Center for Economic Studies, University of Munich, 80539 Munich, Germany

CENTER FOR ECONOMIC STUDIES

EFFECTS OF TARIFF ON INTERNATIONAL MIXED DUOPOLY WITH SEVERAL MARKETS

Koji Okuguchi

Working Paper No. 93

UNIVERSITY OF MUNICH

CES

Working Paper Series

CES Working Paper Series

EFFECTS OF TARIFF ON
INTERNATIONAL MIXED DUOPOLY
WITH SEVERAL MARKETS

Koji Okuguchi

Working Paper No. 93

1995

Center for Economic Studies
University of Munich
Schackstr. 4
80539 Munich
Germany
Telephone & Telefax:
++49-89-2180-3112

This paper was written during the author's stay at *CES*, University of Munich during the summer of 1995. I am grateful to Professor Hans-Werner Sinn for giving me the opportunity to visit *CES*.

CES Working Paper No. 93
November 1995

EFFECTS OF TARIFF ON INTERNATIONAL MIXED DUOPOLY WITH SEVERAL MARKETS

Abstract

First, we formulate international multi-market mixed duopoly consisting of one labor-managed firm (economy) and one profit-maximizing firm (economy), which is shown to have a unique Cournot equilibrium under a set of reasonable assumptions. Second, we examine the effects of the LME's tariff imposed on its imports from the PME. We find that the tariff has ambiguous effects on both LME's and PME's equilibrium total outputs. This result is in sharp contrast with the one obtained for international multi-market duopoly comprising two profit-maximizing firms with decreasing marginal costs.

Koji Okuguchi
Department of Economics
Nanzan University
18 Yamazato-cho, Showa-ku
Nagoya 466
Japan

1. Introduction

Mixed duopoly is characterized by coexistence of one profit-maximizing firm and one labor-managed firm or that of one profit-maximizing firm and one welfare-maximizing public firm. A labor-managed firm is well known to behave perversely in the event of a change in its product price or fixed costs. Mai and Hwang (1989), Okuguchi (1991) and Horowitz (1991) have analyzed the effects of subsidy to labor-managed firm in international mixed duopoly with one profit-maximizing firm or economy (PMF or PME for short) and one labor-managed firm or economy (LMF or LME for short). Any firm, be it LMF or PMF, sells its product not only in its domestic market but also in several foreign markets. Krugman (1984) has demonstrated the export promoting effects of import protection for international duopoly model without product differentiation and with several markets, assuming that both duopolists's marginal costs are decreasing. Okuguchi (1990) has examined the existence of a unique Cournot equilibrium in a model of international duopoly with several markets. Okuguchi and Serizawa (1995) have analyzed the effect of tariff on international duopoly with several markets, assuming asymmetric marginal costs for duopolists.

In this paper we will formulate international mixed duopoly with one LMF and one PMF, as well as with several markets, and analyze the effects of the LME's imposition of tariff on the total outputs of the LME and the PME.

As a preliminary to this investigation, we will in Section 2 prove the existence of a unique Cournot equilibrium for international duopoly with one LMF and one PMF in the absence of trade policy. In Section 3, we will introduce trade policy into our model of international duopoly. We will find that the effects of tariff on the LME's and PME's total outputs are, in general ambiguous. This is in sharp contrast with Krugman's export promoting effect of tariff in international duopoly with two profit-maximizing firms and with several markets.

2. International Duopoly in the Absence of Tariff

In this section we will formulate international mixed duopoly without product differentiation and with several markets. In the following analysis, variables without asterisk refer to the LMF and those with it to the PMF. Let $L = f(\Sigma x_i)$ with $f' > 0$, and $f'' > 0$ be the LMF's labor demand function, where L is the total labor working for the LMF and x_i is its supply to market i, $i = 1,2,\dots,n$. We let market 1 to be LMF's domestic market. Let $p_i = p_i(x_i + x_i^*)$ with $p_i' < 0$ be the inverse demand function in market i, where p_i is the market price of the product supplied by both LMF and PMF. If w and K are the competitive wage rate and fixed cost, respectively, the LMF's dividend s per unit of labor is given by

$$(1)\quad s \equiv \{\Sigma p_j(x_j + x_j^*)x_j - wf(\Sigma x_j) - K\}/f(\Sigma x_j) + w \ .$$

The PMF's profits, π^*, are

$$(2)\quad \pi^* \equiv \Sigma p_j(x_j + x_j^*)x_j^* - w^* f(\Sigma x_j^*) - K^* \ .$$

Assume that both LMF and PMF expect their rival's supplies to all markets to be unaffected by their supplies, i.e. both firms behave as Cournot duopolists in any market. Assume further that both firms' supplies to all markets be positive. Then, the first order condition for maximum s with respect to x_i is

$$(3)\quad \partial s/\partial x_i = \{(p_i + x_i p_i' - wf')f - (\Sigma p_j x_j - wf - K)f'\}/f^2 = 0 \quad , \ i = 1,2,\dots,n \ ,$$

or

$$(4)\quad u^i(x_i, x_i^*, \Sigma x_j) \equiv (p_i + x_i p_i' - wf'(\Sigma x_j))f(\Sigma x_j) - (\Sigma p_j x_j - wf(\Sigma x_j) - K)f'(\Sigma x_j) = 0 \ , \quad i = 1,2,\dots,n \ .$$

The second order condition is shown to be identical to

$$(5)\quad \partial u^i/\partial x_i \equiv u_1^i = (p_i' + p_i' + x_i p_i'' - wf'')f - (\Sigma p_j x_j - wf - K)f'' < 0 \ , \ i = 1,2,\dots,n \ .$$

Before proceeding further, we introduce the following fundamental assumption ("A" before 6 refers to the assumption. The similar convention applies to other assumptions.)

$$(A.6)\quad p_i' + x_i p_i'' < 0, \qquad p_i + x_i^* p_i'' < 0, \qquad i = 1,2,\dots,n \ .$$

This assumption has been widely used in the existence and stability analysis of the classical Cournot oligopoly equilibrium, as the reader can confirm from Okuguchi (1976) and Okuguchi and Szidarovszky (1990). It requires two firms' outputs to be strategic substitutes in each segmented market. If the LMF is viable,

$$(A.7)\quad \Sigma p_j x_j - wL - K \geq 0, \qquad i = 1,2,\dots,n$$

must hold. Hence (5) holds under (A.6) .

The first order and second order conditions for the PMF are

$$(8)\quad u^{*i}(x_i, x_i^*, \Sigma x_j^*) = p_i + x_i^* p_i' - w^* f^{*\prime}(\Sigma x_j^*) = \partial\pi^*/\partial x_i^* = 0, \quad i = 1,2,\dots,n$$

and

$$(9)\quad \partial u^{*i}/\partial x_i^* \equiv u_2^{*i} = p_i' + p_i' + x_i^* p_i'' - w^* f'' < 0, \quad i = 1,2,\dots,n \ ,$$

respectively. Under (A.6), (9) is satisfied.

We introduce two additional assumptions.

$$(A.10)\quad \Delta_i \equiv \begin{vmatrix} u_1^i & u_2^i \\ u_1^{*i} & u_2^{*i} \end{vmatrix} > 0, \qquad i = 1,2,\dots,n \ .$$

$$(A.11)\quad \partial u^i/\partial X \equiv u_X^i = (p_i + x_i p_i')f' - (\Sigma p_j x_j - K)f'' < 0, \quad i = 1,2,\dots,n \ ,$$

where $X \equiv \Sigma x_j$. Furthermore, let $X^* \equiv \Sigma x_j^*$. We note that

$$(A.12)\quad \partial u^i/\partial x_i^* \equiv u_2^i = x_i f p_i'' - p_i'(f - x_i f') \gtreqless 0, \qquad i = 1,2,\dots,n \ .$$

The assumption (A.10) holds if the stability condition is satisfied [1]; (A.11) holds if the LMF is viable.

Solving (4) and (8) with respect to x_i and x_i^*, we have

(13.1) $x_i \equiv \varphi^i(X, X^*), \qquad i = 1,2,\dots,n$,

where

(13.2) $\partial\varphi^i/\partial X = -u_X^i u_2^{*i}/\Delta_i < 0, \quad i = 1,2,\dots,n$,

(13.3) $\partial\varphi^i/\partial X^* = u_{X^*}^{*i} u_2^i/\Delta_i \gtreqless 0,$ according as $u_2^i \lesseqgtr 0$, $i = 1,2,\dots,n$,

and

(14.1) $x_i^* = \varphi^{*i}(X, X^*), \qquad i = 1,2,\dots,n$,

where

(14.2) $\partial\varphi^{*i}/\partial X = u_X^i u_1^{*i}/\Delta_i > 0, \qquad i = 1,2,\dots,n$,

(14.3) $\partial\varphi^{*i}/\partial X^* = -u_{X^*}^{*i} u_1^i/\Delta_i < 0, \qquad i = 1,2,\dots,n$,

where we have made use of the assumptions (A.6), (A.10), and (A.11)[2]. Note that the sign of $\partial\varphi^i/\partial X^*$ is indeterminate.

The Cournot equilibrium total outputs for the LMF and PMF are identical to the solution of the following system of equations, (15.1) and (16.1).

(15.1) $X = \varphi(X, X^*) \equiv \sum_j \varphi^j(X, X^*),$

where

(15.2) $\varphi_X < 0, \quad \varphi_{X^*} \gtreqless 0,$ according as $u_2^i \lesseqgtr 0$ for all i .

(16.1) $X^* = \varphi^*(X, X^*) \equiv \sum_j \varphi^{*j}(X, X^*)$,

where

(16.2) $\varphi_X^* > 0 \quad \varphi_{X^*}^* < 0.$

We can find the solution by use of diagrams. Ruling out the case where $\varphi_{X^*} = 0$, we have to consider two cases.

Case 1 where $\varphi_{X^*} > 0$[3] : In this case the curve for $\varphi(X, X^*)$ for arbitrarily given X^* has a unique intersection E with the 45 degree line, as depicted in Fig.1. The intersection moves to northeast of E if X^* increases. Thus solving (15.1) with respect to X , we have

(17.1) $X \equiv F(X^*), \quad F' > 0$.

Case 2 where $\varphi_{X^*} < 0$: In this case the intersection of the curve for $\varphi(X, X^*)$ with the 45 degree line moves to southwest if X^* increases. Hence,

(17.2) $X \equiv F(X^*), \quad F' < 0$.

Taking into account (16.2) and arguing similarly as above, we can solve (16.1) with respect to X^* as

(18) $X^* \equiv F^*(X), \quad F^{*\prime} > 0$.

Combining (17.1) and (18), we have the equilibrium as the unique intersection E of the two upward-sloping curves, as in Fig.2 where we have assumed that the slope of the curve for (17.1) is greater than that of the curve for (18)[4] .

In the second case when (17.2) and (18) hold, the equilibrium is identical with the unique intersection of the downward-sloping curve for (17.2) and the upward sloping curve for (18), as shown in Fig.3.

3. Effects of Tariff

We are now in a position to analyze the effects of the LME's imposition of tariff on the PME's exports. Let market 1 be the LME's domestic market and t be the parameter for the tariff imposed on its imports from the PME. Then, the PME's revenue from the LME is written as $R^{*1}(x_1, x_1^*, t)$, where

(19) $\partial R^{*1}/\partial t \equiv R_t^{*1} < 0, \qquad \partial^2 R^{*1}/\partial x_1 \partial t \equiv R_{1t}^{*1} < 0$.

The first order condition for the LME's own market is unaffected by the tariff and given by

(20) $u^1(x_1, x_1^*, X) = 0$,

while the PME's first order condition for the same market is now written as

(21) $u^{*1}(x_1, x_1^*, X^*, t) \equiv \partial R^{*1}/\partial x_1^* - w^* f^{*\prime}(X^*) = 0$,

where $u_t^{*1} < 0$.

The first order conditions for all other markets remain the same as before for both LME and PME. Solving (20) and (21) with respect to x_1 and x_1^* , and taking into account (19), we have

(22.1) $x_1 \equiv \varphi^1(X, X^*, t)$,

(22.2) $\partial \varphi^1/\partial X = -u_X^1 u_2^{*1}/\Delta_1 < 0$,

(22.3) $\partial \varphi^1/\partial X^* = u_{X^*}^{*1} u_2^1/\Delta_1 \gtrless 0$ according as $u_2^1 \lesseqgtr 0$,

(22.4) $\partial \varphi^1/\partial t = u_2^1 u_t^{*1}/\Delta_1 \gtrless 0$ according as $u_2^1 \lesseqgtr 0$.

(23.1) $x_1^* \equiv \varphi^{*1}(X, X^*, t)$,

(23.2) $\partial \varphi^{*1}/\partial X = u_X^1 u_1^{*1}/\Delta_1 > 0$,

(23.3) $\partial \varphi^{*1}/\partial X^* = -u_{X^*}^{*1} u_1^1/\Delta_1 < 0$,

(23.4) $\partial \varphi^{*1}/\partial t = -u_1^1 u_t^{*1}/\Delta_1 < 0$.

The Cournot equilibrium total outputs in the presence of tariff are the values of X and X^* satisfying (24) and (25).

(24) $X = \varphi(X, X^*, t) \equiv \varphi^1(X, X^*, t) + \sum_{j=2}^{n} \varphi^j(X, X^*)$,

(25) $X^* = \varphi^*(X, X^*, t) \equiv \varphi^{*1}(X, X^*, t) + \sum_{j=2}^{n} \varphi^{*j}(X, X^*)$.

We have from (24) , (22.2), (22.3), (22.4), and (13.2) and (13.3) for $i = 2, \dots, n$,

(26.1) $X \equiv F(X^*, t)$,

where

(26.2) $F_{X^*} \gtrless 0$ according as $u_2^i \lesseqgtr 0$ for all i ; $F_t \gtrless 0$ according as $u_2^i \lesseqgtr 0$.

Solving (25) with respect to X^* and taking into account (23.2), (23.3) and (23.4) as well as (14.2) and (14.3) for $i = 2, \dots, n$, we derive the equation

(27.1) $X^* \equiv F^*(X, t)$,

where

(27.2) $F_X^* > 0, \qquad F_t^* < 0$.

We have to distinguish two cases depending upon the sign of F_{X^*} , excluding the case where $F_{X^*} = 0$.

Case 1 where $F_{X^*} > 0$: In this case, $u_2^i < 0$ for all i and $F_t > 0$. Let the initial equilibrium be E in Fig.4. If t increases, the curve for $F(X^*, t)$ shifts downward and that for $F^*(X, t)$ also shifts downward. Consequently, five possibilities arise. At the equilibrium E_1 , the total outputs for both economies increase. In the case of E_2 , the LME's total output increases but the PME's total output remains unchanged. At E_3 , the total output of LME increases but that of PME decreases. At E_4 , the total output of LME remains unchanged and that of PME decreases. In the case of E_5 , the total outputs decrease for both economies.

Case 2 where $F_{X^*} < 0$: In this case, $u_2^1 > 0$ for all i and $F_t < 0$. The curves for both $F(X^*, t)$ and $F^*(X, t)$ shift downward in the event of an increase in t , as depicted in Fig.5. Three possibilities arise. In all three cases, the total output for the PME decreases. On the other hand , the LME's total output decreases , remains unchanged , or increases if the new equilibrium is E_1 , E_2 or E_3 , respectively.

Thus the effect of tariff on the LME's and PME's equilibrium total outputs are, in general, ambiguous regardless of the signs of F_{X^*} and F_t [5].

4. Conclusion

In Section 2 we have formulated international duopoly comprising one labor-managed firm (or economy) and one profit-maximizing firm (or economy) and assumed that the homogeneous goods produced by the two firms are sold in several markets. After deriving the relationships between the two firms' total outputs, separately for each firm, we have established the existence of a unique Cournot equilibrium. In Section 3, we have extended our model in Section 2 to take into consideration of the effects of the LME's tariff on the two firms' equilibrium total outputs. We have found that those effects are in general ambiguous. This contrasts with Krugman's export promoting effect of tariff on international duopoly consisting of two profit-maximizing firms (or economies) with diminishing marginal costs.

Footnotes

1. Suppose that x_j and x_j^* are given for all $j \neq i$. Suppose, in addition, that x_i and x_i^* are adjusted according to

$$\frac{dx_i}{dt} = \alpha_i u^i,$$
$$\frac{dx_i^*}{dt} = \alpha_i^* u^{*1},$$

where α_i and α_i^* are positive constants and $\operatorname{sgn} u^i = \operatorname{sgn} \partial s/\partial x_i$. Since $u_1^i < 0$ and $u_2^{*i} < 0$, we can claim that the above system is globally stable if $\Delta_i > 0$ in the light of Olech (1963)'s theorem.

2. The partial derivatives of u^i and u^{*i} are calculated and signed as follows:

$$u_1^i = (p_i' + p_i' + x_i p_i'' - wf'')f - (\Sigma p_j x_j - wf - K)f'' < 0,$$
$$u_2^i = x_i p_i'' f + p_i'(f - x_i f') \gtreqless 0,$$
$$u_X^i = (p_i + x_i p_i')f' - (\Sigma p_j x_j - K)f'' < 0,$$
$$u_1^{*i} = p_i' + x_i^* p_i'' < 0,$$
$$u_2^{*i} = p_i' + p_i' + x_i^* p_i'' - w^* f^{*''} < 0,$$
$$u_{X^*}^{*i} = -w^* f^{*''} < 0.$$

3. If $u_2^i < 0$ for all i , we have $\partial\varphi^i/\partial X^* > 0$ for all i , hence $\partial\varphi/\partial X^* > 0$. If, in addition, p_i is sufficiently concave, $u_2^i < 0$ is likely to hold. On the other hand, we have $\partial\varphi/\partial X^* < 0$ if $u_2^i > 0$ for all i, which is true provided that p_i is either convex, or concave and its degree of concavity is small.

4. If this assumption is satisfied, the discrete iterative process for computing the equilibrium given by

$$\begin{cases} X(t+1) = F(X^*(t)) \\ X^*(t+1) = F^*(X(t)) \end{cases}$$

is globally convergent.

5. This ambiguity is also confirmed algebraically on the basis of two expressions for comparative statics as given by

$$dX/dt = (\varphi_t(1-\varphi^*_{X^*}) + \varphi^*_t\varphi_{X^*})/\Delta,$$
$$dX^*/dt = (\varphi^*_t(1-\varphi_X) + \varphi_t\varphi^*_X)/\Delta,$$

where

$$\Delta \equiv \begin{vmatrix} 1-\varphi_X & -\varphi_{X^*} \\ -\varphi^*_X & 1-\varphi^*_{X^*} \end{vmatrix} .$$

These two expressions are obtained by totally differentiating (24) and (25) and solving with respect to dX/dt and dX^*/dt .

References

Horowitz, I. (1991), " On the Effects of Cournot Rivalry between Entrepreneurial and Cooperative Firms ", Journal of Comparative Economics, 15, 115-121.

Krugman, P.R. (1984), " Import Protection as Export Promotion ", in H. Kierzkowski (ed.), Monopolistic Competition and International Trade, 180-193, Oxford Univ. Press .

Mai, C. C. and H. Hwang (1989), " Export Subsidies and Oligopolistic Rivalry between Labor-Managed and Capitalistic Economies ", Journal of Comparative Economics, 13, 473-480.

Okuguchi. K. (1976), " Expectation and Stability in Oligopoly Models ", Berlin, Heidelberg, and N.Y., Springer-Verlag.

Okuguchi. K. (1990), " Cournot Duopoly with Several Markets ", Regional Science and Urban Economics, 20, 305-311.

Okuguchi. K. and F. Szidarovszky (1990), " The Theory of Oligopoly with Multi-Product Firms ", Berlin, Heidelberg, N.Y., Springer-Verlag.

Okuguchi. K. (1991), " Labor-Managed and Capitalistic Firms in International Duopoly : The Effect of Export Subsidy ", Journal of Comparative Economics, 15, 476-484.

Okuguchi. K. and N. Serizawa (1995), " Effects of Trade Policy for International Duopoly ", to be presented at the 11th World Congress of the International Economic Association, Tunis, Tunisia, 18-22, Dec. 1995.

Olech, C. (1963), " On the Global Stability of an Autonomous System on the Plane ", Contributions to Differential Equations, 1, 389-400.

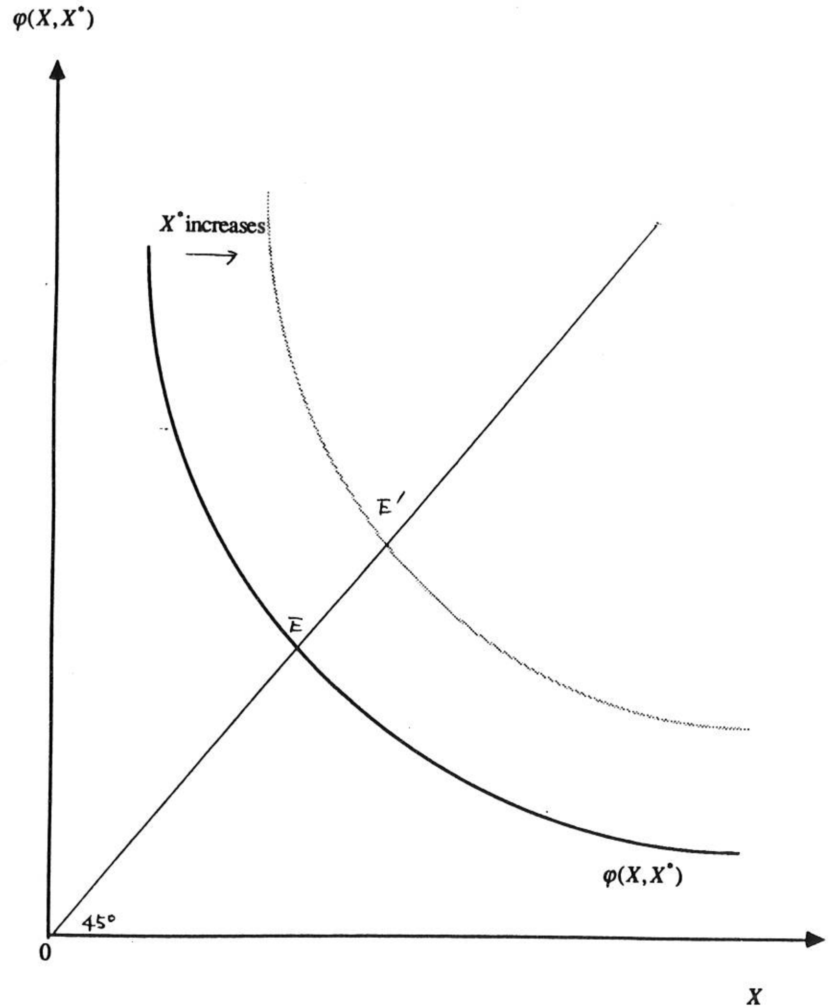

Fig. 1 Solution of (15.1)

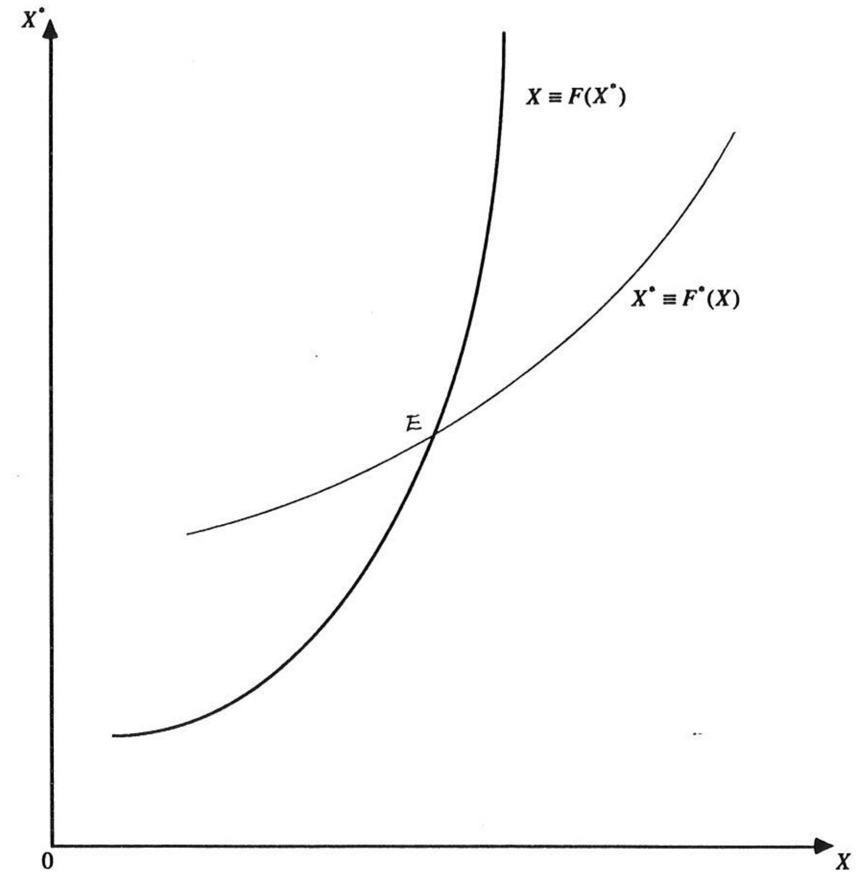

Fig. 2 Equilibrium total outputs when $u_2^i < 0$ for all i .

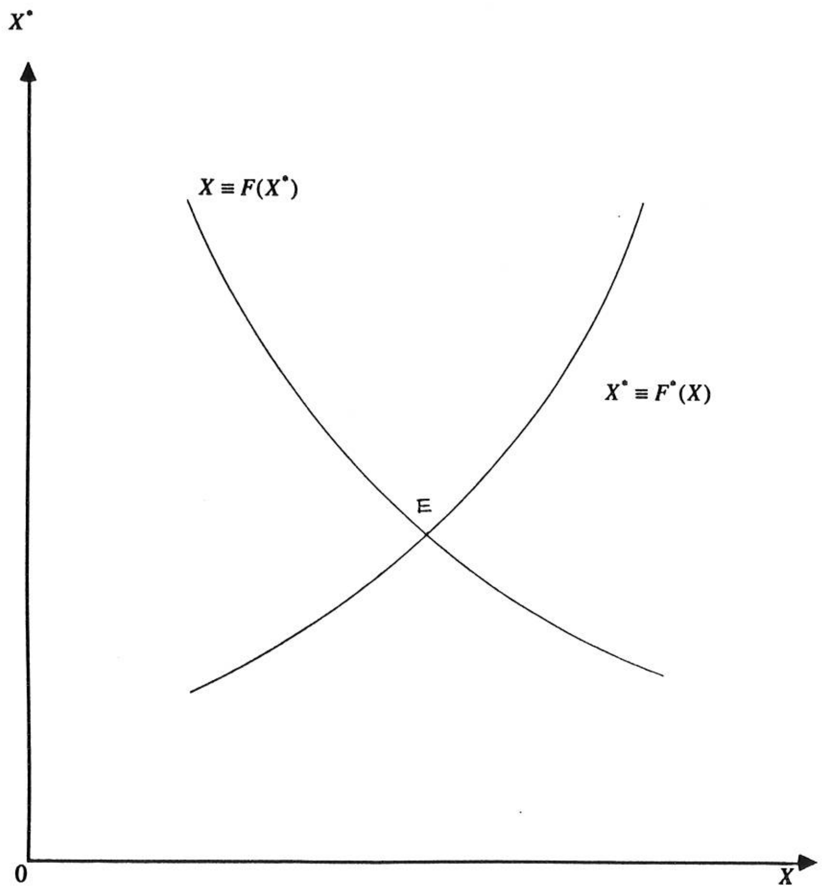

Fig. 3 Equilibrium total outputs when $u_2^i > 0$ for all i .

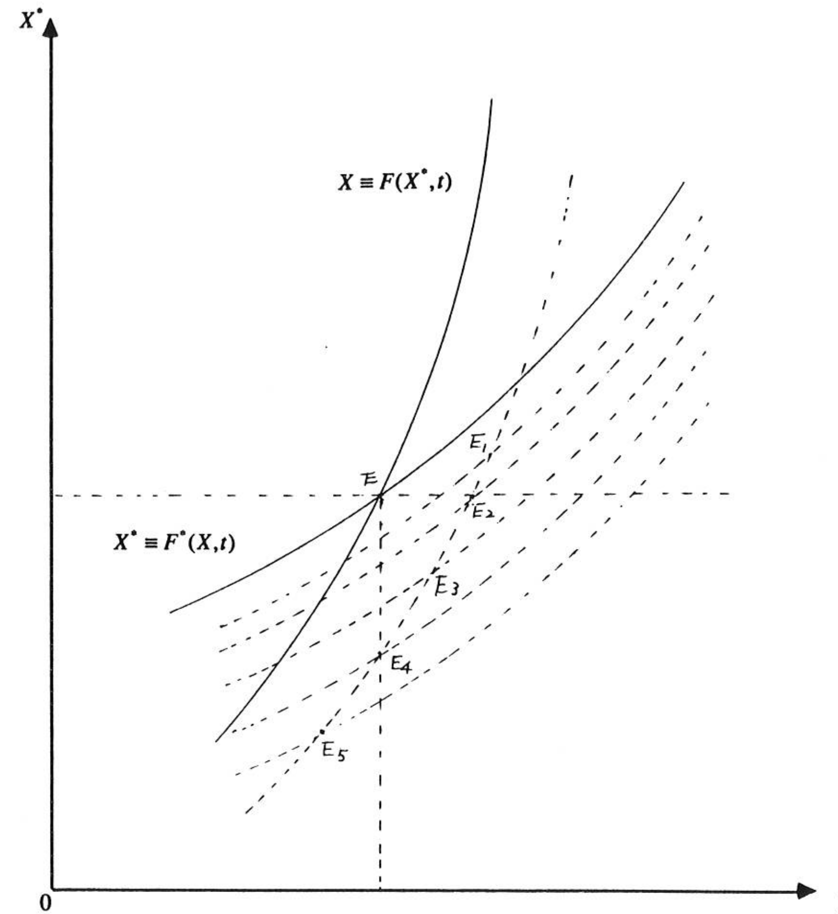

Fig.4 $F_{X^*} > 0, \quad F_t > 0$

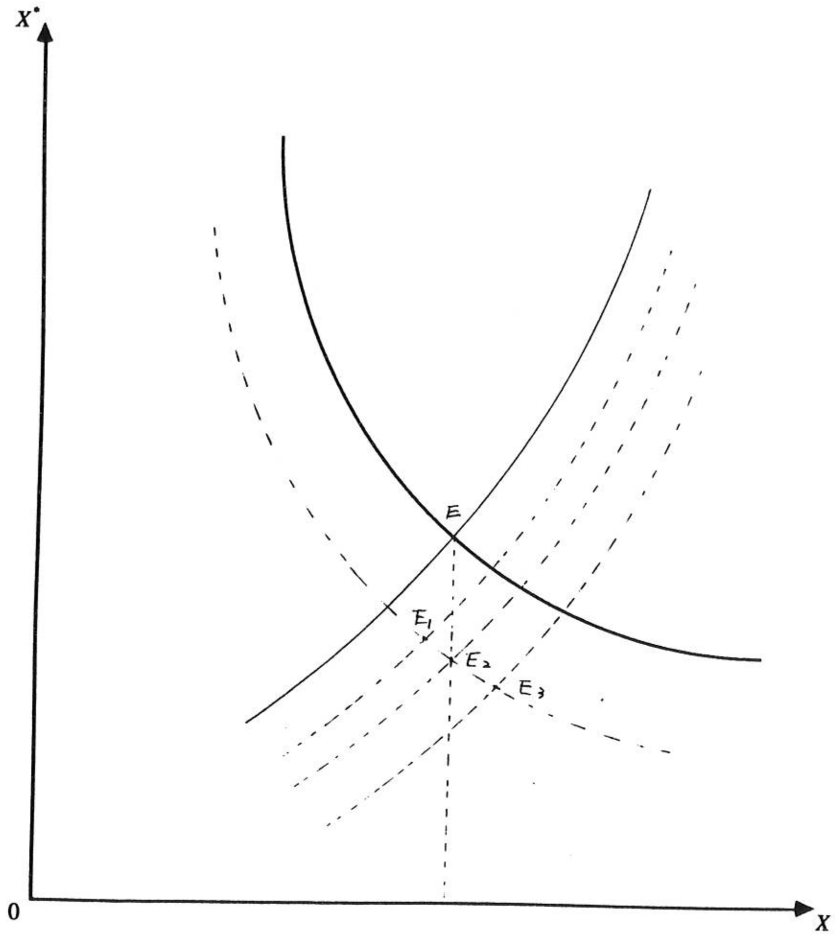

Fig. 5 $F_{X^*} < 0, \quad F_t < 0$

CES Working Paper Series

29 Michael Funke and Dirk Willenbockel, Die Auswirkungen des "Standortsicherungs-gesetzes" auf die Kapitalakkumulation - Wirtschaftstheoretische Anmerkungen zu einer wirtschaftspolitischen Diskussion, January 1993

30 Michelle White, Corporate Bankruptcy as a Filtering Device, February 1993

31 Thomas Mayer, In Defence of Serious Economics: A Review of Terence Hutchison; Changing Aims in Economics, April 1993

32 Thomas Mayer, How Much do Micro-Foundations Matter?, April 1993

33 Christian Thimann and Marcel Thum, Investing in the East: Waiting and Learning, April 1993

34 Jonas Agell and Kjell Erik Lommerud, Egalitarianism and Growth, April 1993

35 Peter Kuhn, The Economics of Relative Rewards: Pattern Bargaining, May 1993

36 Thomas Mayer, Indexed Bonds and Heterogeneous Agents, May 1993

37 Trond E. Olsen and Gaute Torsvik, Intertemporal Common Agency and Organizational Design: How much Decentralization?, May 1993

38 Henry Tulkens and Philippe vanden Eeckaut, Non-Parametric Efficiency, Progress and Regress Measures for Panel Data: Methodological Aspects, May 1993

39 Hans-Werner Sinn, How Much Europe? - Subsidiarity, Centralization and Fiscal Competition, July 1993

40 Harald Uhlig, Transition and Financial Collapse, July 1993

41 Jim Malley and Thomas Moutos, Unemployment and Consumption: The Case of Motor-Vehicles, July 1993

42 John McMillan, Autonomy and Incentives in Chinese State Enterprises, August 1993

43 Murray C. Kemp and Henry Y. Wan, Jr., Lumpsum Compensation in a Context of Incomplete Markets, August 1993

44 Robert A. Hart and Thomas Moutos, Quasi-Permanent Employment and the Comparative Theory of Coalitional and Neoclassical Firms, September 1993

45 Mark Gradstein and Moshe Justman, Education, Inequality, and Growth: A Public Choice Perspective, September 1993

46 John McMillan, Why Does Japan Resist Foreign Market-Opening Pressure?, September 1993

47 Peter J. Hammond, History as a Widespread Externality in Some Arrow-Debreu Market Games, October 1993

48 Michelle J. White, The Costs of Corporate Bankruptcy: A U.S.-European Comparison, October 1993

49 Gerlinde Sinn and Hans-Werner Sinn, Participation, Capitalization and Privatization, Report on Bolivia's Current Political Privatization Debate, October 1993

50 Peter J. Hammond, Financial Distortions to the Incentives of Managers, Owners and Workers, November 1993

51 Hans-Werner Sinn, Eine neue Tarifpolitik (A New Union Policy), November 1993

52 Michael Funke, Stephen Hall and Martin Sola, Rational Bubbles During Poland's Hyperinflation: Implications and Empirical Evidence, December 1993

53 Jürgen Eichberger and Ian R. Harper, The General Equilibrium Foundations of Modern Finance Theory: An Exposition, December 1993

54 Jürgen Eichberger, Bayesian Learning in Repeated Normal Form Games, December 1993

55 Robert S. Chirinko, Non-Convexities, Labor Hoarding, Technology Shocks, and Procyclical Productivity: A Structural Econometric Approach, January 1994

56 A. Lans Bovenberg and Frederick van der Ploeg, Consequences of Environmental Tax Reform for Involuntary Unemployment and Welfare, February 1994

57 Jeremy Edwards and Michael Keen, Tax Competition and Leviathan, March 1994

58 Clive Bell and Gerhard Clemenz, The Desire for Land: Strategic Lending with Adverse Selection, April 1994

59 Ronald W. Jones and Michihiro Ohyama, Technology Choice, Overtaking and Comparative Advantage, May 1994

60 Eric L. Jones, Culture and its Relationship to Economic Change, May 1994

61 John M. Hartwick, Sustainability and Constant Consumption Paths in Open Economies with Exhaustible Resources, June 1994

62 Jürg Niehans, Adam Smith and the Welfare Cost of Optimism, June 1994

63 Tönu Puu, The Chaotic Monopolist, August 1994

64 Tönu Puu, The Chaotic Duopolists, August 1994

65 Hans-Werner Sinn, A Theory of the Welfare State, August 1994

66 Martin Beckmann, Optimal Gambling Strategies, September 1994

67 Hans-Werner Sinn, Schlingerkurs - Lohnpolitik und Investitionsförderung in den neuen Bundesländern, September 1994

68 Karlhans Sauernheimer and Jerome L. Stein, The Real Exchange Rates of Germany, September 1994

69 Giancarlo Gandolfo, Pier Carlo Padoan, Giuseppe De Arcangelis and Clifford R. Wymer, The Italian Continuous Time Model: Results of the Nonlinear Estimation, October 1994

70 Tommy Staahl Gabrielsen and Lars Sørgard, Vertical Restraints and Interbrand Competition, October 1994

71 Julia Darby and Jim Malley, Fiscal Policy and Consumption: New Evidence from the United States, October 1994

72 Maria E. Maher, Transaction Cost Economics and Contractual Relations, November 1994

73 Margaret E. Slade and Henry Thille, Hotelling Confronts CAPM: A Test of the Theory of Exhaustible Resources, November 1994

74 Lawrence H. Goulder, Environmental Taxation and the "Double Dividend": A Reader's Guide, November 1994

75 Geir B. Asheim, The Weitzman Foundation of NNP with Non-constant Interest Rates, December 1994

76 Roger Guesnerie, The Genealogy of Modern Theoretical Public Economics: From First Best to Second Best, December 1994

77 Trond E. Olsen and Gaute Torsvik, Limited Intertemporal Commitment and Job Design, December 1994

78 Santanu Roy, Theory of Dynamic Portfolio Choice for Survival under Uncertainty, July 1995

79 Richard J. Arnott and Ralph M. Braid, A Filtering Model with Steady-State Housing, April 1995

80 Vesa Kanniainen, Price Uncertainty and Investment Behavior of Corporate Management under Risk Aversion and Preference for Prudence, April 1995

81 George Bittlingmayer, Industry Investment and Regulation, April 1995

82 Richard A. Musgrave, Public Finance and Finanzwissenschaft Traditions Compared, April 1995

83 Christine Sauer and Joachim Scheide, Money, Interest Rate Spreads, and Economic Activity, May 1995

84 Jay Pil Choi, Preemptive R&D, Rent Dissipation and the "Leverage Theory", May 1995

85 Stergios Skaperdas and Constantinos Syropoulos, Competing for Claims to Property, July 1995

86 Charles Blackorby, Walter Bossert and David Donaldson, Intertemporal Population Ethics: Critical-Level Utilitarian Principles, July 1995

87 George Bittlingmayer, Output, Political Uncertainty, and Stock Market Fluctuations: Germany, 1890 - 1940, September 1995

88 Michaela Erbenová and Steinar Vagstad, Information Rent and the Holdup Problem: Is Private Information Prior to Investment Valuable?, September 1995

89 Dan Kovenock and Gordon M.Phillips, Capital Structure and Product Market Behavior: An Examination of Plant Exit and Investment Decisions, October 1995

90 Michael R. Baye, Dan Kovenock and Casper de Vries, The All-pay Auction with Complete Information, October 1995

91 Erkki Koskela and Pasi Holm, Tax Progression, Structure of Labour Taxation and Employment, November 1995

92 Erkki Koskela and Rune Stenbacka, Does Competition Make Loan Markets More Fragile?, November 1995

93 Koji Okuguchi, Effects of Tariff on International Mixed Duopoly with Several Markets, November 1995