Growth, Environment and Urban Unemployment in the Developing Economy

Ichiroh Daitoh

Tohoku   University

Motivation

LDC Governments have pursued economic growth to reduce domestic poverty.

Since the middle of 1990s, a growing number of economists and policymakers have begun to discuss environmental problems in developing countries by taking into account its close relationship to poverty reduction.

e.g.(1) The UNCSD suggested in 1996 that they would focus attention on the links between poverty and the environment. (Rao (2000), p.254)

(2)The World Bank regards environment as a basic factor for poverty reduction. (*Environmental Strategy Notes No.4: Mainstreaming Environ- ment in Poverty Reduction Strategies, August 2002*)

As Poverty specific to LDCs, Urban Unemployment has been focused on in Development Economics Literature.

From an Environmental viewpoint,
Urban Unemployment has begun to receive considerable attention.
  e.g. Rao (2000) , Barbier (2002)

In the existing literature on environmental policies in Harris-Todaro economy, little attention has been paid to the Effects of Economic Growth on Environmental quality and Conditions for Welfare Improvement.
    e.g. Dean and Gangopadhyay (1997)
        Batabyal (1998)
        Chao, Kerkvliet and Yu (2000)

Batabyal and Beladi (2002)

Lee and Batabyal (2002)

Daitoh(2003)

This Paper

Effects of Population Growth and

Urban Capital Accumulation on

Manufacturing Employment

Urban Unemployment

Pollution

GDP

Welfare

in a small open Harris-Todaro model with

a Polluting Urban Manufacturing sector.

Similar results to Khan (1982) but

Economically Different Conditions and

New Results about Environment

Small Open HT Model with Pollution

Constrained Factor Demand Functions

$$L_m = c_w(w_m, r, \tau)y \qquad (1)$$

$$K = c_r(w_m, r, \tau)y \qquad (2)$$

$$Z = c_\tau(w_m, r, \tau)y \qquad (3)$$

Zero-profit Condition

$$p = c(w_m, r, \tau) \qquad (4)$$

Labor Allocation

$$L_m + L_u = L_c \qquad (5)$$

$$L_x + L_c = L \qquad (6)$$

Rural Wage

$$w_x = f'(L_x) \qquad (7)$$

Harris-Todaro Condition

$$w_x = \frac{w_m L_m}{L_c} \qquad (8)$$

Pollution in Utility Function

$$U = U(D_x, D_y, Z) \quad \text{:homothetic in } D_x \text{ and } D_y$$

Basic Results

Proposition 1 (Corden and Findlay(1975))

Population Growth L

Urban Equilibrium Not affected

r=const.　　L_m^*,　y^*,　Z^*

Given L_x,　$w_x > \dfrac{w_m L_m}{(L-L_x)}$

L_x　　　$w_x \downarrow$　　　$(L_m / L_c) \downarrow$　　　L_c

Capital Accumulation K

$p = c(w_m, r, \tau)$:　　r=const.

$K = c_r(w_m, r, \tau) y$　　　y

$L_m = c_w(w_m, r, \tau) y$:　L_m　　　　　w_x

$Z = c_\tau(w_m, r, \tau) y$　　Z

Urban Unemployment

Proposition 2

    Population Growth L $L_m{}^*$=const.

    Capital Accumulation K L_m

  When L_m ,

$$L_u \downarrow \qquad \eta_x > \frac{w_m - w_x}{w_x}$$

$$where \quad \eta_x = (L_c / w_x)(dw_x / dL_c)$$

\<Implication\>

$$\left| f''(L_x) \right| > \frac{w_m - w_x}{L_c} \qquad \text{New !}$$

(1) Rural technology exhibits

          Strong Diminishing Returns.

(2) Degree of Urbanization is High.

Proposition 3 (Pollution)

    Population Growth L Z=const.

    Capital Accumulation K Z

Increase in GDP

Proposition 4 (GDP)

   Population Growth L　　$G = x + py$

   Capital Accumulation K　　G

     "K　GDP　"

     $p > \Gamma(L_x, w_m) c(w_m, r, \tau)$

     where

$$\Gamma(L_x, w_m) = \frac{w_m}{1 + L_c \, |f''(L_x)/f'(L_x)|} > 0$$

<Implication>

   (1) Rural technology exhibits

        Strong Diminishing Returns.

   (2) Degree of Urbanization is High.

\<Intuition\>

- K　　　L_m　　　　$w_x = f'(L_x) < \dfrac{w_m L_m}{L_c}$

　　　　$L_x \downarrow$　　x

　　　　$y \uparrow$　and　$x \downarrow$

- For a small decrease in x,

　　w_x　should rise rapidly.

　　$\left| f''(L_x) \right|$　should be large.

　　Strong Diminishing Returns to labor

Welfare Changes

Proposition 5 (Welfare)

    Population Growth L Welfare

    Capital Accumulation K Welfare

$$\frac{dV}{dK} = \frac{U(\phi(p,Z),1,Z)}{p+\phi(p<Z)}\left[\frac{dG}{dK}\right] + D_y U_Z\left[\frac{dZ}{dK}\right]$$

$$+ D_y\phi_Z(p,Z)\left[U_x(\phi(p,Z),1,Z) - \frac{U(\phi(p,Z),1,Z)}{p+\phi(p,Z)}\right]\left[\frac{dZ}{dK}\right]$$

    =GDP effect + Pollution Disutility

        + MRS effect

MRS effect should not be ignored.

1. Separable Utility Function is unrealistic.

2. Empirical Research rests on non-separable

    utility.

Immiserizing Growth

$\dfrac{dG}{dK} < 0$ and MRS effect<0   Welfare

Role of $\phi_Z(p,Z) > 0$

An increase in pollution raises the relative demand for clean (rural) product.

Welfare can improve.

LDC government will have an incentive to promote Capital Accumulation in the Urban Manufacturing even if it increases pollution.

A tendency toward "Greener Consumer" may give the government an incentive for polluting urban capital accumulation.

Conclusions

Small Open Harris-Todaro Model

   Population Growth

   Urban Capital Accumulation

   Sufficient   Conditions   for   Welfare
Deterioration (Improvement)

   (1) Diminishing Returns to Rural Labor

   (2) Degree of Urbanization

   (3) MRS effect of Pollution Externality

Future Research

   1. Intersectoral Capital Mobility

   2. Endogenous Wage Determination

   3. Dynamic Growth Model