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TRADE AND GAINS FROM TRADE BETWEEN PROFIT-MAXIMIZING AND LABOUR-MANAGED COUNTRIES WITH IMPERFECT COMPETITION

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Abstract

It is known that, in the Heckscher-Ohlin type of general equilibrium trade models with one commodity produced by Cournot Oligopolists in the world market, the smaller country exports the imperfectly competitive commodity and gains from trade but the larger country may lose from trade. The present paper examines these results under the assumption that all firms of one country are labour-managed and the countries are the same in size. Then we obtain the result that the profit-maximizing country exports the imperfectly competitive commodity and gains from trade but the labour-managed country may lose from trade.

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1. Introduction

Labour-managed firms are not only seen in East European countries but may also apply to one of the most advanced countries in the world, namely Japan. Although it is still at a controversial stage whether Japanese firms are behaving on a similar principle to that of labour-managed firms, this possibility may shed some light in the recent trade conflict between the U.S. and Japan.(1) The conflict is caused by a rather long-term and large trade deficit of the U.S. to Japan. And it is widely admitted from this view that Japan makes gains from trade far more than the U.S. In spite of a great effort of the U.S. and even of Japan, there has been no tendency to resolve the U.S.'s trade deficit. A number of reasons have been considered for it. One recent explanation is that Japanese markets are not sufficiently opened to U.S. producers. This is, however, hardly convincing. The attitude regarding how to sell products may be different between the U.S. and Japanese firms. As far as Japanese firms are concerned, Japanese markets are open to everyone. On the other hand, the U.S. firms do not share the Japanese firms' viewpoint. Thus, when we think about the trade conflict, we should pay much of our attention to differences in the attitude or view the firms have in the U.S. and in Japan.(2)

In this paper, we adopt the assumption that all firms in one country are of labour-managed type while those in the other country are of profit-maximizing type. Then, we make an analysis on trade between these two countries and investigate the pattern of trade and gains from trade. The analysis of this kind has been attempted recently by Ishii (1986 and 1990) and Tawada and Shimomura (1995). However, they concentrated on the Heckscher-Ohlin framework as faithfully as possible and thus assumed in particular that every market is perfectly competitive. Consequently, in their studies, all well-known theorems derived from the Heckscher-Ohlin model have been shown to carry over.

One of the main defects of the Heckscher-Ohlin model is the assumption of perfect competition. In reality, quite many, if not most, commodities are produced under

imperfect competition nowadays. We take account of this aspect and suppose that one commodity is produced by a domestic monopolist in each country and these two domestic monopolists act as oligopolists of the Cournot-Nash type in the world market. The consideration of imperfect competition brings forth quite different results from what Ishii (1986 and 1990) and Tawada and Shimomura (1995) reached. Though leaving our detailed and exact results to the last section of this paper, our main conclusion is that if the labour-managed country is larger or at least equal to the profit-maximizing country in size, the labour-managed country imports the commodity of imperfect competition and trade is gainful for the profit-maximizing country. Also we will show that if the profit-maximizing country is much larger than the other, all the conclusions may be reversed. Hence, it explains why Japan has a far greater gain from trade than the U.S.

The paper is organized as follows. The subsequent section presents the model. Section 3 investigates the autarkic equilibria of both countries. The pattern of trade and the gains from trade are analyzed in sections 4 and 5, respectively. The analysis of the difference in country size is treated in section 6. The final section is devoted to the summary and implications of our results.

2. The Model

We consider two countries, one is labour-managed and the other is a profit-maximizing country. There are supposed to be two commodities, one is produced under imperfect competition and the other produced under perfect competition. Labour is the only primary factor and no intermediate goods exist in this economy. We assume that technologies are identical between the two countries and that preferences of all households are identical and homothetic. We further assume that the amount of labour endowment is given equally to both countries. The produced commodities are supposed to be mobile

internationally while labour is imobile between domestic industries. This is the framework of the economy we consider.

Now we describe each country in detail. First we focus on the labour-managed country (the M country). Let the industry under imperfect competition be denoted as the X industry where commodity X is produced. Solely one firm exists in the X industry of the M country, so that commodity X is produced under monopoly if there is no trade. Suppose that the production function of this firm is

$$X^M = F(L_X^M) - \overline{X}, \tag{1}$$

where X^M is the output of commodity X and L_X^M and $\overline{X}$ are, respectively, the labour input and the fixed cost in the production of X. We assume that the function F is twice differentiable and strictly concave with positive slope and $F(0) = 0$.

The aim of the monopolistic firm in the M country is to maximize the average income of labour working in the firm, so that its objective is expressed as

$$\underset{L_X^M}{\text{Max}} \quad \frac{p(X^M)X^M}{L_X^M} \equiv w_X^M \text{ subject to (1)}, \tag{2}$$

where $p = p(X^M)$ is the inverse demand function of commodity X and hence it implies the price of commodity X.

The optimal condition for (2) is

$$p[1-\varepsilon(p)]F_L(L_X^M) = \frac{p(X^M)X^M}{L_X^M} \equiv w_X^M, \tag{3}$$

where $\varepsilon(p) \equiv -(X^M / p)/(dp / dX^M)$ and $F_L(L_X^M) \equiv dF(L_X^M)/dL_X^M$.

Let us turn our attention to the other industry where a commodity is produced under perfect competition. We call this industry as the Y industry and the commodity as commodity Y. Let the number of firms in this industry of the M country be n^M. Suppose that all the n^M firms are identical and that a representative firm's behaviour is to maximize the average income of labour working in this firm. Therefore the optimization problem of a typical firm of this industry in the M country is formulated as

$$\underset{l_y^M}{\text{Max}} \quad \frac{g(l_y^M)-\bar{y}}{l_y^M} \equiv w_y^M, \tag{4}$$

where the function g is a firm's production function in the Y industry and has the same properties as function F, and l_y^M and $\bar{y}$ are, respectively, the labour input and the fixed cost in this firm. Here we take commodity Y as numeraire, so that the price of commodity Y is always unity and all other prices are those relative to this price.

The optimal condition for (4) is

$$g_l(l_y^M) = [g(l_y^M)-\bar{y}]/l_y^M \equiv w_y^M, \tag{5}$$

where $g_l(l_y^M) \equiv dg(l_y^M)/dl_y^M$.

Finally the labour constraint has to be imposed as

$$L_X^M + n^M l_y^M = \bar{L}, \tag{6}$$

where $\bar{L}$ is the labour endowment of this country and regarded as given.

For any given p, equations (1), (3), (5) and (6) determine L_M^X, l_y^M, X^M and n^M. These determined values can be regarded as production equilibrium values. Thus, from these variables, we can also calculate w_X^M, w_y^M and $Y^M \equiv n^M[g(l_y^M)-\bar{y}]$.

Concerning w_X^M and w_y^M, if $w_y^M > w_X^M$, then the labour movement would occur from the X industry to the Y industry in order to obtain higher income by establishing new firms in the Y industry. On the contrary, even if $w_X^M > w_y^M$, the labour movement is not inevitable. This is because we consider only one firm can exist in the X industry by some institutional or technological reason. Therefore, we have $w_X^M \geq w_y^M$ in production equilibrium. Thus, we assume, for the time being,

Assumption 1 $\quad w_X^M > w_y^M$ in production equilibrium.

We will discuss later the case where $w_X^M \geqq w_y^M$.

Now our attention has to be directed to the profit-maximizing country (the C country). By assumption, the circumstances in the C country are almost the same as those in the M country. The only difference is the behaviour of the firms. In the C country, the firms behave as profit maximizers. We express the variables of the C country by the superscript C.

Consider the economy without trade. Then the monopolist in the X industry of the C country maximizes its profit $p(X^C)X^C - w^C L_X^C$ with respect to L_X^C, where w^C is the wage rate in the C country and

$$X^C = F(L_X^C) - \bar{X}. \tag{7}$$

The optimal condition is

$$p[1-\varepsilon(p)]F_L(L_X^C) = w^C. \tag{8}$$

On the other hand, there are supposed to be n^C identical firms in the Y industry and a typical firm of this industry aims to maximize its profit $g(l_y^C) - w^c l_y^C - \bar{y}$, where commodity Y is taken as numeraire. Then, the optimal condition is described as

$$g_l(l_y^C) = w^C \tag{9}$$

In the Y industry perfect competition prevails, so that the firm's profit must be vanished. Hence

$$g_l(l_y^C) = [g(l_y^C) - \bar{y}] / l_y^C \tag{10}$$

Combining (8) and (9) together gives

$$p[1 - \varepsilon(p)] F_L(L_X^C) = g_l(l_y^C), \tag{11}$$

Finally the labour constraint is expressed as

$$L_X^C + n^C l_y^C = \bar{L}, \tag{12}$$

For any given p, variables L_X^C, l_y^C, n^C, and X^C are determined by equations (7), (10), (11) and (12). These variables represent the autarkic production equilibrium of the C country.

3. The Autarkic Equilibria

In this section we concentrate our analysis on the autarkic equilibria of both countries. In autarkic production equilibria, l_y^M and l_y^C are the same since they are determined by (5) and (10), respectively. Moreover, for any p, these l_y^M and l_y^C are invariant. Thus the production locus (X^M, Y^M) determined by (1), (6) and Y^M ($\equiv n^M[g(l_y^M) - \bar{y}]$) coincides with the production locus (X^C, Y^C) determined by (7), (12) and Y^C ($\equiv n^C[g(l_y^C) - \bar{y}]$).

Now we examine the shape of these production loci. To do so, differentiate (1), (6) and $Y^M \equiv n^M[g(l_y^M) - \bar{y}]$. Then we obtain $dX^M = F_L(L_X^M) dL_X^M$, $dL_X^M + l_y^M dn_y^M = 0$ and $dY^M \equiv n^M[g(l_y^M) - \bar{y}] dn^M$, from which it must hold that

$$dY^M / dX^M = -g_l(l_y^M) / F_L(L_X^M) < 0 \tag{13}$$

Furthermore, we can also verify that

$$d^2Y^M / dX^{M2} = g_l(l_y^M)[F_{LL}(L_X^M) / F_L(L_X^M)^3] < 0$$

since $F_{LL} \equiv d^2F / dL_X^{M2} < 0$. Therefore, the production locus of the M country is concave to the origin with negative slope. Recalling that the shape of the production locus of the C country is completely the same as that of the M country, we can depict these two loci as in Figure 1.

(Figure 1 about here)

Our next analysis is centered on the autarkic equilibrium of the M country, from which the autarkic supply curve is deduced. Total differentiation of (3) yields

$$-\varepsilon'(p)dp = \frac{F_L(L_X^M)L_X^M F_L(L_X^M) - X^M[F_L(L_X^M) + L_X^M F_{LL}(L_X^M)]}{[L_X^M F_L(L_X^M)]^2} dL_X^M ,$$

where $\varepsilon'(p) \equiv d\varepsilon(p)/dp$. Notice that

$$\begin{aligned} &F_L(L_X^M)^2 L_X^M - X^M[F_L(L_X^M) + L_X^M F_{LL}(L_X^M)] \\ &= F_L(L_X^M)X^M[1/(1-\varepsilon(p)) - 1] - L_X^M F_{LL}(L_X^M)X^M > 0. \end{aligned} \qquad (14)$$

Thus we have

$$dL_X^M / dp \gtreqless 0 \quad \text{if} \quad \varepsilon'(p) \lesseqgtr 0.$$

This, together with the fact that the production locus is negatively sloped, leads us to

$$d(X^M/Y^M)/dp \gtreqless 0 \qquad \text{if} \quad \varepsilon'(p) \lesseqgtr 0.$$

which exhibits the price-supply relation of the M country.

In order to obtain the supply curve of the C country, we differentiate (11) while keeping l_y^C constant. We then have

$$\frac{dL_X^C}{dp} = -\frac{[1-\varepsilon(p) - p\varepsilon'(p)]F_L(L_X^C)}{p[1-\varepsilon(p)]F_{LL}(L_X^C)} > 0,$$

under the following assumption:

Assumption 2 $\quad 1 - \varepsilon(p) - p\varepsilon'(p) > 0.$

Hence X^C/Y^C is an increasing function of p.

Our next step is to investigate where in the production locus the production equilibrium occurs in each country when p is given. For any given p, the production equilibrium of the M country must satisfy

$$-\frac{dY^M}{dX^M} = \frac{w_y^M L_X^M}{pX^M} p[1-\varepsilon(p)],$$

by (13), (3) and (5), while that of the C country must satisfy

$$-\frac{dY^C}{dX^C} = p[1-\varepsilon(p)],$$

by (13) and (11).

Assumption 1 implies that

$$\frac{w_y^M L_X^M}{pX^M} < \frac{w_X^M L_X^M}{pX^M} = 1,$$

whence we have $(-dY^C/dX^C) > (-dY^M/dX^M)$ for any given p. This, combined with the fact that the production loci of both countries are common and concave to the origin, brings forth the result that $(X^C/Y^C) > (X^M/Y^M)$ for any p. This is illustrated in Figure 2.

(Figure 2 about here)

The production equilibrium point of each country should be on the same production locus and for the same p the tangent slope of the locus is steeper at the production equilibrium point of the C country than at that of the M country since $(-dY^C/dX^C) > (-dY^M/dX^M)$. In Figure 2, therefore, the production equilibrium point of the

M country, say P^M, is located somewhere in the North-West direction of the locus from that of the C country, say P^C. Thus, it is evident that $X^M/Y^M < X^C/Y^C$ for any p.

The above conclusion that, for any p, the C country produces more of commodity X than the M country assures straightforwardly Figure 3 where the supply curve of the M country is lying below that of the C country. This is independent of the sign of ε'. In Figure 3, the supply curve of the C country is represented as the CC curve which is upward sloping and that of the M country as the MM curve which is fluctuating (depending on the sign of ε').

(Figure 3 about here)

We are now in a position to take account of the demand side. By assumption preferences are homothetic and identical for both countries. Therefore, both countries have the following identical demand functions:

$$X^i/Y^i = h(p), \quad i = M,C \tag{15}$$

where $h' \equiv dh/dp < 0$. The curve of these functions is also drawn in Figure 3 as the DD curve.

Figure 3 gives the autarkic equilibria of both countries. E^{CA} and E^{MA} display the autarkic equilibria of the C and M countries, respectively. Let the autarkic equilibrium price of commodity X in the ith country be denoted as p^{iA}, $i = M, C$, and the autarkic equilibrium supplies of commodities X and Y in the i country as X^{iA} and Y^{iA}, respectively. Then, obviously, $p^{MA} > p^{MC}$ and $X^{CA}/Y^{CA} > X^{MA}/Y^{MA}$, in view of Figure 3.

Thus, our first theorem is obtained as

Theorem 1

Under Assumptions 1 and 2, the autarkic equilibrium price of the monopolized commodity is higher in the labour-managed country than in the profit-maximizing country and the autarkic equilibrium output ratio of the monopolized commodity to the other commodity is less in the labour-managed country than in the profit-maximizing country.

We turn our attention to the welfare aspect of each country. Theorem 1 produces Figure 4 since $X^{MA} < X^{CA}$ in autarkic equilibrium. In Figure 4, E^{MA} and E^{CA} express the autarkic equilibrium of the M and C countries, respectively. The budget constraint of the C country includes E^{MA} because the slope of the price line p^{CA} passing through E^{CA} is steeper than the tangent line of the locus at E^{CA}. Hence, the aggregate utility of the C country becomes higher than that of the M country for the autarkic equilibrium indifference curve of the M country must pass through E^{MA}. This is seen in Figure 4 where U^{iA} is the autarkic equilibrium indifference curve of the ith country.

(Figure 4 about here)

Now we can state

Theorem 2

Under Assumptions 1 and 2, the autarkic equilibrium level of welfare is lower in the M country than in the C country.

We close this section by making a remark.

Remark 1 If we relax Assumption 1, it is possible to have the case where $w_x^M = w_y^M$ at equilibrium. In this case the supply curves of both countries have a common point where

the demand curve cuts these supply curves. This case is illustrated in Figure 5. In this situation, both countries have the same autarkic price and output, so that the autarkic level of welfare is the same between two countries.

(Figure 5 about here)

4. The Pattern of Trade

This section deals with the analysis on the pattern of trade between the labour-managed and profit-maximizing countries. Consider the opening of trade. Then the monopolist of each country faces oligopolistic competition in the world market. We assume that these firms behave as the oligopolists of the Cournot-Nash type.

Let $Q \equiv X^C + X^M$. Then, following trade, the production equilibrium of the M country is obtained by the Cournot-Nash behaviour as

$$[p'(Q)X^C + p(Q)]F_L(L_X^M)L_X^M = p(Q)X^M,$$

which is rewritten as

$$\frac{g_l(l_y^M)L_X^M p[1-\sigma^M \varepsilon(p)]}{pX^M} = \frac{g_l(l_y^M)}{F_L(L_X^M)} \equiv MRT^M, \qquad (16)$$

where $\sigma^M \equiv X^M/Q$ and MRT^M indicates the marginal rate of transformation of the M country.

In a similar way, the production equilibrium of the C country is expressed as

$$p'(Q)X^C + p(Q) = g_l(l_y^C)/F_L(L_X^C),$$

which is further rewritten as

$$p[1-\sigma^C \varepsilon(p)] = g_l(l_y^C)/F_L(L_X^C) \equiv MRT^C \qquad (17)$$

where $\sigma^C \equiv X^C/Q$ and MRT^C is similarly defined as the marginal rate of transformation MRT^M but of the C country.

For any p, solving equations (16) and (17) simultaneously yields the production equilibrium values of X^M and X^C under free trade. For any p, suppose now that $\sigma^M \geq \sigma^C$. This means $X^M \geq X^C$, implying $MRT^C \leq MRT^M$ by the concavity property of the production locus. On the other hand, in view (16), (17) and Assumption 1, we have

$$MRT^M = g_l(l_y^M)L_X^M[1-\sigma^M \varepsilon(p)]/X^M < p[1-\sigma^M \varepsilon(p)] \leq p[1-\sigma^C \varepsilon(p)] = MRT^C,$$

which is a contradiction. Hence, it must hold true that $\sigma^M < \sigma^C$ for any given p. In other words, we must have

$$X^M/Y^M < X^C/Y^C, \text{ for any } p. \qquad (18)$$

As for the demand side, by the homotheticity of preferences, equation (15) applies to each country even after trade. Therefore, it follows that

$$D_X^M / D_Y^M = D_X^C / D_Y^C, \text{ for any } p, \qquad (19)$$

where D_j^i stands for the demand in commodity j in the ith country, for $j = X, Y$; $i = M, C$.

Equations (18) and (19), together with the world market clearing condition that $D_X^M + D_X^C = X^M + X^C$, yield

$$D_X^M > X^M \text{ and } D_Y^M < Y^M$$

at the trade equilibrium.

So we obtain the following result:

Theorem 3

Under Assumption 1, after the opening of trade, the labour-managed country exports the commodity produced under perfect competition and imports the commodity produced under imperfect competition, while the profit-maximizing country exports the commodity produced under imperfect competition and imports the commodity produced under perfect competition.

This section is also closed by a remark on the case where $w_X^M = w_Y^M$.

Remark 2 If we allow for $w_X^M = w_Y^M$ in Assumption 1, it may be the case that $w_X^M = w_Y^M$ in trade equilibrium. Then, $MRT^C = MRT^M$ and there is no trade.

5. The Gains From Trade

In addition to the analysis on the pattern of trade, there is another significant topic to tackle with. That is to investigate whether trade is gainful or not. This section is devoted to this problem.

We begin with the following lemma which will be useful to draw out clear results on the gains from trade.

Lemma 1

Under Assumption 1, for any country, if the commodity produced under imperfect competition is produced in greater quantity after trade than before trade, then trade is gainful for this country.

Proof. Consult Figure 6 where the curve concave to the origin is the production locus of any country and points E^A and E^T on the locus is the autarkic and trade production equilibria of that country, respectively. By (16) or (17), the trade equilibrium price line p^T which cuts the production locus at E^T is steeper than the tangent line of the locus at E^T. So, if E^A exists somewhere on the LHS part of the locus from E^T, E^A is attainable after trade. This implies that the welfare after trade must be greater than that prevailing before trade. In Figure 6, the before- and after-trade welfare levels are indicated by the indifference curves U^A and U^T, respectively. Q.E.D.

(Figure 6 about here)

Now consider the case of the C country and let p^T and p^{CA} be country C's trade and autarkic equilibrium prices, respectively. In order to compare the welfare level after trade with that before trade, we treat the case of $p^T < p^{CA}$ and the case of $p^T \geq p^{CA}$, separately.

First, consider the case where $p^T < p^{CA}$. The fact that $p^T < p^{CA}$ brings forth $D_X^{CT} / D_Y^{CT} > D_X^{CA} / D_Y^{CA} = X^{CA} / Y^{CA}$, where D_j^{CT} and D_j^{CA}, respectively, stand for the trade and autarkic equilibrium demands for commodity j in the C country, $j = X, Y$. It follows from Theorem 3 that $D_X^{CT} / D_Y^{CT} < X^{CT} / Y^{CT}$, where X^{CT} and Y^{CT} are, respectively, the

trade equilibrium supplies of commodity X and Y in the C country. Therefore, it is clear that $X^{CA}/Y^{CA} < X^{CT}/Y^{CT}$. Hence $X^{CA} < X^{CT}$. Making use of Lemma 1, obviously, the C country gains from trade.

Second, consider the case where $p^T \geq p^{CA}$. Assumption 2 assures

$$MRT^{CA} = p^{CA}[1 - \varepsilon(p^{CA})] \leq p^T[1 - \varepsilon(p^T)] < p^T[1 - \sigma^C\varepsilon(p^T)] = MRT^{CT},$$

where MRT^{CA} and MRT^{CT} mean the marginal rates of transformation at the autarkic and trade equilibrium points of the C country, respectively. Thus, we have $X^{CA}/Y^{CA} < X^{CT}/Y^{CT}$ by the concave property of the production locus, yielding $X^{CA} < X^{CT}$. Again, a gain from trade is assured for the C country, because of Lemma 1.

Theorem 4

Under Assumptions 1 and 2, free trade is always gainful for the profit-maximizing country, which produces more of the monopolized commodity after trade than before trade.

Our subsequent analysis is directed to the case of the M country. Recalling (3), we differentiate it with respect to σ^M and L_X^M by taking account of $X^M = F(L_X^M)$. The outcome is

$$-\varepsilon(p)d\sigma^M = \frac{F_L(L_X^M)^2 L_X^M - X^M[F_L(L_X^M) + L_X^M F_{LL}(L_X^M)]}{[L_X^M F_L(L_X^M)]^2} dL_X^M$$

from which

$$dL_X^M/d\sigma^M < 0, \qquad (18)$$

by virtue of (14).

We know from the analysis of section 3 that the autarkic supply curve is upward sloping if ε' never takes positive sign. Moreover, (18) assures that the after-trade supply curve lies above the autarkic supply curve as in Figure 7(a), where curves A and T are, respectively, the autarkic and after-trade supply curves of the M country. Figure 7(a) shows evidently that if $p^{MA} \leq p^T$, $X^{MT}/Y^{MT} > X^{MA}/Y^{MA}$, where X^{MT} and Y^{MT} are, respectively, the supplies of commodities X and Y in the M country at trade equilibrium. So, $X^{MT} > X^{MA}$. Consequently, trade is gainful for country M by Lemma 1.

On the contrary, suppose that for any p, ε' is positive. The autarkic supply curve becomes downward sloping, so that we have Figure 7(b). Clearly the supply of commodity X increases after trade if $p^T < p^{MA}$. Again, trade is gainful for country M.

(Figures 7(a) and 7(b) about here)

Based on these observations, we present the following theorem.

Theorem 5

Suppose that Assumptions 1 and 2 hold. Then (i) the supply of the commodity of imperfect competition decreases after trade in the labour-managed country if its price does not decrease after trade, and (ii) trade is gainful for the labour-managed country if the sign of ε' is positive for any p and if the price of the commodity produced under imperfect competition becomes higher after trade in this country.

Proof. (i) Suppose that after trade the supply of commodity X does not decrease in the M country. Then we have

$$\frac{D_X^{MA}}{D_Y^{MA}} = \frac{X^{MA}}{Y^{MA}} \leq \frac{X^{MT}}{Y^{MT}}, \tag{19}$$

Theorem 4 assures that

$$\frac{D_X^{CA}}{D_Y^{CA}} = \frac{X^{CA}}{Y^{CA}} < \frac{X^{CT}}{Y^{CT}}, \tag{20}$$

On the other hand, it must hold that

$$\frac{D_X^{MT}}{D_Y^{MT}} \leq \frac{D_X^{MA}}{D_Y^{MA}}, \text{ and } \frac{D_X^{CT}}{D_Y^{CT}} \leq \frac{D_X^{CA}}{D_Y^{CA}}, \tag{21}$$

since $p^{CA} < p^{MA} \leq p^T$. Consequently, from (19), (20), and (21), we obtain

$$\frac{D_X^{MT}}{D_Y^{MT}} \leq \frac{X^{MT}}{Y^{MT}}, \text{ and } \frac{D_X^{CT}}{D_Y^{CT}} < \frac{X^{CT}}{Y^{CT}},$$

which contradicts to the world market clearing condition. Therefore, after trade, the supply of commodity X must decrease in the M country.

(ii) From (i), the case of Figure 7(a) does not arises. The case of Figure 7(b), however, remains to be possible. Q.E.D.

Theorems 4 and 5 tell us that the profit-maximizing country necessarily gains from trade while the labour-managed country does not. Recall that the labour-managed country tends to produce the imperfectly competitive commodity less than the profit-maximizing country and thus the *exporter* of the commodity produced under imperfect competition is the profit-maximizing country. Thus our result is, in some respects, similar to that obtained previously by Markusen (1981). He analyzed the model where both countries

are of the profit-maximizing type but they are different in size. Markusen concluded that the smaller country who is an *exporter* of the commodity produced under imperfect competition gains from trade, but the other country does not necessarily.

Following the previous sections, we close this section by making a brief remark on the case where $w_X^M = w_Y^M$.

Remark 3

Allow for the case where $w_X^M = w_Y^M$ and suppose that it holds true at the trade equilibrium. Then, at the trade equilibrium, both countries would produce the same amount of the imperfectly competitive commodity and gain from the *possibility* of trade even though actual trade never occurs.

Remark 3 means that if we assume that $w_X^M = w_Y^M$ not only the profit-maximizing country but also the labour-managed country will gain from trade. The reason is as follows: The C country produces commodity X more or at least equal to the M country when there is no trade. And once trade starts, the C country produces that commodity more than before. Since the M country produces it in just the same amount as the C country after trade, the provision of commodity X in the M country necessarily increases after trade.

6. The Difference in Country Sizes

In this section we briefly discuss the case where two countries are different in size. The size of a country is measured by its labour endowment.

We first assume that the C country is larger than the M country, implying $\bar{L}^C > \bar{L}^M$, where $\bar{L}^i$ is the labour endowment of the ith country. Then the production

locus of the C country shifts vertically, holding the same shape. Therefore, for a common value of X, the production loci of both countries have identical tangent lines as is illustrated in Figure 8. C' is the locus of the C country while M is that of the M country. For any common level of X, say $\overline{X}$ in the figure, the corresponding tangent lines A and A' have the same slope.

(Figure 8 about here)

Keeping Figure 8 in mind, we notice that, for any given p, the country size does not affect the supply amount of commodity X but does affect that of commodity Y. Obviously, for any given p, the supply ratio X/Y falls if $\overline{L}$ increases. Under the present assumption that $\overline{L}$ increases in the C country, Figure 9 is produced to illustrate the supply and demand curves. As $\overline{L}$ of the C country increases, the supply curve of the C country moves downward from C to C' while the demand curve D and the supply curve of the M country stay there. Thus, if the C country is large enough as in Figure 9, Theorem 1 is no longer true and, in fact, the reserve holds for both countries' autarkic equilibria.

(Figure 9 about here)

Now consider the trade between these countries. The analysis of section 4 is valid in the present circumstances. So it is true that $X^M < X^C$ for any p. But, since the C country is larger than the M country, Y^C is greater than Y^M. If this gap is sufficiently large, it is possible that $X^{MT}/Y^{MT} > X^{CT}/Y^{CT}$ for any p. This implies that at the trade equilibrium the C country imports commodity X and the M country exports it. The pattern of trade is reserved from that in Theorem 3. Consequently, it is possible that the M country gains and the C country loses from trade. The larger the size of country C relative to that of the M country, the more likely it is.

Let us consider the remaining case where the C country is smaller than the M country in size. Then, the corresponding production locus and the supply curve of the C country are illustrated as C'' in Figures 8 and 9. Obviously nothing alters from what we obtain in the case where the country sizes are identical. So all theorems presented so far survive.

7. Summary

In this paper we investigated the pattern of trade and the gains from trade between profit-maximizing and labour-managed countries. Our results are summarised as follows:

(i) If the country size is equal between countries, the welfare level of the profit-maximizing country is higher than the labour-managed country in autarky. This is because the former country produces the imperfectly competitive commodity more than the latter country in autarky.

(ii) If the labour-managed country is larger than or equal to the profit-maximizing country in size, the profit-maximizing country exports the imperfectly competitive commodity and gains from trade while the other country may lose from trade.

(iii) If the profit-maximizing country is larger than the labour-managed country, the labour-managed country may export the imperfectly competitive commodity and may have a trade gain while the other country may lose from trade. The greater the difference in country sizes, the more likely it is.

It is possible to suppose that the U.S. is a profit-maximizing country and much larger than Japan in scale. Then, if Japanese firms behave like labour-managed firms, free trade between these counties is likely to be gainful to Japan but may be harmful to the U.S. Thus, free trade does not necessarily improve the trade deficit of the U.S. as long as Japanese firms are of the labour-managed type. Though we need careful examinations on the behaviour of Japanese firms, it is no doubt that the difference is not only the organization of industries but also the aim of firms between countries affects the trade patterns and gains quite seriously.

Finally, we may have an interest in observing trade between labour-managed counties. If we confine it in our present framework, we can easily guess from the analysis of section 6 that a smaller labour-managed country would export the imperfectly competitive commodity and enjoy the gains from trade. This is a similar conclusion to what Markusen (1981) obtained in the economy where all countries are of the profit-maximizing type.

Footnotes

(1) As for the meaning or concept of a labour-managed firm, see, for example, Ward (1958) or Vanek (1970). perhaps the most influential argument is found in Komiya (1988), where he discussed the similarity between Japanese firms and labour-managed firms.

(2) Concerning the successful performance of the Japanese economy, Morishima (1982) inspired by Max Weber, argued in his excellent book that ....

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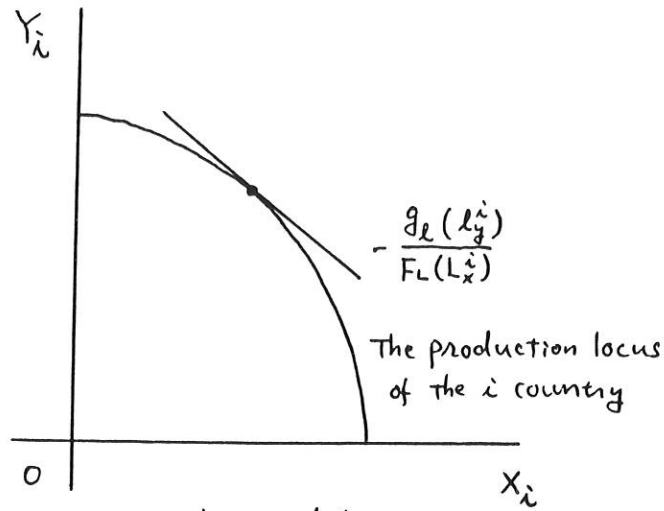

i = M and C

Figure 1

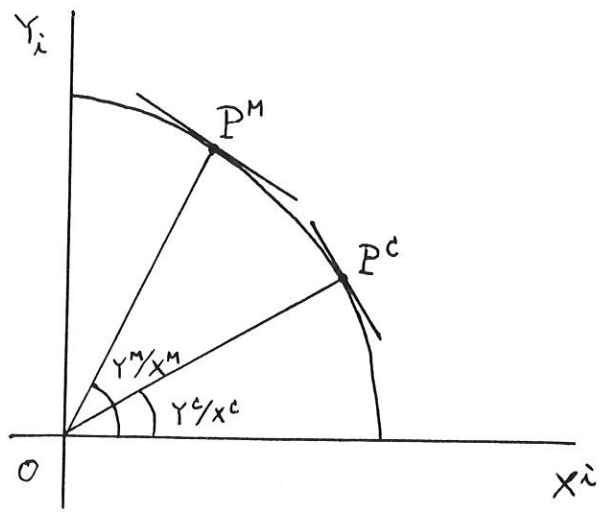

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Figure 2

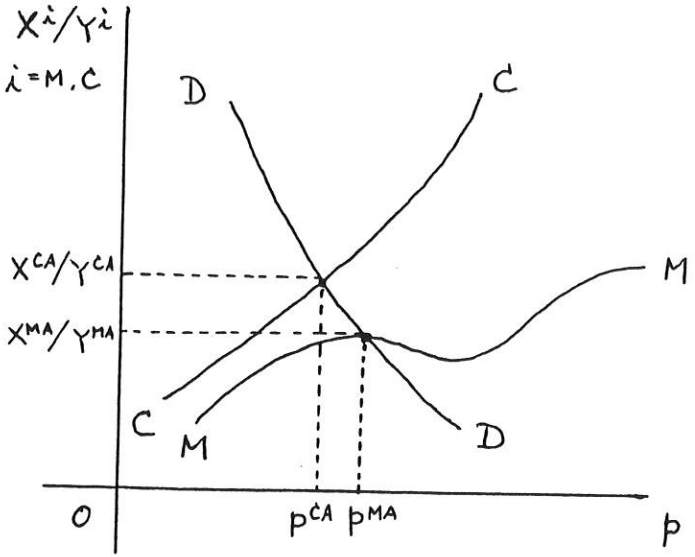


Figure 3

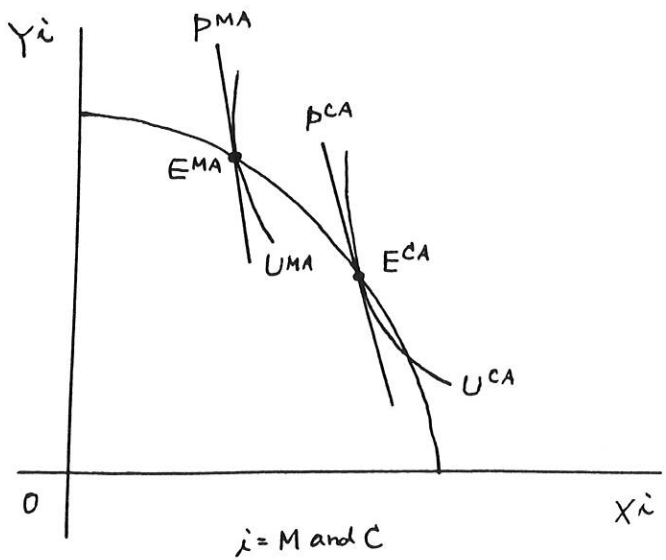


Figure 4

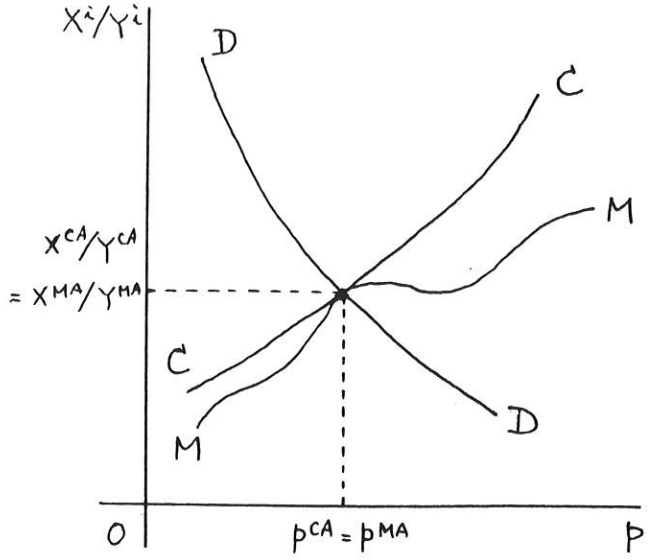


Figure 5

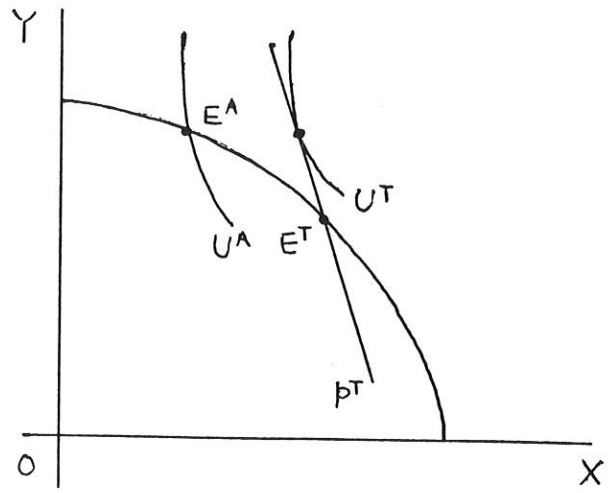


Figure 6

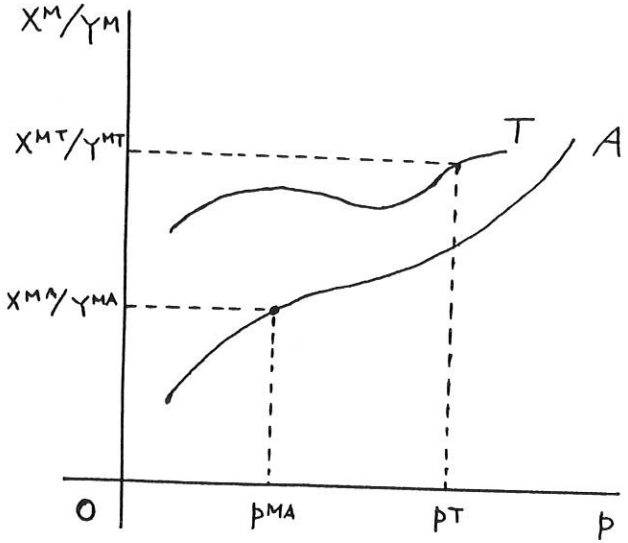


Figure 7 (a) $\varepsilon' \leq 0$

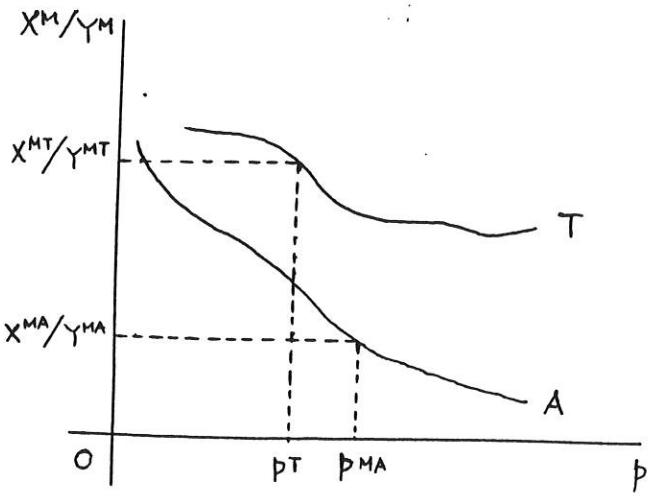
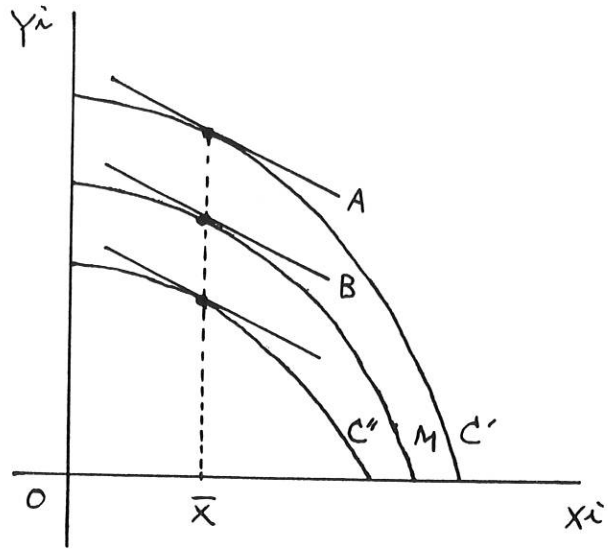


Figure 7 (b) $\varepsilon' > 0$



i = M and C

Figure 8

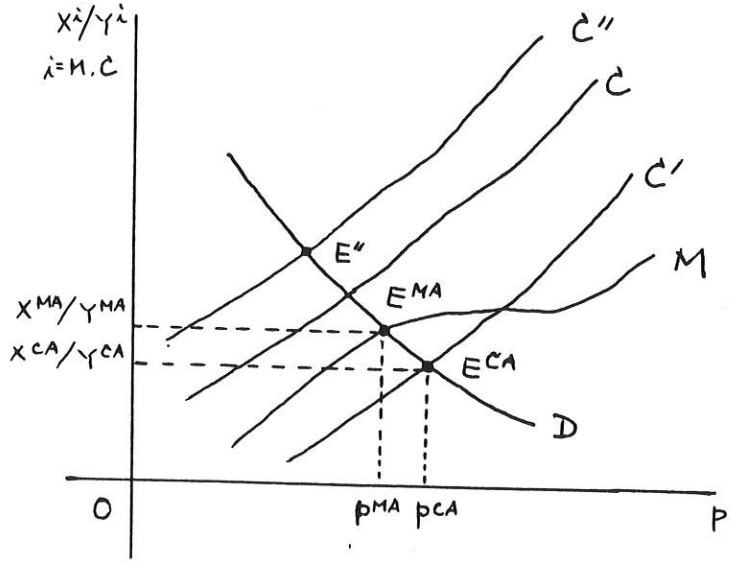


Figure 9

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