Wage Traps as Poverty and Distribution Traps in Neoclassical and Endogenous Growth Models

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Contribution of this paper

- Spell out conditions under which wage traps occur (as done in Gärtnér and Gärtnér (2008))
  - regarding labor demand
  - regarding labor supply
- Trace macroeconomic consequences (focus on poverty traps and related issues)
  - in neoclassical growth models
  - in endogenous growth models

Wage traps

- Definition
  We speak of a wage trap when the labor market features multiple equilibria, one of which generates labor incomes that do not exceed subsistence needs.

- Pertinent research in labor economics
  Outward sloping labor supply, „S-shaped“, „inverted S“, „Z-shaped.“
  e.g. Krougor (1992); 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); Gärtnér and Gärtnér (2008)
Poverty traps

- Definition
  Multiple macroeconomic steady states featuring distinctly different, path-dependent levels of aggregate income.

- Causes
  - Production function that violates Inada conditions
  - Non-parametric savings or fertility rates
  - Imperfections in credit markets

- Links to wage traps
  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
  1. normal (positively sloped) at medium wage rates
  2. backward-bending (negatively sloped) at high wage rates
  3. outward-sloping (negatively sloped) at subsistence-level labor income

One subsistence-level equilibrium

- Labor demand curve
- Subsistence level labor supply curve
- Orthodox labor supply curve
- Employment
- Real wage
**Multiple near-subsistence equilibria**

![Graph showing labor demand and supply curves with points A, B, and C indicating equilibrium states.]

**Generic conditions for wage traps**

- \( I_S(w^*) = I_D(w^*) \)  
  - 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)

**Specific functional forms**

- **Labor demand**
  - Cobb-Douglas production function
    \( Y = F(L) = AL^\beta \) \( (A > 0, \ 0 < \beta < 1) \)
  - Wage-elasticity of labor demand when production is Cobb-Douglas
    \( \varepsilon_D = (1 - \beta) / \beta < 1 \)

- **Labor supply**
  - Parametric subsistence level of labor income
    \( wL = MIN \)
  - Wage-elasticity of labor supply when subsistence level is parametric
    \( \varepsilon_S = -1 \)
Modifications to Cobb-Douglas scenario that foster wage traps

- Modifications to labor supply
  \[ MIN(L) = \lambda L^{1/\gamma} \]  
  \[ \varepsilon^{-1} = -1 + \gamma > -1 \]  
  Wage trap occurs whenever \( \gamma > \beta \)

- Modifications to demand side
  \[ F(L) = A(L \times L)^{\beta} \quad \text{Cobb-Douglas with labor efficiency} \]  
  \[ F = \eta^B \quad \text{Labor efficiency depends on wage rate} \]  
  \[ L = (\beta A \alpha^{\beta-1})^{1/\beta} \quad \text{Labor demand} \]  
  \[ \varepsilon_D = \frac{1 - \alpha}{1 - \beta} \quad \text{Wage elasticity of labor demand} \]  
  \( \alpha = 0 \) standard case; no wage trap  
  \( \alpha > 1 \) wage trap possible  
  \( \alpha = 1/\beta \) wage trap disappears; efficiency wage scenario kicks in

Efficiency wages and wage traps
Wage traps in Solow model: assumptions

- Active population comprises workers and owners of capital stock
  - workers do not save
  - capital owners save a constant fraction of their income

- Closed economy; no government
  - savings are a constant fraction of income
  - investment equals private saving

Wage traps in Solow model: case 2
Efficiency wages and wage traps

Main results

- Wage traps cannot occur in scenarios that combine parametric subsistence levels with conventional Cobb-Douglas production.
- There is no such thing as the wage trap. Wage traps may occur under three stylized scenarios:
  1. When labor income falls as we move down the labor demand curve.
     A. This may happen when income goes up while the share of labor income falls.
     B. It may also happen at constant labor income shares, as in Cobb-Douglas, when labor efficiency drops when wage rate falls.
  2. When subsistence needs are not parametric, but rise with employment.
     - Wage traps may translate into poverty traps in neoclassical growth models and affect growth paths in models of endogenous growth if they are of type 1A or type 2.
     - Wage traps may also translate into distribution traps in neoclassical growth models and affect growth paths in models of endogenous growth if they are of type 1B.