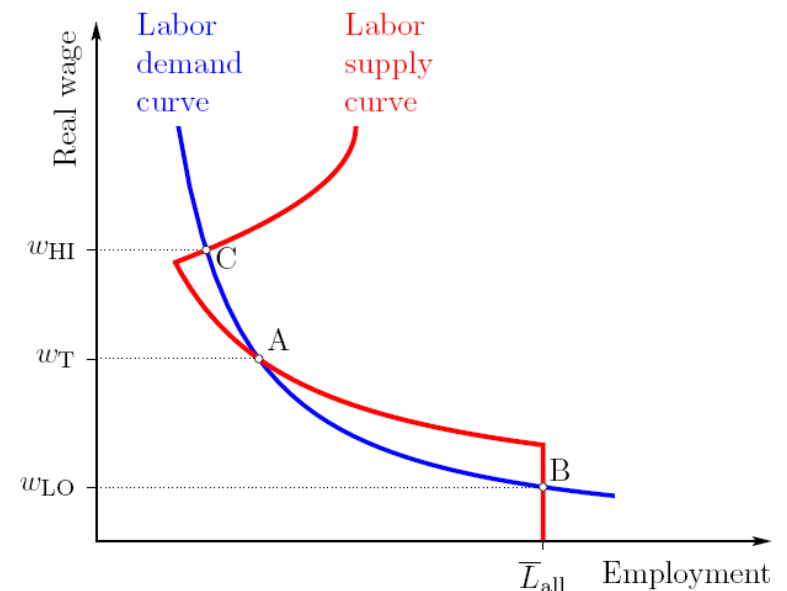
$$U = U(C, \bar{L} - L) \times S$$

$$C = w \cdot L \quad U(\cdot) > 0$$

$$S = \begin{cases} 1 & \text{if } wL \geq \text{MIN} \\ 0 & \text{if } wL < \text{MIN} \end{cases}$$

Problem:
Households are indifferent between all points below subsistence threshold MIN

C	consumption
L	employment
S	survival
w	(real) wage rate
MIN	subsistence level



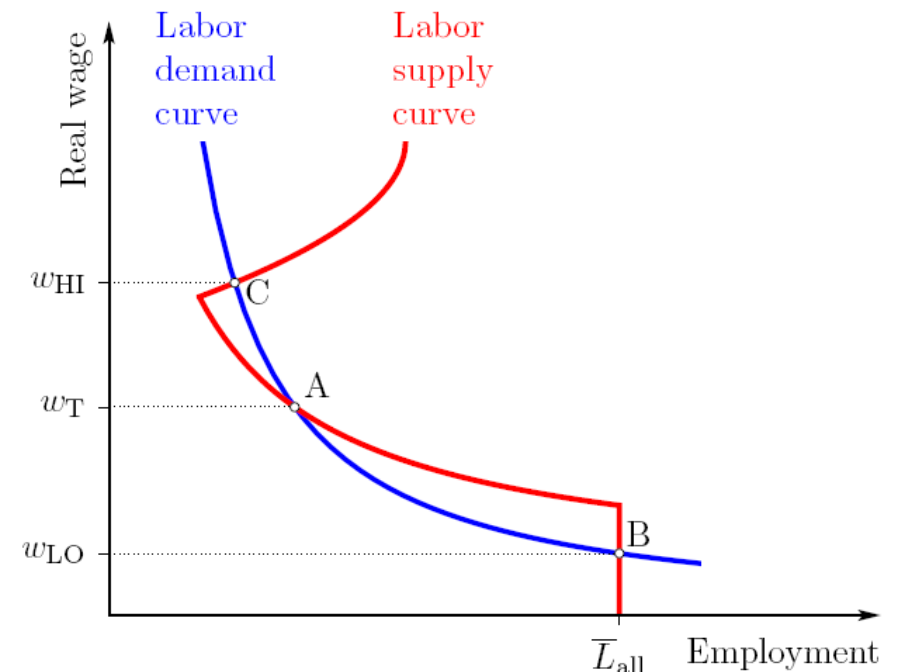
Household utility function (II)

$$U = U(C, \bar{L} - L) \times S + u(wL - \text{MIN}) \times (1 - S)$$

$$C = w \cdot L \quad U(\cdot) > 0 \quad u(0) = 0 \quad u' > 0$$

$$S = \begin{cases} 1 & \text{if } wL \geq \text{MIN} \\ 0 & \text{if } wL < \text{MIN} \end{cases}$$

C	consumption
L	employment
S	survival
w	(real) wage rate
MIN	subsistence level



Household utility function (III)

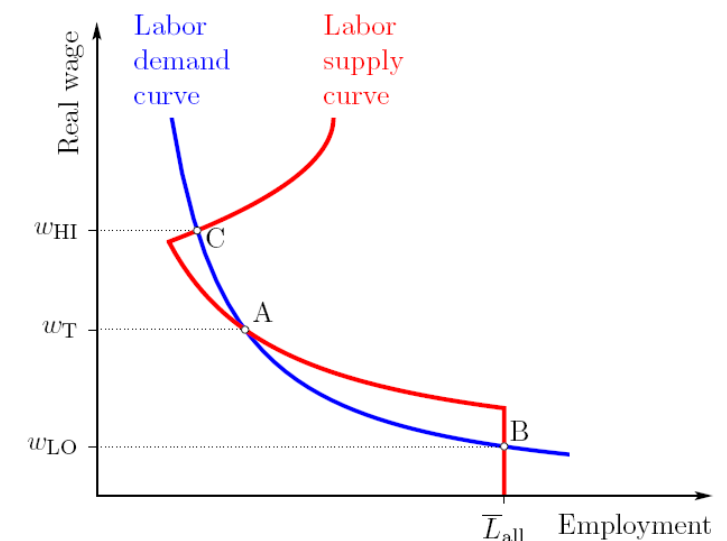
$$U = \int_{t=0}^{\infty} e^{-\delta t} U(C, \bar{L} - L) dt$$

$$U(\cdot) > 0$$

$$C = w \cdot L$$

$$\delta = f(\text{MIN} - wL) \quad f' > 0$$

C	consumption
L	employment
δ	rate of time preference
w	(real) wage rate
MIN	subsistence level



When do wage traps occur?

$$L_S(w^*) = L_D(w^*)$$

supply = demand

$$L'_D(w^*) > L'_S(w^*)$$

instability in equilibrium (1)

$$\varepsilon_S(w) = L'_S(w) \cdot w / L_S(w)$$

wage elasticity of labor supply

$$\varepsilon_D(w) = L'_D(w) \cdot w / L_D(w)$$

wage elasticity of labor demand

$$\varepsilon_D(w^*) > \varepsilon_S(w^*)$$

instability in equilibrium (2)

$$L_S(w) = \text{MIN}/w$$

subsistence-level labor supply

$$\varepsilon_S = -1$$

wage elasticity of labor supply when
subsistence level is parametric

$$\varepsilon_D(w^*) > -1$$

existence condition for wage trap when
subsistence level is parametric

Specific functional forms: Cobb-Douglas

Cobb-Douglas production function

$$Y = F(L) = AL^{\beta} \quad (A > 0, 0 < \beta < 1)$$

Wage-elasticity of labor demand when production is Cobb-Douglas

$$\varepsilon_D = -(1 - \beta)^{-1} < -1$$

When is a subsistence-level equilibrium unstable?

■ Formally:

wage-elasticity of labor supply $>$ wage-elasticity of labor demand

■ Intuitively:

a subsistence-level equilibrium is unstable if labor income falls as we move down the labor demand curve. So either

- Output must fall as we move down the labor demand curve or
- the share of labor income must fall as we move down labor demand.

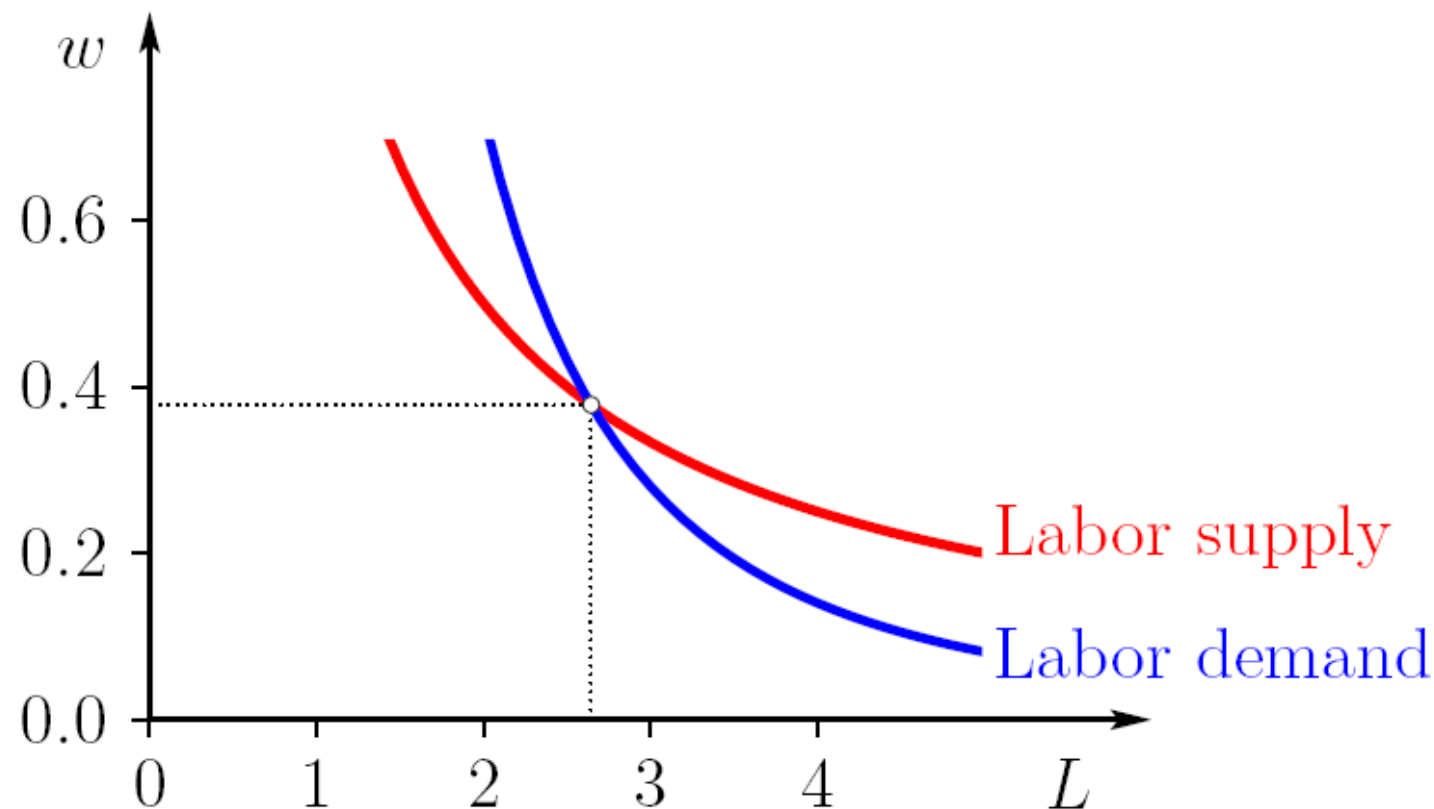
■ Does not hold when production function is Cobb-Douglas

see graphical thought experiment

Specific functional forms: CES

Parameter constellations exist that generate wage traps when the production function is CES.

Example:



Modifications to Cobb-Douglas scenario that make wage traps more likely

■ Modifications to labor supply

$$\text{MIN}(L) = \lambda \cdot L^\lambda \quad (\lambda, \gamma, L > 0)$$

$$\varepsilon_S^{-1} = -1 + \gamma > -1$$

Wage trap occurs whenever $\gamma > \beta$

Modifications to Cobb-Douglas scenario that make wage traps more likely

■ Modifications to demand side

$$F(L) = A(E \times L)^\beta$$

Cobb-Douglas with labor efficiency

$$E = w^\alpha$$

Labor efficiency depends on wage rate

$$L = \left(\beta A w^{\alpha\beta-1} \right)^{\frac{1}{1-\beta}}$$

Labor demand

$$\varepsilon_D = -\frac{1 - \alpha\beta}{1 - \beta}$$

Wage elasticity of labor demand

$$\alpha = 0$$

standard case; no wage trap

$$\alpha > 1$$

wage trap possible

$$\alpha = 1/\beta$$

wage trap disappears; efficiency wage scenario kicks in

Modifications to Cobb-Douglas scenario that make wage traps more likely

■ Modifications to demand side

$$F(L) = A(E \times L)^\beta$$

Cobb-Douglas with labor efficiency

$$E = \frac{w^\alpha}{L^\delta}$$

Labor efficiency depends on wage rate

Labor demand

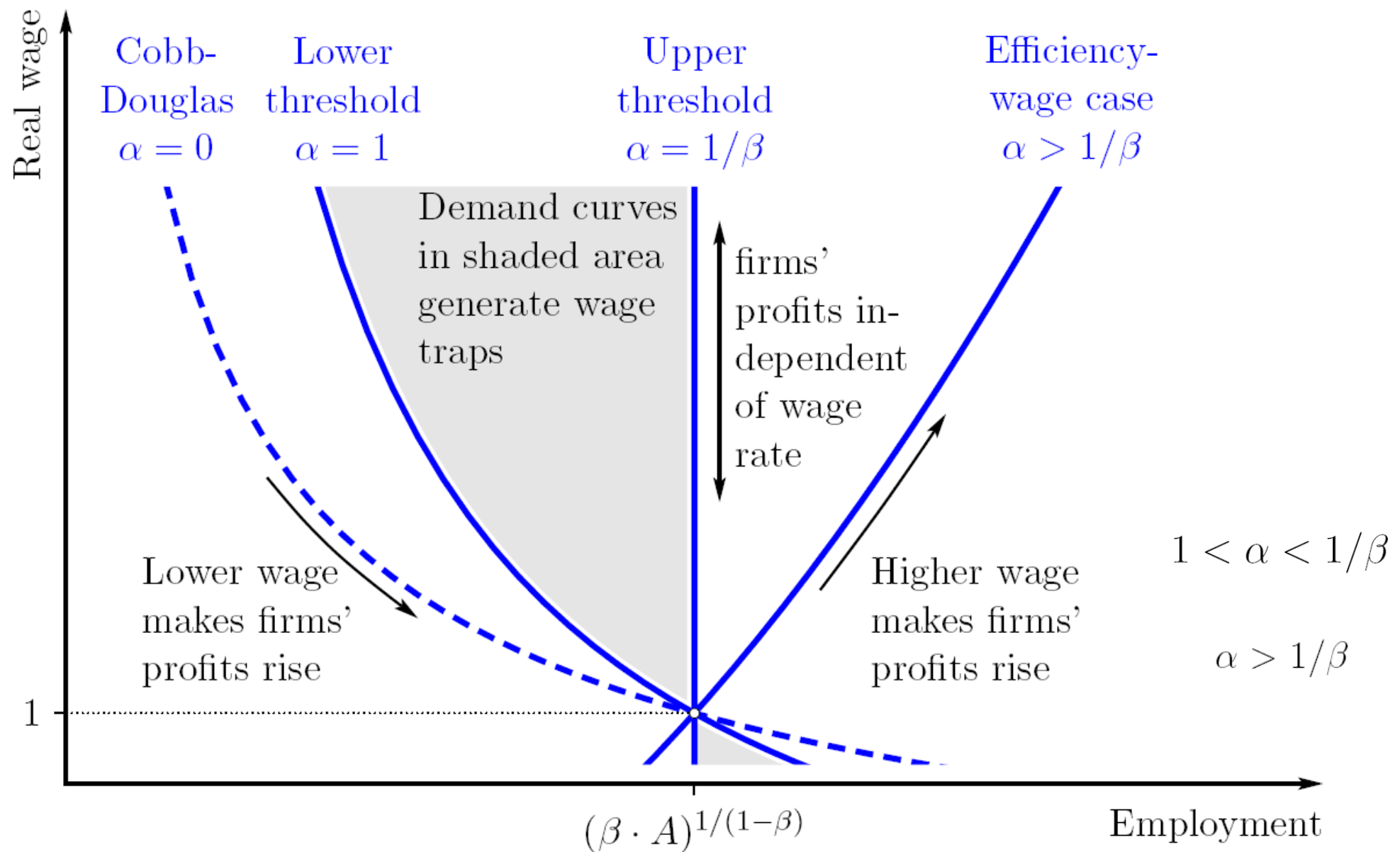
$$\varepsilon_D = -\frac{1 - \alpha\beta}{1 - (1 - \delta)\beta}$$

Wage elasticity of labor demand

$$1 - \delta < \alpha < 1/\beta$$

Wage trap possible

Efficiency wages and wage traps



Policy implications

■ Foreign aid

Needs to be substantial (big push); takes long time for effects to materialize

■ Banning child labor

Effective! Family income rises immediately. Schooling improves human capital.
BUT family income remains trapped below subsistence!

■ Minimum wage laws

Highly effective. Rises family incomes and improves schooling. May generate escape from wage trap. Effect on child labor may be less direct.

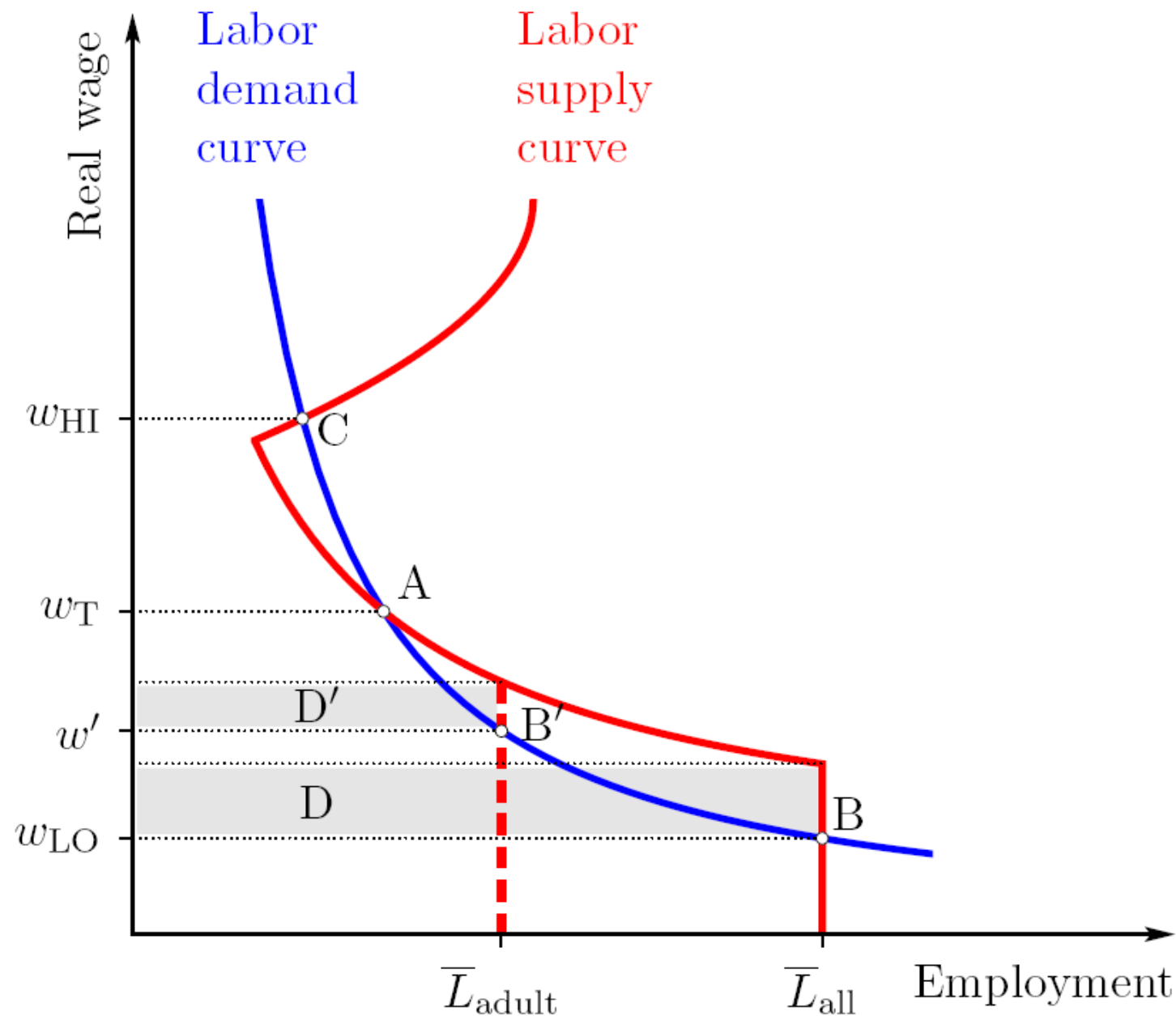
■ Labor unions

May prevent labor market from falling into wage trap. Removes incentives for child labor. BUT may generate involuntary unemployment.

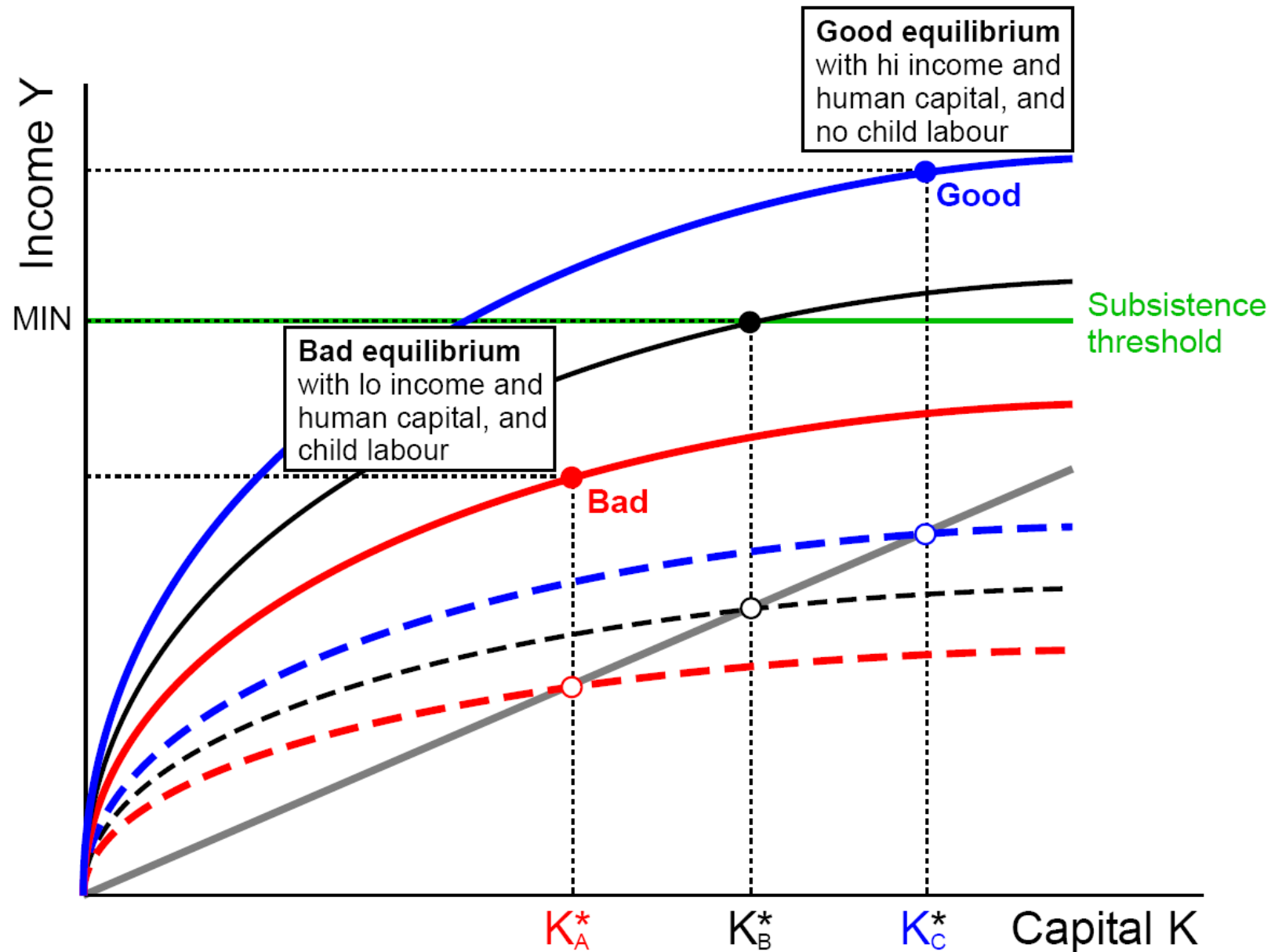
■ Fair trade agreements

May spur or facilitate above measures, with similar effects.

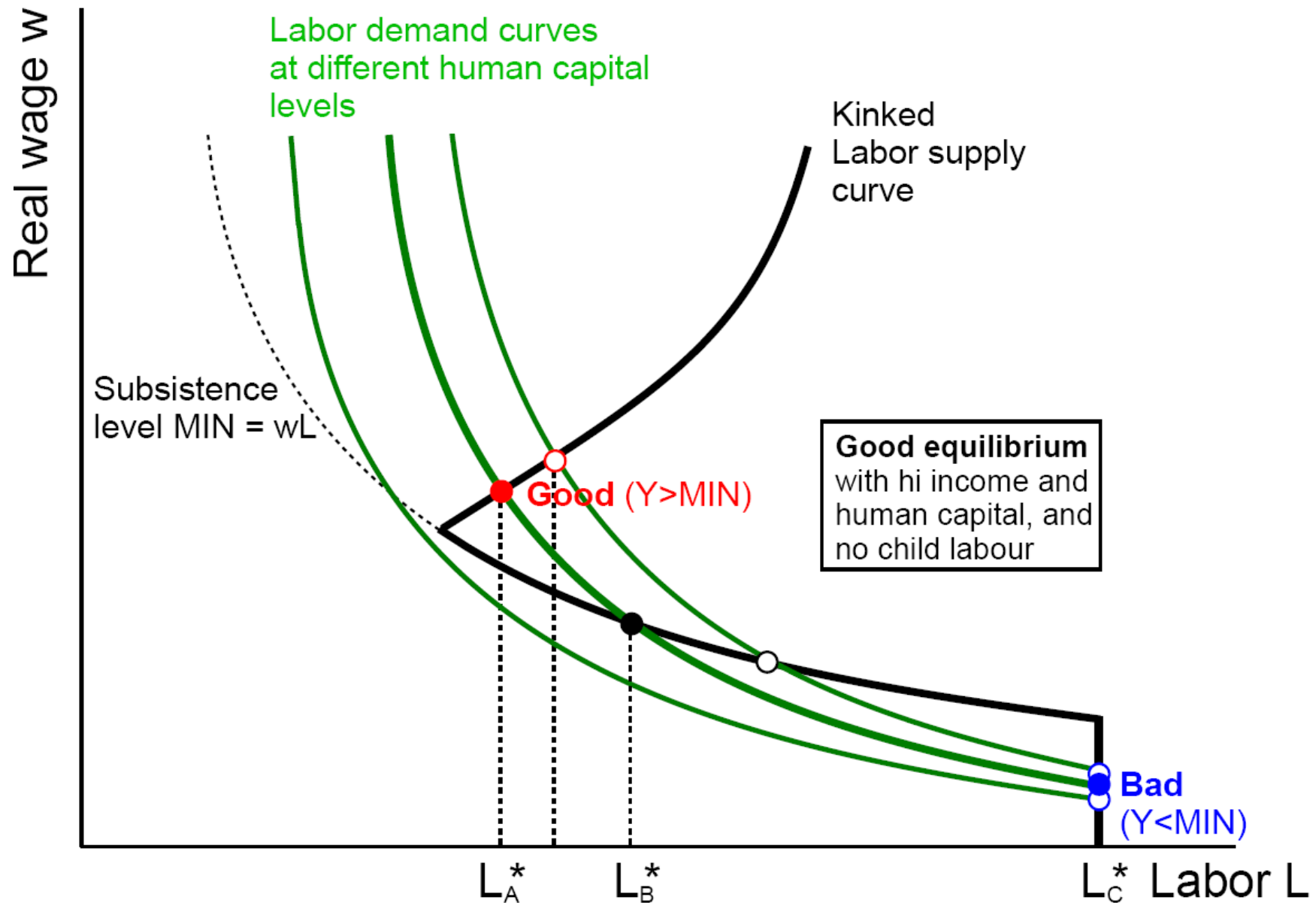
A ban on child labor or a minimum wage



From labor market to Solow model

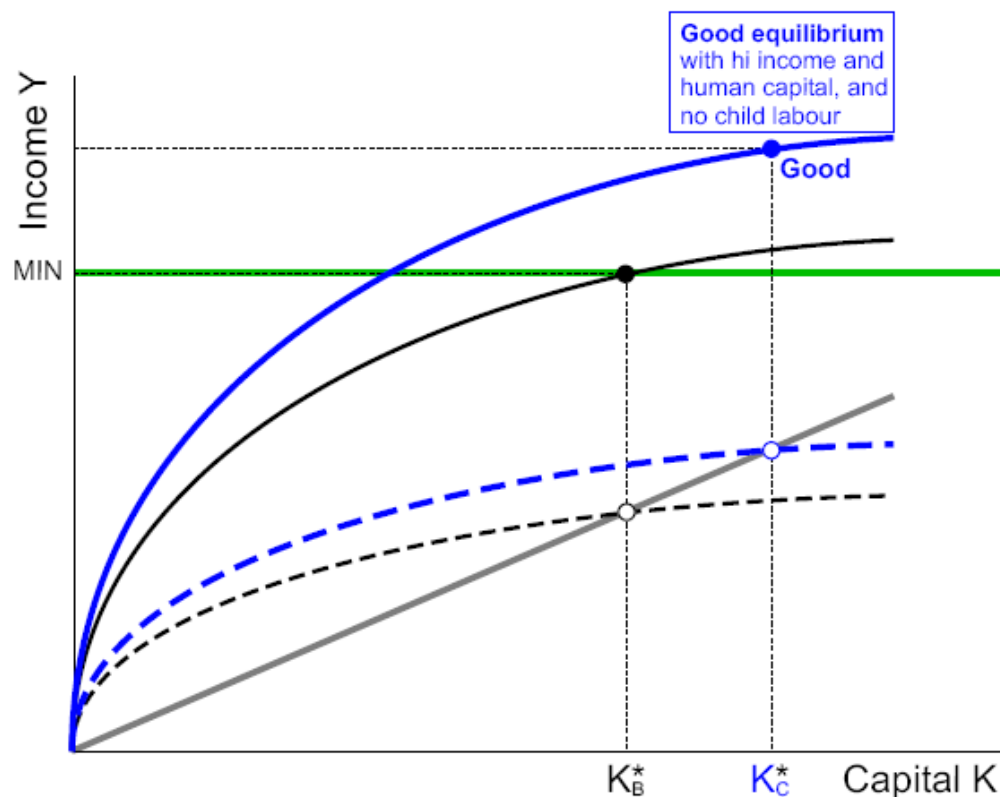


Labor market dynamics

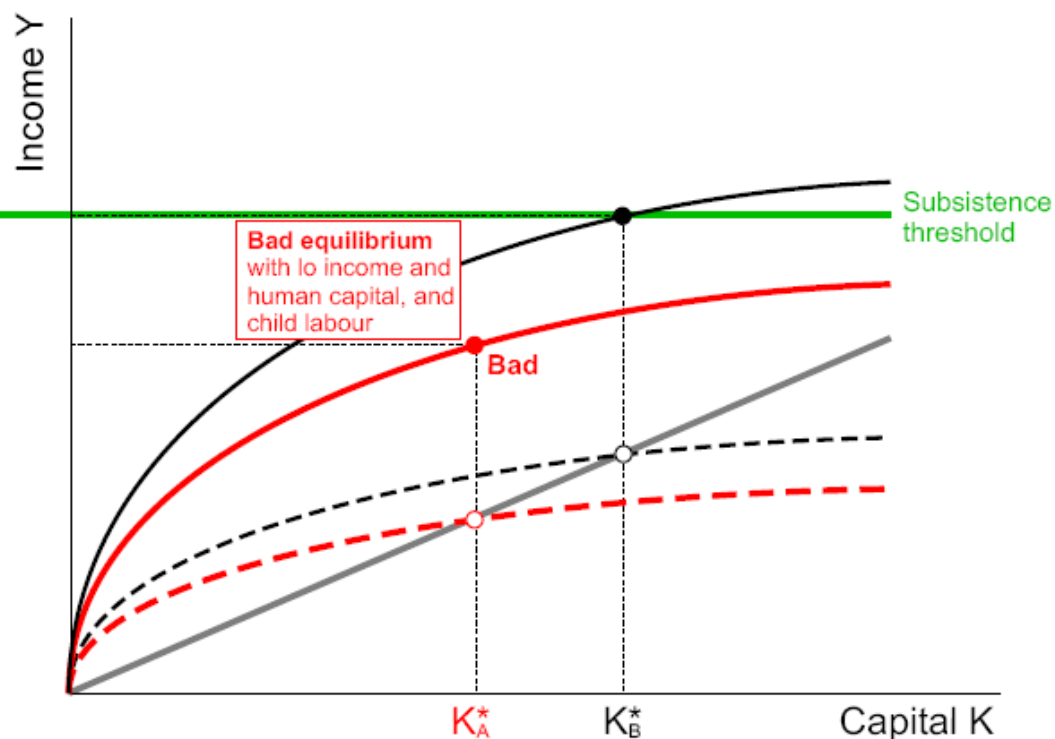


Two identical countries with different histories

May international capital flows help?



One country in good equilibrium



One country stuck in wage trap

Main results

- Outward-sloping labor supply curves near subsistence levels do not necessarily generate multiple equilibria and wage traps.
- Wage traps cannot occur in scenarios with parametric subsistence levels and conventional Cobb-Douglas production.
- Wage traps may occur under three stylized scenarios:
 - A. When labor income falls as we move down the labor demand curve.
 - A1. This may happen when income increases while the share of labor income falls.
 - A2. It may also happen at constant labor income shares, as in Cobb-Douglas, when labor efficiency falls when the wage rate falls.
 - B. When subsistence needs are not parametric, but rise with employment.
- In the presence of wage traps, labor market features such as minimum wages or monopolistic trade unions may appear in a new light.
- Wage traps may translate into poverty traps in neoclassical growth models and affect growth paths in models of endogenous growth.