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DISTRIBUTIONAL EFFECTS OF COMMERCIAL POLICIES IN A SMALL OPEN DEVELOPING ECONOMY UNDER IMPERFECT LABOR MOBILITY

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This paper extends the Mussa's model (1982) which shows that the owners of a mobile factor will be interested in securing protection for the industry in which they are employed if the factor is imperfectly substitutable and the interests are especially strong when the degree of mobility is low. By incorporating some important considerations in LDCs, namely, urban nontraded good production and labor market segmentation, this paper shows that there may be a production trap in the urban nontraded good production in which the interests of factor owners in commercial policies may be reversed from those of the Mussa's model under some plausible demand conditions. This paper also shows that the degree of factor mobility may not go in one direction with factor returns, contrary to the major conclusion of the Mussa's model.

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I. INTRODUCTION

Tariffs and other commercial policies are implemented in many countries to protect the incomes of the owners of factors of production employed in industries faced with foreign competition. The effect of commodity price changes on income distribution in the general equilibrium analysis is a long standing interest in the literature. In a political economy context, the directions of factor price changes induced by commercial policies indicate the implicit political interests of the owners of factors in those policies. It is well documented in the trade literature that the effect of a change in the terms of trade between the two sectors on those in factor incomes will be solely dependent on the relative

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factor intensities of the two sectors under the assumption of perfect factor mobility (Stolper-Samuelson). This theory, however, assumes an ideal economy in which factors are costlessly mobile and substitutable and highlights the importance of the differences in relative factor intensities.

Many models have been proposed which extend the case by imposing some restrictions on the mobility of factors (Johnson and Mieszkowski (1970), Jones (1971), Hu (1974), Mussa (1974,1982) among others). Some important implications are derived from those models. For instance, the owners of a mobile factor may be interested in securing protection for an industry since it will increase their income. If a factor is completely mobile, however, the rents they could earn from the protection of a particular industry may be dissipated since that factor will earn the same return in every industry (Mussa(1982)). This naturally leads us to think about the case of imperfect mobility of factors since we observe that the owners of a specific factor employed in a particular industry are eager to secure protection from the government for that industry.

In this context, Mussa (1982) shows that the owners of a mobile factor employed in a particular industry would indeed be interested in securing protection for that industry if the factor is imperfectly substitutable ; the interests are especially strong when the degree of mobility is low. Two important considerations are missing in his model for an application to a small open developing economy. As many development economists have pointed out, urban sector in LDCs consists of single integrated markets neither for labor nor for goods ; labor markets are segmented and some outputs are nontradable. Urban informal sector is characterized as the sector with free entry, while there exists some entry barriers to the formal (or 'protected') sector labor market (for instance, minimum wage). Labor is mobile but are not perfectly substitutable ; for an employment in the protected sector, some form of human capital may be required. This imperfectness of labor mobility helps to preserve the wage differential in the urban sector. It is also noted that the urban informal sector production is concentrated on nontradable goods which require little capital investment ; labor intensive and small-scale family managed form of production is a major characteristic observed in that sector. Under this more realistic situation, we may examine the linkage between the interests of the owners of factors and the degree of mobility of factors.

This paper addresses the distributional issues of commercial policies in a small open developing economy with nontraded good production in the urban sector. The major thrust of this paper is that the demand and production conditions in the nontraded good market are critically important in assessing the implications of commercial policies. Given demand and supply parameters, we may also discuss the linkage between the interests of factor owners and factor mobility in commercial policies. One of the significant contributions of this paper is to extend some previous result (e.g. Mussa(1982)) concerning the relationship between factor mobility and factor returns by incorporating an important consideration neglected. From this analysis, it may also be possible to induce some important policy implications. For instance, policymakers in LDCs with large enough nontraded good sector in the urban region may find it helpful to have an information on the direction of political interests of the major social groups in a certain package of commercial policies, given demand and supply conditions in the nontraded good market. Then, they may calculate the political responses from the major social groups derived from a change in commercial policies and may assess the feasibility of reform in those policies.

Ⅱ. BASIC MODEL

We assume that there are three sectors in the economy. The rural sector (Y) provides the wage which is determined by competitive market forces. The "wage" in the urban nontraded good sector (Z) is assumed to be equal to the value of the average product of labor. We assume that this sector is characterized as a sector with "free entry"[1]. Due to this nature of the labor market in the nontraded good sector, we assume that the rural competitive wage is equalized with the "wage" in the nontraded good sector in the equilibrium state. On the contrary, the urban formal (or protected) sector (X) provides the wage which is higher than the wages elsewhere in the economy. This may be attributed to many reasons (for instance, the institutional forces (i.e. labor union) prevailing in that sector), but we simply assume that the imperfect mobility of labor causes the difference in wages.

The linear homogenous, twice differentiable and well behaved production functions of each sector are defined as

$$X = G(L_x, K_x), \quad Y = F(L_y, K_y), \quad Z = J(L_0) \tag{1}$$

where L and K represent labor and capital employed in each sector. By setting the product of X as a numeraire, the labor markets are characterized[2] as

$$PF_L = w_y, \quad G_L = w_x, \quad w_0 = q\frac{Z}{L_0} \tag{2}$$

where q and P are the prices of the products produced in the nontraded good sector and the rural sector in terms of X, w_y, w_x, w_0 are wages in the rural sector, urban formal sector and nontraded good sector, respectively. We assume that Z is consumed only in the urban sector and nontraded internationally, while

[1] In this sense, we may characterize the urban nontraded goods sector to be "informal".

[2] In each sector (the urban formal sector and the rural sector), optimizing firms under competitive environment will employ labor up to a point where the marginal value product of labor is equal to the wage rate facing the industry.

X and Y are tradable both in domestic and international markets. Since we assume a small open economy, P is determined in the international market and is given exogenously to this economy but can be manipulated by commercial policies of the government. For later reference, we define $\mu_J = J'L_0 / J$ as being the output elasticity in the nontraded good sector[3].

From the free entry hypothesis, we simplify the situation by assuming[4] that

$$w_y = w_0 \tag{3}$$

We assume that labor is perfectly mobile and substituitable between the rural sector and the nontraded good sector while it is imperfectly mobile between the urban formal sector and the rural sector (and hence the informal sector). To represent the imperfectness of the mobility of labor, we assume that the available combinations of $L_0 + L_y$ and L_x lie along a convex input transformation curve (Mussa(1982)).

$$L_x = S(L_0 + L_y), \quad S' < 0, \quad S'' < 0 \tag{4}$$

As implied by Mussa(1982), suppliers of labor are assumed to maximize total labor income subject to the constraint of the input transformation function. This assumption will lead to

$$w_y / w_x = -S'(L_0 + L_y) \tag{5}$$

For later reference, let $\sigma = S'/(L_0 + L_y)S'' > 0$ be defined as the elasticity of mobility. Using (5), we can easily get $\alpha\widehat{L}_0 + (1-\alpha)\widehat{L}_y = \sigma(\widehat{w}_y - \widehat{w}_x)$, where $\alpha = L_0/(L_0 + L_y)$ is the ratio of "nonskilled" labor in the nontraded good sector. Hence, σ represents the mobility of labor due to price incentive under (5). We define

$$w_x = \beta w_0, \quad \beta > 1 \tag{6}$$

where β represents the wage differential in the urban sector, which will be

[3] Note that the output elasticity can be rewritten as the ratio of the marginal product of labor over the average product of labor. Hence, $\mu_J > (<) 1$ means that the average productivity increases (decreases) as population inflows into the sector. Average productivity of the workers employed in the nontraded goods sector may increase if i) a new flow of workers are more efficient in production (in the case when they are released from the protected sector) and/or ii) nontraded good production exhibits the economies of scale in enjoying externalities generated from public goods offered in the urban sector.

[4] To be accurate, we should include the adjustment cost of migration, but we ignore this complication for the clarity of the analysis.

endogenously determined in our model. Finally, we introduce output market equilibrium conditions. Since X and Y are freely traded internationally, we only consider the domestic market equilibrium of the nontraded good Z[5]. If preferences are homothetic, we may express

$$Z = \phi(P, q) I_U = D(P, q) \tag{7}$$

where $I_U = X + qZ$ is the total urban income (expressed in terms of X) and ϕ is the budget share for the consumption of the nontraded good. For later reference, we define

$$\rho_p = \frac{dD}{dP}\frac{P}{D} = \frac{\phi_p P}{\phi}, \quad \mu_q = -\frac{dD}{dq}\frac{q}{D} = \lambda_q - (1 - a_1) > 0,$$
$$\lambda_q = -\frac{\phi_q q}{\phi}, \quad a_1 = \frac{X}{I_U} \tag{8}$$

where the (own) demand elasticity[6] is denoted by μ_q while ρ_p represents the cross demand elasticity. Note that an increase in q will lead to an increase in the urban income (expressed in terms of X) while it will lower the budget share spent on the consumption of the nontraded good. Aggregated, we assume that the negative consumption (budget allocation) effect dominates the income effect (i.e. the (own) price elasticity of demand (net of sign) is negative). This assumption is equivalent to say that the budget share elasticity (λ_q) is greater than the relative size of the nontraded good sector in the urban production $(1 - a_1)$. The cross demand elasticity may be either positive or negative but we assume that it is smaller than the own demand elasticity even if it is positive (i.e. $\rho_p < \mu_q$).

Ⅲ. THE CASE OF "PRODUCTION TRAP" : SOME IMPORTANT QUALIFICATIONS

If capital is sector specific, $\widehat{K}_x = \widehat{K}_y = 0$. Then, we get

$$\widehat{w}_x = -\eta_x \widehat{L}_x = \widehat{\beta} + \widehat{w}_0 = \widehat{\beta} + \widehat{q} + (\mu_J - 1)\widehat{L}_0 = \widehat{\beta} + \widehat{P} - \eta_y \widehat{L}_y = \widehat{\beta} + \widehat{w}_y \tag{9}$$

where $\eta_x = -G_L/G_{LL}L_x$, $\eta_y = -F_L/F_{LL}L_y$ are derived labor demand elasticities in X and Y sectors. Since $\widehat{\beta} = \widehat{w}_x - \widehat{w}_y$, we also derive

[5] Alternatively, we may introduce the market conditions including export and import equations of tradable goods. This consideration makes the analysis unnecessarily complicated, however.

[6] The definition includes the minus sign to let the value be positive.

$$\alpha\widehat{L_0}+(1-\alpha)\widehat{L_y}=-\sigma\widehat{\beta},\quad \widehat{L_x}=\lambda_L\sigma\widehat{\beta},\quad \lambda_L=\frac{w_y(L_y+L_0)}{w_xL_x} \tag{10}$$

from (5), (6) and

$$\hat{Z}=\hat{X}-\frac{\mu_q}{a_1}\hat{q}+\frac{\rho_p}{a_1}\hat{P}=\mu_J\widehat{L_0},\quad \hat{X}=\theta_x\widehat{L_x},\quad \theta_x=\frac{w_xL_x}{X} \tag{11}$$

From (7) and (1). By a simple manipulation, we derive

$$\widehat{\beta}=-\frac{M_3}{M_2}\hat{P}=-\frac{\frac{\alpha}{M_1}\frac{\rho_p}{a_1}+(1-\alpha)\frac{1}{\eta_y}}{\sigma+\frac{\alpha}{M_1}[\sigma\lambda_L(\theta_x+\frac{\mu_q}{a_1}\eta_x)+\frac{\mu_q}{a_1}]+(1-\alpha)\frac{\lambda_L\eta_x\sigma+1}{\eta_y}}\hat{P} \tag{12}$$

where $M_1=-\mu_J(\frac{\mu_q}{a_1}-1)+\frac{\mu_q}{a_1}>(<)0\Leftrightarrow\mu_J<(>)\overline{\mu_J}=\frac{(\mu_q/a_1)}{(\mu_q/a_1)-1}$ if $\mu_q>a_1$[7].

As can be seen in (12), the sign of $-M_3/M_2$ depends on the value of M_1 and hence on the values of μ_q and μ_J. Note that if $M_1>0$, i.e., if $\mu_J<\overline{\mu_J}$, we derive $\widehat{\beta}<0$ under $\hat{P}>0$. But for some parameter values, we find "abnormal"[8] cases as follows.

Proposition 1. $\widehat{\beta}>0$ if the following conditions hold

(i) $\mu_q>a_1$

(ii) $1<\mu_J^1<\mu_J<\mu_J^3$, if $\rho_p<\Phi<\mu_q$;
$1<\mu_J^1<\mu_J<\mu_J^0$, if $\rho_p<\mu_q<\Phi$

where $\Phi=\frac{\theta_y}{\eta_y}s_y$, $s_y=\frac{PY}{X+qZ}$, $\theta_y=\frac{w_yL_y}{PY}$, and

$$\mu_J^1=\frac{(\mu_q/a_1)+M_1^1}{(\mu_q/a_1)-1},\quad \mu_J^3=\frac{(\mu_q/a_1)+M_1^3}{(\mu_q/a_1)-1},\quad \mu_J^0=\frac{(\mu_q/a_1)+M_1^0}{(\mu_q/a_1)-1}$$

$$M_1^0=\frac{\alpha\eta_y}{1-\alpha}\frac{\mu_q}{a_1},\quad M_1^1=\frac{\alpha\eta_y}{1-\alpha}\frac{\rho_p}{a_1},\quad M_1^3=\frac{\alpha\eta_y(\frac{\mu_q}{a_1}\lambda_L\eta_x+\lambda_L\theta_x)}{\eta_y+\lambda_L\eta_x(1-\alpha)}$$

Proof : See the Appendix.

Corollary 1-1 If $\mu_q<a_1$, $\widehat{\beta}<0$

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[7] This assumption is equivalent to say that the budget share elasticity is greater than one (i.e. $\lambda_q>1$). Note that $M_1>0$, if $\mu_q<a_1$

[8] In the sense that the result is contrary to that of Mussa (1982).

These results imply that if the demand elasticity of the nontraded good (NG) product is greater than the relative size of the rest of the economy other than the NG sector, there may be a "production trap" which leads to the abnormal case. Here "production trap" in the NG sector happens to exist where the output elasticity of that sector be greater than unity. In particular, we find

Corollary 1-2 If $\rho_p=0$, and $\mu_q>a_1$, there always exists a production trap.

i.e., if the cross demand elasticity be negligible, and the demand elasticity be large enough, we can always find a production trap in the NG sector.

If we introduce urban NG sector, we also find

Proposition 2 If $\mu_q>a_1$, σ may not be unilaterally related with the magnitude of $\widehat{\beta}$

i.e., labor mobility may increase or decrease the wage differential between the two sectors (urban formal sector vs. rural sector) depending on the sign of $\widehat{\beta}$.

Proof : See the appendix

These results imply that the output elasticity and demand elasticities (i.e., supply and demand conditions) in the nontraded good sector are crucial in determining the responses of factor returns to the change in commodity prices.

For instance, if the agricultural production dominantly contributes to GNP and labor is the dominant factor in agricultural production (i.e., if Φ is large enough), it may be possible that $\rho_p<\mu_q<\Phi$. Then the proposition shows that the "abnormal" result may be reproduced if the output elasticity in nontraded good production is in a certain range above unity. For a heuristic case, let $\alpha=a_1=\theta_y=0.5$, and $\mu_q=2$, $\rho_p=0$, $\eta=1$, $s_y=5$. Then, the proposition implies that the wage differential in the economy will be enlarged under the favorable agricultural terms of trade if and only if $1.33<\mu_J<2.66$. This example shows the possibility that there exists a production trap in the urban NG sector under which workers would not show the political interest in the output price of an industry in which they are employed regardless of the degree of labor mobility.

Intuitively, these results may be explained as follows. If the agricultural terms of trade is augmented, labor will be relocated according to the profitability of employment. Since free entry is assumed, an initial increase in the rural wage may attract workers employed in the urban nontraded good sector into the rural sector, ceteris paribus[9]. This change in the production side will increase q given

[9] Note that this explanation holds only under the 'ceteris paribus' condition. This is only a

demand condition, while demand will also be affected by the change in prices. If the cross demand elasticity is negligible, the resulting q will depend upon the magnitudes of the own demand elasticity and the output elasticity. For the simplest case, assume that labor is completely immobile between the manufacturing sector and the nontraded good sector (i.e. $\sigma=0$). The triggered change in q may bring different results depending on some parameters. In particular ; 1) If the output elasticity is very large, the equilibrium labor employment in the nontraded good sector may actually increase due to the initial increase in q (see (18)), while the equilibrium q will be reduced through the eventual increase in production. Since the "wage" in the nontraded good sector is the composite of q and the average product, the direction of the change in the equilibrium "wage" in the sector will depend upon the relative strength of the price effect over the average product effect[10]. Large output elasticity implies that the average product effect (positive effect) will typically dominate the price effect (negative effect). Then, the "wage" in the NG sector (and hence the competitive agricultural wage) will be augmented and the wage differential in the economy will be lowered in equilibrium (since the manufacturing wage will not be affected due to the assumption of the immobility of labor) ; 2) Similarly, if the output elasticity is very small, the equilibrium labor employment will decrease and the equilibrium price q may increase (see (19')). Since both the average product effect and the price effect will be positive, we get the same conclusion ; 3) Under a certain 'production trap' in the NG sector, however, it may be possible that the negative effect may dominate the positive effect, leading to a decrease in the "wage" in the NG sector and an increase in the wage differential in the economy. This possibility is described in the above proposition.

Note that if the NG sector production is weakly responsive to the input employment increase ($\mu_J<1$), the wage differential in the economy is reduced ($\widehat{\beta}<0$), as the agricultural terms of trade rises. In this case, we get the same conclusion as that of Mussa (1982), i.e., the interests of workers in securing protection for the industry in which they are employed are strong when the degree of mobility is low.

The size of the NG sector in this economy may be captured by the magnitude of α. For instance, we get

$$\widehat{\beta} \rightarrow -\frac{1}{\sigma(\eta_y+\lambda_L\eta_x)+1}\hat{P} \quad \text{if} \quad \alpha\rightarrow 0 \ (a_1\rightarrow 1) \tag{12'}$$

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logical explanation based on our model, not the description of reality.

[10] Note that $\frac{\partial(Z/L_0)}{\partial L_0}=(\mu_J-1)\frac{Z}{L_0^2}$. Hence the average product increases (decreases) as labor flows into the nontraded good sector iff the output elasticity is greater (less) than one.

$$\hat{\beta} \rightarrow -\frac{\rho_p}{\sigma(M_1 a_1 + \lambda_L \theta_x a_1 + \mu_q \eta_x \lambda_L) + \mu_q} \hat{P} \quad \text{if} \quad \alpha \rightarrow 1 \tag{12''}$$

Since $-\hat{\beta} = \hat{w}_y - \hat{w}_x$, as in a standard two sector model, (12') implies that "the differential in the movement of wage rates between the two industries is greater the lesser is the extent of labor mobility" (Mussa (1982))[11] if the importance of the NG sector is minimal. (12'') shows that as the NG sector becomes dominant, it may be possible that the wage differential in the economy $(-\hat{\beta} = \hat{w}_y - \hat{w}_x)$ is smaller the lesser is the extent of labor mobility depending on the values of the cross demand elasticity and the output elasticity. For instance, if the output elasticity in the NG sector is large enough (i.e. $\mu_J > 1 + \frac{\lambda_L \eta_x \mu_q + 1}{\mu_q - a_1} = \mu_J^3$) and the cross demand elasticity is positive[12], the denominator in (12'') may become negative if the degree of mobility is large enough and we may get the opposite result. The same conclusion applies if the cross demand elasticity is negative and the output elasticity is smaller than μ_J^3. These results imply that under the significance of the NG production in the economy, the degree of labor mobility may not affect the differential in the movement of wage rates between the two industries in one direction depending on the magnitudes of the output elasticity and the cross demand elasticity. We may also find that if $\alpha \rightarrow 0$ $(a_1 \rightarrow 1)$, $M_1^0, M_1^1, M_1^3 \rightarrow 0$, and hence there is no way to satisfy the above proposition. Assume that the cross demand elasticity is positive. Then, if $\alpha \rightarrow 1$, we may derive

$$\hat{\beta} > 0 \quad \text{if} \quad \mu_J > \mu_J^3 \text{ and } \sigma > \bar{\sigma} \tag{13}$$

where $\bar{\sigma}$ is such that the denominator in (12'') becomes zero. (13) implies that the smaller the degree of labor mobility, the larger the wage differential in the economy and the lesser will workers be interested in securing protection for the industry in which they are employed, if the output elasticity is large enough and the degree of mobility is greater than a threshold.

IV. SOME OTHER RESULTS

The response of β to a change in the relative price P may be used to

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[11] (12') represents the similar result as the equation (16) of Mussa's model. Note that the interpretation is slightly different. Since X sector is assumed to provide higher wage in the initial setting of our model, a rise in the relative price of Y will help to decrease the wage differential between the two sectors and the extent of the decrease is greater the lesser is the extent of labor mobility.

[12] Note that if the cross demand elasticity is negligible (i.e $\rho_p \rightarrow 0$) proposition 1 shows that the wage differential in the economy will not be affected by commercial policies if the nontraded good sector is dominant.

determine the responses of the other variables. For instance, it is straightforward to get

$$\widehat{L}_x > (<) 0,\ \ \widehat{w}_x < (>) 0,\ \ \widehat{w}_y < (>) 0,\ \text{as } \widehat{\beta} > (<) 0 \tag{14}$$

The response of the rental rates in each sector may be derived by using the linear homogeneity property of production. Since $\theta_x \widehat{w}_x + (1-\theta_x)\widehat{r}_x = 0$, $\theta_y \widehat{w}_y + (1-\theta_y)\widehat{r}_y = \widehat{P}$, we get

$$\widehat{r}_x > (<) 0 \text{ as } \widehat{\beta} > (<) 0 \tag{15}$$

$$\widehat{r}_y > 0 \text{ if } \widehat{\beta} > 0 \quad \text{or} \quad \widehat{\beta} < 0 \quad \text{and} \quad M_1 > 0 \tag{16}$$

Hence, under sector specific capital, we find ; 1)*There exists a production trap in the nontraded good sector in which the ratio of the urban to rural wages (which also represents the wage differential in the urban sector in percentage terms) may increase as the agricultural terms of trade rises. The increase in the ratio will be accompanied by the decrease in wages and the increase in rental r*ates of capital in each sector ; 2) *If the average productivity declines as labor flows into the nontraded good sector, the wage differential in the economy will be reduced, workers will unanimously gain but the owners of capital in the urban (rural) sector will lose (gain) under rising agricultural terms of trade.*

These findings claim, quite intuitively, that the factor price responses in an economy with nontraded good sector to the change in the terms of trade critically depend upon the demand and supply conditions of the nontraded good market. In particular, under some output production 'trap' in the nontraded good sector (the condition of which relies on some other economic parameters), wage earners will unanimously lose (and the wage differential widens) and the owners of capital will unanimously gain when capital is perfectly immobile, as the terms of trade moves in favor of agricultural production.

The labor allocation between the nontraded good sector and the rural sector will be

$$\widehat{L}_y > 0 \text{ if } M_1 > 0,\ \ \widehat{L}_0 < 0 \text{ if } M_1 > 0 \text{ and } \rho_p < \Phi \tag{17}$$

In particular, if the cross demand elasticity is negligible (i.e. $\rho_p \cong 0$), we derive

$$\widehat{L}_0 > (<)\ 0 \quad \text{if} \quad \mu_J > (<) \mu_J^4 \tag{18}$$

where $\mu_J^4 = \dfrac{\mu_q + \dfrac{a_1\alpha[\sigma\lambda_L(\theta_x + (\mu_q/a_1)\eta_x) + (\mu_q/a_1)]}{\sigma + (1-\alpha)(\sigma\lambda_L\eta_x + 1)/\eta_y}}{\mu_q - a_1} = \dfrac{\mu_q((1-\alpha) + \alpha\eta_y)}{(\mu_q - a_1)(1-\alpha)}$,
if $\sigma = 0$. Note that as $\alpha \to 1$, it is more likely that $\widehat{L}_0 < 0$. The price response in the nontraded good sector will be

$$\hat{q} > 0 \text{ if } \rho_p < \Phi \text{ and } 1 < \mu_J < \bar{\mu}_J \tag{19}$$

i.e., the relative price of nontraded good would increase if the cross demand elasticity is small enough and the output elasticity is greater than one but is less than a value which becomes larger the larger the own demand elasticity. In particular, if the cross demand elasticity is negligible (i.e. $\rho_p \cong 0$), we derive

$$\hat{q} > 0 \text{ if } \mu_J^5 < \mu_J < \bar{\mu}_J, \ \hat{q} < 0 \tag{19'}$$

otherwise

where $\mu_J^5 = \dfrac{\sigma\lambda_L\theta_x}{2 + \sigma\lambda_L\eta_x} = 0$, if $\sigma = 0$

V. CONCLUDING REMARKS

In this paper, we have examined the effects of commercial policies in a small open developing economy when there exists urban nontraded good sector, extending the Mussa (1982)'s model. The major findings of our paper are as follows.

If the average productivity in the nontraded good sector is declining as it gets crowded, immobility of capital helps to augment the interests of urban workers in the protected sector in commercial policies in favor of agriculture. Under the condition, we also find that the wage differential (in percentage terms) in the economy is reduced when capital is perfectly immobile under favorable agricultural terms of trade.

If the average productivity in the nontraded good sector is rising as it gets crowded, however, it may be possible that the interests of workers run in the opposite direction to the movement of the output price of a sector in which they are employed, unless the demand elasticity for the nontraded good is small enough. The precise condition depends upon the magnitudes of many parameters, but the message of this analysis seems to be clear ; with nontraded good sector characterized as the sector with free entry, it is no longer valid to argue that the immobility of factors helps to preserve the interests of factor owners in the output price of a sector in which factors are employed. Mobility may act in either direction depending on many parameters. These observations may be contrasted against some of the previous results. One of the key findings of

Mussa (1982) was that "the interests of each unit of imperfectly mobile labor are to some extent linked to the relative price of the industry in which the labor is employed". It is shown in our model that this is not always the case if there exists the nontraded good sector in the urban region. Under some demand and supply conditions in the nontraded good sector, rural labor (urban formal labor) may not have a special interest in the agricultural (industrial) terms of trade and this possibility is more likely the larger the size of the nontraded good sector in the economy.

Some implicit conclusions are in order from the analysis. First, depending on the importance of labor market segmentation and the nontraded good market in an economy, mobility of factors may generate very different distributional implications of commercial policies. Second, in a political economy context, if the demand elasticity of the nontraded good is large enough and the nontraded good production exhibits an output elasticity the magnitude of which is in a cerain range above the unity ('production trap'), wage differential in the economy may be enlarged by favorable agricultural terms of trade and the pro-agriculture commercial policies may be politically less acceptible.

REFERENCES

Batra, R.N. and Naqvi, N. (1987), "Urban Unemployment and the Gains From Trade", *Economica*, 54, 381-96.

Bhagwati, J. and Srinivasan, T. (1974), "On Reanalysing the Harris-Todaro Model : Policy Rankings in the Case of Sector-Specific Sticky Wages", *American Economic Review,* 64, 502-08.

Bhagwati, J. and Srinivasan, T. (1975), "Alternative Policy Rankings in a Large Open Economy with Specific Minimum Wages", *Journal of Economic Theory*, 11, 356-71.

Corden, W.M. and Findley, R. (1975), "Urban Unemployment, Intersectoral Capital Mobility and Development Policy", *Economica*, 42, 59-78.

Das, S.P. (1982), "Sector-Specific Minimum Wages, Economic Growth and Some Policy Implications", *Journal of Development Economics*, 10, 127-31.

Hazari, B.R. and Sgro, P.M. (1991), "Urban-Rural Structural Adjustment, Urban Unemployment with Traded and Nontraded Goods", *Journal of Development Economics*, 35, 187-96.

Hu, S.C. (1973), "Capital Mobility and the Effects of Unionization", *Southern Economic Journal*, April, 526-34.

Johnson, H.G. and Mieszkowski, P.M. (1970), "The Effects of Unionization on the Distribution of Income : A General Equilibrium Approach", *Quarterly Journal of Economics,* Nov., 539-61.

Jones, R.N. (1971), "Distortions in Factor Markets and the General Equilibrium Model of Production", *Journal of Political Economy*, May/June, 437-59.

Long, N.V. and Vousden, N. (1991), "Protectionist Responses and Declining Industries", *Journal of International Economics*, 30, 87-103.

Mayer, W. (1974), "Short Run and Long Run Equilibrium for a Small Open Economy", *Journal of Political Economy,* Sept./Oct., 955-68.

McCool, T. (1982), "Wage Subsidies and Distortionary Taxes in a Mobile Capital Harris-Todaro Model", *Economica*, 49, 69-80.

McLure, Jr. C.E. (1970), "Taxation, Substitution, and Industrial Location", *Journal of Political Economy*, Jan./Feb., 112-32.

Mundall, R.A. (1957), "International Trade and Factor Mobility", *American Economic Review*, June, 321-35.

Mussa, M. (1982), "Imperfect Factor Mobility and the Distribution of Income", *Journal of International Economics*, 12, 125-41.

Mussa, M. (1974), "Tariffs and the Distribution of Income : The Importance of Factor Specificity, Substitutability, and Intensity in the Short Run and Long Run", *Journal of Political Economy,* Nov./Dec., 1191-1203.

Stolper, W. and Samuelson, P. (1941), "Protection and Real Wage", *Review of Economic Studies* 9, 58-73.

Appendix : Proof of Proposition 1

Assume that $M_1<0$. (12) in the text can be rewritten as

$$\widehat{\beta}=-\frac{M_3}{M_2}\hat{P}=-\frac{B_1}{B_0+B_2\sigma}\hat{P} \tag{A0}$$

where

$$B_0=\frac{1-\alpha}{\eta_y}M_1+\alpha\frac{\mu_q}{a_1}<(>)0\Leftrightarrow -M_1>(<)M_1^0=\frac{\alpha\eta_y}{1-\alpha}\frac{\mu_q}{a_1}$$

$$B_1=\frac{1-\alpha}{\eta_y}M_1+\alpha\frac{\rho_p}{a_1}<(>)0 \Leftrightarrow -M_1>(<)M_1^1=\frac{\alpha\eta_y}{1-\alpha}\frac{\rho_p}{a_1}$$

$$B_2=M_1(1+(1-\alpha)\frac{\lambda_L\eta_x}{\eta_y})+\alpha\lambda_L(\theta_x+\frac{\mu_q}{a_1}\eta_x)<(>)0$$

$$\Leftrightarrow -M_1>(<)M_1^3=\frac{\alpha\eta_y(\frac{\mu_q}{a_1}\lambda_L\eta_x+\lambda_L\theta_x)}{\eta_y+\lambda_L\eta_x(1-\alpha)}$$

Since $M_1^0-M_1^1>0 \Leftrightarrow \mu_q>\rho_p$, we find $B_1>0 \Rightarrow B_0>0$ and $B_0<0 \Rightarrow B_1<0$

For $\widehat{\beta}>0$ we need

$B_1>0$ and $B_0+B_2\sigma<0$ or

$B_1<0$ and $B_0+B_2\sigma>0$

Now there may be three cases.

1) $M_1^0>M_1^1>M_1^3$

2) $M_1^0>M_1^3>M_1^1$

3) $M_1^3>M_1^0>M_1^1$

For each case, we have 4 possibilities

1-a) $M_1^0>M_1^1>M_1^3>-M_1 \Leftrightarrow B_0>0,\ B_1>0,\ B_2>0$

1-b) $M_1^0>M_1^1>-M_1>M_1^3 \Leftrightarrow B_0>0,\ B_1>0,\ B_2<0$

1-c) $M_1^0>-M_1>M_1^1>M_1^3 \Leftrightarrow B_0>0,\ B_1<0,\ B_2<0$

1-d) $-M_1>M_1^0>M_1^1>M_1^3 \Leftrightarrow B_0<0,\ B_1<0,\ B_2<0$

2-a) $M_1^0>M_1^3>M_1^1>-M_1 \Leftrightarrow B_0>0,\ B_1>0,\ B_2>0$

2-b) $M_1^0>M_1^3>-M_1>M_1^1 \Leftrightarrow B_0>0,\ B_1<0,\ B_2>0$

2-c) $M_1^0>-M_1>M_1^3>M_1^1 \Leftrightarrow B_0>0,\ B_1<0,\ B_2<0$

2-d) $-M_1>M_1^0>M_1^3>M_1^1 \Leftrightarrow B_0<0,\ B_1<0,\ B_2<0$

3-a) $M_1^3>M_1^0>M_1^1>-M_1 \Leftrightarrow B_0>0,\ B_1>0,\ B_2>0$

3-b) $M_1^3 > M_1^0 > -M_1 > M_1^1 \Leftrightarrow B_0 > 0,\ B_1 < 0,\ B_2 > 0$

3-c) $M_1^3 > -M_1 > M_1^0 > M_1^1 \Leftrightarrow B_0 < 0,\ B_1 < 0,\ B_2 > 0$

3-d) $-M_1 > M_1^3 > M_1^0 > M_1^1 \Leftrightarrow B_0 < 0,\ B_1 < 0,\ B_2 < 0$

Among those listed, 2-b) and 3-b) will lead to $\hat{\beta} > 0$, regardless of the value of σ.

For the case 2-b), we need

$$M_1^0 - M_1^3 > 0 \quad \text{and} \quad M_1^3 - M_1^1 > 0 \quad \Leftrightarrow \quad \mu_q > \Phi > \rho_p$$

where $\Phi = \dfrac{a_1(1-\alpha)\lambda_L\theta_x}{\eta_y} = \dfrac{\theta_y}{\eta_y}s_y$

$M_1^3 > -M_1 > M_1^1$ condition implies

$$\hat{\beta} > 0 \text{ if } 1 < \frac{(\mu_q/a_1) + M_1^1}{(\mu_q/a_1) - 1} < \mu_J < \frac{(\mu_q/a_1) + M_1^3}{(\mu_q/a_1) - 1} \text{ under } \mu_q > \Phi > \rho_p \quad \text{(A1)}$$

Similarly, for the case 3-b), we need

$M_1^0 - M_1^3 < 0 \Leftrightarrow \rho_p < \mu_q < \Phi$

$M_1^0 > -M_1 > M_1^1$ condition implies

$$\hat{\beta} > 0 \text{ if } 1 < \frac{(\mu_q/a_1) + M_1^1}{(\mu_q/a_1) - 1} < \mu_J < \frac{(\mu_q/a_1) + M_1^0}{(\mu_q/a_1) - 1} \text{ under } \rho_p < \mu_q < \Phi \quad \text{(A2)}$$

For the cases of 1-b) and 3-c), we need a restriction for $\sigma > -\dfrac{B_0}{B_2} = \sigma^*$. Similarly, we need $\sigma < -\dfrac{B_0}{B_2} = \sigma^*$ for the cases of 1-c) and 2-c)

$$\hat{\beta} > 0 \text{ if } 1 < \frac{(\mu_q/a_1) + M_1^3}{(\mu_q/a_1) - 1} < \mu_J < \frac{(\mu_q/a_1) + M_1^1}{(\mu_q/a_1) - 1} \text{ under } \mu_q > \rho_p > \Phi, \quad \text{(A3-1)}$$

$\sigma > \sigma^*$

$$\hat{\beta} > 0 \text{ if } 1 < \frac{(\mu_q/a_1) + M_1^1}{(\mu_q/a_1) - 1} < \mu_J < \frac{(\mu_q/a_1) + M_1^0}{(\mu_q/a_1) - 1} \text{ under } \mu_q > \rho_p > \Phi, \quad \text{(A3-2)}$$

$\sigma < \sigma^*$

$$\hat{\beta} > 0 \text{ if } 1 < \frac{(\mu_q/a_1) + M_1^3}{(\mu_q/a_1) - 1} < \mu_J < \frac{(\mu_q/a_1) + M_1^0}{(\mu_q/a_1) - 1} \text{ under } \mu_q > \Phi > \rho_p, \quad \text{(A3-3)}$$

$\sigma < \sigma^*$

$$\hat{\beta} > 0 \text{ if } 1 < \frac{(\mu_q/a_1) + M_1^0}{(\mu_q/a_1) - 1} < \mu_J < \frac{(\mu_q/a_1) + M_1^3}{(\mu_q/a_1) - 1} \text{ under } \Phi > \mu_q > \rho_p, \quad \text{(A3-4)}$$

$\sigma > \sigma^*$

For proposition 2, now think about the case 3-c) (other cases may be similarly addressed). Since $B_0>0$, $B_1>0$, $B_2<0$, it may be possible either $\widehat{\beta}>0$ or $\widehat{\beta}<0$ depending on the value of σ. Now let $\sigma>\sigma^*$ and $\widehat{\beta}>0$. Under this restriction, the larger the value of σ, the smaller the magnitude of $\widehat{\beta}\,(>0)$, since the absolute value of $B_0+B_2\sigma\,(<0)$ becomes greater as σ goes up. (Note that $B_0>0$, $B_1>0$, $B_2<0$) Now let $\sigma<\sigma^*$ and $\widehat{\beta}<0$. Under this restriction, the larger the value of σ, the larger the absolute magnitude of $\widehat{\beta}\,(<0)$, since the value of $B_0+B_2\sigma\,(>0)$ becomes smaller as σ goes up. (Note that $B_0>0$, $B_1>0$, $B_2<0$)

We may also get

$$\widehat{\mathrm{r}}_{\mathrm{y}}=\frac{1}{(1-\theta_{\mathrm{y}})\mathrm{M}_2}\left[(1-\alpha)(1-\theta_{\mathrm{y}})\frac{\mathrm{Z}_0}{\eta_{\mathrm{y}}}+\sigma+\frac{\alpha}{\mathrm{M}_1}\left\{\frac{\mathrm{Z}_0}{\mathrm{a}_1}(\mu_{\mathrm{q}}-\theta_{\mathrm{y}}\rho_{\mathrm{p}})+\sigma\lambda_{\mathrm{L}}\theta_{\mathrm{x}}\right\}\right]>0 \quad \text{(A4)}$$

if $\mathrm{M}_1>0$