Immigration in Less Developed Countries:
A Theoretical Note

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Abstract

The effects of an inflow of immigrant labour force on unemployment and social welfare are analyzed in a Harris-Todaro economy. It is shown that an inflow of immigrant labour force lowers unemployment, improves the income-distribution and raises the social welfare if there is perfect capital-mobility between the urban sector and the rural sector. But the results will be opposite to these in the non-shiftable capital model.

I. Introduction

Less developed countries often supply labour to the developed economies and this international migration has received special attention in the theoretical literature of trade and development.[1] But there is another type of international migration from one less developed economy to another less developed economy – the inflow of illegal immigrants. No doubt, the issue is more political than economic. Government of India is very serious to restrict the inflow of illegal immigrants from two of the neighbouring coun-

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1. See, for example, Bhagwati and Rodriguez [1976], Djajiac [1986], Quibria [1988], Rivera-Batiz [1982, 1984], Thompson [1984], *etc.*

tries – Bangladesh and Nepal. In this paper, we want to analyse the conse-
quences of this immigration problem from the economic view-point.

An inflow of immigrants into a country enlarges its labour endowment
and the less developed countries generally suffer from the unemployment
problem. Does this immigration affect the social welfare? We attempt to
answer these questions using a two-sector general equilibrium model of a
less-developed economy – a Harris-Todaro model which can explain unem-
ployment as an equilibrium phenomenon.

In the section II of the paper, we consider a mobile capital Harris-Todaro
model of Corden-Findlay [1975] type. Here the factor prices and the urban
employment rate (urban unemployment as a ratio to urban employment)
remain unchanged when the size of the labour force is increased. So the
national income (total factor-income) remains unchanged if the immigrants'
income is remitted. However, the labour intensive rural sector expands and
the capital-intensive urban sector contracts. So given the urban unemploy-
ment-rate, the absolute level of unemployment is reduced.

In the section III, we consider the non-shiftable capital Harris-Todaro
[1970] model. The increase in the labour-endowment raises rural sector's
employment, lowers the wage-rate and raises the level of urban unemploy-
ment. National income is also reduced when the immigrants' income is
remitted.

In the Harris-Todaro model there are three different income-groups: (i)
the urban sector workers who earn a high wage rate; (ii) the rural sector
workers earning a relatively lower but positive wage rate; and (iii) the
unemployed workers in the urban sector who do not earn anything.[2] So,
there exists a positive degree of inequality in the distribution of income of
the workers. The welfare measure of Sen [1974] defined as the mean
income multiplied by one minus the Gini-coefficient of the income-distribu-
tion, should be an appropriate welfare measure in the Harris-Todaro model.
In the mobile-capital model, the mean income (equal to the rural wage rate)
remains unchanged and the inequality is reduced when the inflow of immi-

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2. Sometimes, the unemployed workers join the urban informal sector and earn a posi-
   tive wage-rate lower than the rural wage-rate. However, this does not affect the major
   results of the paper.

grants takes place. So the society enjoys an welfare improvement. But the results will be reversed in the non-shiftable capital model.

II. The Mobile Capital Harris-Todaro Model

A. The Model

The economy considered in this model is a small open one and its internal structure is described by the Corden-Findlay [1975] version of the mobile capital Harris-Todaro model. There are two sectors – rural and urban; and the terms of trade is exogenously given and is normalized to unity. Both the sectors have CRS production-functions with capital and labour as inputs. Domestic labour and immigrant labour are perfectly substitutes. Also there is perfect capital-mobility between the two sectors with flexible interest-rates. However, the urban wage-rate is institutionally fixed and the rural-urban migration-mechanism is of Harris-Todaro [1970] type.

Let 1 and 2 stand for the urban and the rural sector. Following notations are used in the model.

y_i = Average productivity of labour in the ith sector for $i = 1, 2$.

k_i = Capital-labour ratio in the ith sector for $i = 1, 2$.

r_i = Interest rate on capital in the ith sector for $i = 1, 2$.

$\overline{W}_1$ = Institutionally fixed urban wage-rate.

W_2 = Rural wage-rate.

L_1 = Level of employment in the ith sector for $i = 1, 2$.

L_u = Level of urban unemployment.

$\lambda = \dfrac{L_u}{L_1}$

$\overline{K}$ = Exogenously given domestic capital stock.

L_F = Stock of immigrant labour force.

$\overline{L}$ = Given domestic labour-endowment in the economy.

The equational structure of the model is the following:

$$y_i = f_i(k_i) \text{ with } f_i' > 0, \ f_i'' < 0 \tag{1}$$

is the intensive production function of the ith sector for $i = 1, 2$.

$$f_i(k_i) - f_i'(k_i) \cdot k_i = W_i \tag{2}$$

is the equality between the marginal productivity of labour and the wage-rate in the ith sector – a condition for profit maximization in that sector.

Interest rates in the two sectors are determined following the rule of marginal productivity pricing. Hence,

$$r_i = f_i'(k_i) \tag{3}$$

for the ith sector; $i = 1, 2$.

Perfect capital mobility between the two sectors leads to the following equilibrium condition :

$$r_1 = r_2 = r \tag{4}$$

Harris-Todaro [1970] migration equilibrium condition is given by the following:

$$1 + \lambda = (\overline{W}_1 / W_2) \tag{5}$$

Here $(\overline{W}_1 / (1 + \lambda))$ is the expected urban wage-rate and this is equal to the actual rural wage-rate in the migration-equilibrium.

Full-utilization of capital-stock leads to the following equation :

$$k_1 \cdot L_1 + k_2 \cdot L_2 = \bar{K} \tag{6}$$

Also we have,

$$(1 + \lambda) L_1 + L_2 = \bar{L} + L_F \tag{7}$$

An exogenous inflow of immigrant labour force *i.e.* a rise in L_F alters the equilibrium values of L_1 and L_2 determined from equations (6) and (7), but can not affect the equilibrium values of k_1, k_2, λ, r and W_2. They are determined by the set of equations (1) – (5).

B. The Results

First, we study the effects of an increase in immigrant labour, L_F, on the equilibrium values of L_1 and L_2.

We assume that $k_1 > k_2 (1 + \lambda)$. This means that the unemployment adjusted capital-labour ratio in the urban sector is greater than the capital-labour ratio in the rural sector. This is also the condition for stable equilibrium in the Corden-Findlay [1975] version of the Harris-Todaro [1970] model.

Now we can prove the following proposition:

Proposition 1: *If urban sector is relatively more capital intensive (with unemployment adjustment), inflow of immigrant labour force lowers employment in that sector and raises rural employment.*

The intuitive explanation is the following: given the capital endowment and the domestic labour endowment, an increase in immigrant labour force makes the country relatively more labour abundant. In order to maintain balance, *i.e.* to ensure full utilization of capital stock and to keep the unemployment-rate unchanged, the overall labour intensity of the economy's production structure should be increased. This is possible if the capital intensive sector contracts and the labour intensive sector expands.

Note that,

$$L_u = \lambda L_1$$

and hence

$$(dL_u/dL_F) = \lambda \cdot (dL_1/dL_F) < 0.$$

So we have the following proposition:

Proposition 2: *An inflow of immigrant labour force lowers the absolute level of urban unemployment.*

Now we analyse the effect of an increase in L_F on the national income when entire immigrant labour income is remitted. The national income in this case is given by

$$Y = \bar{W}_1 L_1 + W_2 L_2 + r\bar{K} - W_2 L_F \tag{8}$$

Now using equation (6) and (8), we have

$$\bar{W}_1 L_1 + W_2 L_2 = W_2(\bar{L} + L_F) \tag{9}$$

and hence

$$Y = W_2 \bar{L} + r\bar{K}.$$

As W_2 and r remain unchanged when L_F is increased, national income remains unaffected with an exogenous inflow of immigrant labour.

Defining social welfare as national income is objectionable in a Harris-Todaro type model because there is a positive degree of inequality in the income distribution of the workers. There are three different income groups in the working class: (i) the urban sector workers who earn the wage rate, $\bar{W}_1$; (ii) the rural sector workers who earn the wage rate W_2; and (iii) the unemployed workers who do not earn anything. So the income-distribution of the workers is given by the following:

Wage rate: $\bar{W}_1$ W_2 0
Employment: L_1 L_2 λL_1

So the welfare measure of Sen [1974], which is defined as the per-capita income multiplied by one minus Gini-coefficient of the income distribution, is an appropriate measure of welfare of the workers. Let H be the social welfare; and H_W and H_K are the welfare of the workers and capitalists – with weights being Q_1 and Q_2 to the respective classes. Hence,

$$H = Q_1 H_W + Q_2 H_K. \tag{10}$$

Here

$$H_W = W_2(1 - G)\bar{L} \tag{11}$$

where W_2 is the per-capita income of the workers and G is the Gini-coefficient of the income distribution of the workers; and

$$H_k = r \cdot \bar{K}. \tag{12}$$

Note that W_2 and r are independent of the size of L_F. But an increase in L_F

lowers L_1 and L_u; and raises L_2. So G is affected by a change in L_F. Hence an exogenous inflow of immigrant labour force only affects H_W.

We can prove the following proposition:

Proposition 3: *If the urban sector is capital intensive (with unemployment adjustment), then an exogenous inflow of immigrant labour force improves the welfare of the society.*

The intuitive explanation is the following: an increase in the volume of immigrant labour force, L_F, does not affect the different wage-rates; but alters their relative frequencies. It lowers L_1, the frequency to the highest wage-rate, $\overline{W}_1$. As λ remains unchanged, the frequency to the zero wage-income, λL_1 also falls at the same rate. The frequency to the middle income-group, L_2, is significantly increased. So the inequality in labour-income is reduced. There is no inequality in the distribution of capital income. Also the per-capita income remains unaffected because the factor-prices and the domestic factor endowments do not change and wage-income of the immigrant workers is fully remitted. So the social welfare, measured by the welfare index of Sen [1974], is increased.

III. The Non-Shiftable Capital Harris-Todaro Model

In this section, we assume that capital once installed is non-shiftable. So equation (4) does not exist and the equation (6) is replaced by the following two equations:

$$k_i L_i = \bar{K}_i \qquad \text{for } i = 1, 2. \tag{6A}$$

Here $\bar{K}_1$ and $\bar{K}_2$ represent the exogenously given stock of capital in the urban sector and the rural sector respectively. Other equations remain unchanged.

Using equations (5) and (7), we obtain the following :

$$\overline{W}_1 L_1 = W_2(\bar{L} + L_F - L_2)$$

Here $\overline{W}_1$ is fixed and the equilibrium value of L_1 is independent of L_F

because it is determined by equations (6A) and (2) for $i = 1$. A rise in L_F first raises L_2 and this lowers k_2 because $\bar{K}_2$ is fixed. So the rural wage-rate, W_2, determined by the equation (2) for $i = 2$, falls. This offsets a part of the initial increase of L_2 and raises the value of λ in the new-equilibrium because $(\bar{W}_1/W_2)$ rises. So given L_1, $L_u = \lambda L_1$ also rises.

So we can prove the following proposition:

Proposition 4: *An increase in L_F lowers the rural wage-rate and raises the level of rural employment as well as urban unemployment.*

While analysing its effect on welfare as measured by the index of Sen [1974], we first consider the mathematical expression of the Gini-coefficient, G, of the income-distribution of the workers. It is given by

$$G = (1/W_2) \left[L_1 L_2 (\bar{W}_1 - W_2) + \lambda L_1^2 \bar{W}_1 + \lambda L_1 L_2 W_2 \right]$$

As $\bar{W}_1$ and L_1 remain fixed, but L_2 and λ rise being accompanied by a fall in W_2, the first two components always rise. So the Gini-coefficient, G, takes a higher value if the third component *i.e.*, $\lambda L_1 L_2 W_2$, rises. This must rise if the rise in L_2 more than offsets the negative effect of the fall in W_2, *i.e.*, if the wage-elasticity of employment in the rural sector is greater than unity. So $H_W = W_2(1 - G)$ must fall in this case. So we can establish the following proposition:

Proposition 5: *An increase in L_F, implying an inflow of immigrants, raises the degree of inequality in the distribution of wage income and lowers the social welfare, as measured by the index of Sen [1974], if the wage-elasticity of employment in the rural sector is greater than unity.*

If the immigrants send their income back to the country, $W_2 \cdot dL_F$ is the additional income remitted because W_2 is the average wage-rate of an worker. However, the total output is increased by the amount $W_2 \cdot dL_2$ because, in equilibrium, rural sector's marginal productivity of labour is equal to the wage-rate, W_2. But $dL_F > dL_2$ and hence the domestic factor income (national income) falls when L_F rises. This leads to the following proposition:

Proposition 6: *An inflow of immigrants lowers the national income if the immigrants' income are remitted.*

IV. Conclusion

In this paper, we have analysed the economic consequences of immigration in less developed countries using a Harris-Todaro type of model. The conclusions regarding the nature of the effects on unemployment, national income, welfare, inequality *etc.* in a mobile-capital model may be completely opposite to those in a non-shiftable capital model. So one should look at the nature of capital-movement between the rural sector and the urban sector in an economy with Harris-Todaro type of labour market distortion before adopting a policy of immigration-restriction.

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