BUILDING TRADE BARRIERS AND KNOCKING THEM DOWN: THE POLITICAL ECONOMY OF UNILATERAL TRADE LIBERALIZATIONS

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July 1995

RESEARCH DEPARTMENT

WORKING PAPER

95-05

Federal Reserve Bank of Dallas

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The Political Economy of Unilateral Trade Liberalizations[*]

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Abstract

This paper examines the dynamic behavior of protection and liberalization
in developing countries. Consistent with empirical evidence on the
development of trade policies, we model policy decisions as the outcome of
a political contest between import-competing interests and exporters.
Uncertainty about the success of political contests yields a dynamic
political equilibrium in which tariffs gradually increase over time.
Eventually, the economic costs of increasing tariffs cause declining
profits in the exports sector and induce exporters to enter the political
arena and lobby actively against tariffs. We show that depending on the
characteristics of the market, a political contest may generate a
liberalization or a move toward autarky.

Building Trade Barriers and Knocking Them Down:
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During the 1980s a large number of developing countries began the

process of liberalizing their economies. Argentina, Mexico, Turkey, and

several other countries in Asia, Africa, and Latin America began the

process of reducing tariffs and eliminating import quotas and licenses.

Mexico, for example, began a sweeping liberalization in 1987. Since then,

not only has Mexico dropped its average tariff level from around 34

percent to 4 percent, but it also joined the General Agreement on Tariffs

and Trade (GATT) and the North American Free Trade Agreement (NAFTA).

Despite recent economic volatility in Mexico and other emerging markets,

economic reforms are not being reversed.

Why has there been the push to liberalize and why has it persisted?

One simple answer is that international organizations—such as the World

Bank and the International Monetary Fund (IMF)—have successfully exerted

pressure on countries to liberalize their economies. Undoubtedly, some

countries with severe balance of payment problems have been persuaded to

liberalize at times of crisis; but this rationale cannot explain most

cases. Mexico's recent entry into NAFTA, for example, was not undertaken

because of pressure from the IMF or the World Bank. Moreover, foreign

institutions played at best a modest role in initiating recent reforms in

several other countries (Rodrik 1992).

Another possible explanation is that only recently have developing

countries have begun to realize that highly protectionist policies have

not worked and are just now beginning to correct their ways. However,

this explanation is perhaps a bit naive. Government policymakers have been aware of problems inherent in import-substitution policies for quite a while. Raul Prebisch, for example—one of the main architects of the import-substitution industrialization policies in Latin America—realized the problems of highly protectionist policies as early as 1963.[1]

Although there certainly other possible explainations for recent trade liberalizations, these liberalizations may not be a new phenomenon. For decades Latin American development has been marked by cycles of increasing protection and episodes of liberalization (Findlay 1986). Oftentimes, liberalizations are introduced during a crisis period when a country is suffering severe economic difficulties, such as the 1980s debt crisis. But almost as many liberalizations have started under placid conditions, with no obvious malfunctioning of the economic system (Michaely, Papageorgiou and Choksi 1991). One element common to all large liberalizations, however, is that they were preceded by several years of gradually increasing levels of domestic distortions.

What, then, explains the build-up of protection and episodes of unilateral liberalization? We know that governments are often aware of what policies are best for the country as a whole, however—as Stigler (1971), Peltzman (1976) and others have noted—governments seldom pursue polices designed to maximize social welfare. Rather, governments maximize

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[1]Hirschman (1968) quotes an insightful passage from Prebisch (1963): "As is well known, the proliferation of industries of every kind in a closed market has deprived the Latin American countries of the advantages of specialization and economies of scale, and owing to the protection afforded by excessive tariff duties and restrictions, a healthy form of internal competition has failed to develop, to the detriment of efficient production."

their political support and, in doing so, implement policies that reflect the interests of the most powerful and vocal self-interest groups.

This paper's contribution is to enhance understanding of the dynamic political process behind the decision to build trade barriers and then knock them down. Although the model specifically addresses trade distortions, it can be applied to a broad class of economic distortions and episodes of economic reforms. We model the domestic political market for protection and liberalization as a lobbying contest between pro- and anti-trade groups.

The model explains a number of stylized facts in tariff-setting behavior and liberalizations. First, the model demonstrates that a government, responding only to domestic political pressure groups, will delay a liberalization until domestic protection reaches a critical level. Liberalizations will occur only when the potential gains to the pro-trade group (exporters) outweigh the costs to entering the political process.

Second, the model explains the dynamic pattern of tariffs. Protectionist policies are usually implemented on an industry-by-industry basis and tend to increase gradually, while trade liberalizations are usually implemented at discrete points in time and tend to reduce protection across many industries at once. Such liberalizations are often followed by subsequent pressures that may partially or completely reverse the original liberalization (Marvel and Ray 1983, Ray 1987, Michaely, Papageorgiou and Choksi 1991).[2] We demonstrate that as import-competing interests lobby for higher levels of protection, they gain information

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[2]There are few explanations of this cycle of protection in the literature. An exception is Cassing, McKeown and Ochs (1986).

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about the tolerance of exporters. This information alters the political equilibrium, increasing the equilibrium tariff. Eventually, if the protection rises to such an extent that it induces exporters to enter the political process and lobby heavily, it can generate an episode of liberalization.

The paper is organized as follows. Section I sets the background for the model and describes the industry structure and the behavior of firms. Section II describes the political market and trade policy contests. Section III presents the dynamic political process that determines tariffs. Section IV concludes with some brief remarks.

I. Industry Structure and the Behavior of Firms

This section considers an economy consisting of two sectors—an import-competing sector and an exporting sector—there is imperfect competition between firms. An import tariff increases the profits of firms in the import-competing sector at the expense of profits in the exporting sector.[3] Within each sector there exists a large number of industries which have the same duopolistic structure. Within an import-competing industry, a single domestic firm competes in the domestic market with a single foreign rival, while within an exporting industry, a single domestic firm competes in the foreign market with a single foreign

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[3]Another economic model that yields this result is the specific factors model (see Jones 1971, Mayer 1974 and Mussa 1974). In that model the real return to the fixed factor in the import-competing sector increases as a result of an import tariff, while the real return to the fixed factor in the exporting sector falls. See Hillman (1982) and Mayer (1984) for uses of the specific factors model in explaining the structure of protection.

firm. A common tariff on all imports gives firms in the import-competing sector an advantage over their foreign competitors which increases output and profits in the sector. This advantage creates an interest group in favor of the tariff. However, the resultant increase in the demand for labor increases wages and production costs in the exporting sector. This increase places firms in this sector at a disadvantage compared with their foreign competitors, which creates an interest group countering the pro-tariff forces.

The Import-Competing Sector

The import-competing sector consists of m identical industries. In each industry there are two firms, a domestic firm and a foreign rival firm, producing a homogeneous good solely for sale on the domestic market. The market inverse demand function for a typical industry in the import-competing sector is given by $P_x(X_i)$ (i=1, . . ., m), where

$$X_i = x_i + x_i^* \tag{1}$$

is the total supply to the market; x_i is the output of the domestic firm in industry i; and x_i^* is the output of the foreign firm in industry i. The demand function is downward-sloping and linear, so $P_x'(.) < 0$ and $P_x''(.) = 0.$[4]

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[4]This market structure is similar to that used by Hillman and Ursprung (1988) who analyze the political choice between tariffs and voluntary export restraints. Gould and Woodbridge (1995) use a similar economic model to explain tariff formation and episodes of trade liberalizations under threats of retaliation from a trading partner.

Both firms use the same production technology which is linear in the single input (labor). The cost functions of the two firms are given by

$$C(x_i) = (w\alpha)x_i \qquad (2)$$

and

$$C^*(x_i^*) = (w^*\alpha)x_i^* \qquad (3)$$

where α is the units of labor required to produce one unit of the good; w is the domestic wage rate; and w^* is the foreign wage rate.

The foreign firm faces a specific tariff t_{xi} when importing to the country.[5] The profit functions of a typical domestic import-competing firm and foreign rival firm are given by

$$\Pi_{xi} = [P_x(X_i) - w\alpha]x_i \qquad (4)$$

and

$$\Pi_{xi}^* = [P_x(X_i) - t_{xi} - w^*\alpha]x_i^* . \qquad (5)$$

The firms engage in a one-shot Cournot game—they simultaneously announce quantities and prices adjust to clear the market. Because there are many firms within both sectors, each firm treats the wage as fixed and selects a quantity to maximize profits given the quantity chosen by its competitor. Setting the perceived marginal profit of the domestic firm and the foreign firm equal to zero yields the reaction functions

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[5] Later we discuss the impact of an increase in a common tariff ($t_x = t_{xi}$ for all i) on profits and output.

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$$P'_x(X_i)x_i + P_x(X_i) - w\alpha = 0 \qquad (6)$$

and

$$P'_x(X_i)x^*_i + P_x(X_i) - t_{xi} - w^*\alpha = 0 \ . \qquad (7)$$

Given the assumption of constant costs and linear demand functions, there exists a unique Cournot equilibrium.[6] The equilibrium output and profit levels of the two firms are functions of the tariff and wage rates in the two countries. For the foreign firm, the tariff is a constant per unit cost of access to the domestic market and hence has the same impact on profits as an increase in the marginal cost of production. If the specific tariff exceeds a certain level $\bar{t}_x$ (the prohibitive tariff), it will be unprofitable for the foreign firm to produce any quantity of the good. If the tariff equals or exceeds the prohibitive level, the domestic import-competing firm earns monopoly profits.

Totally differentiating the reaction functions (6) and (7) and solving the equations gives the impact of an increase in the industry's tariff on the two firm's output levels

$$dx_i/dt_{xi} = -1/(3P') > 0 \qquad (8)$$

and

$$dx^*_i/dt_{xi} = 2/(3P') < 0 \ . \qquad (9)$$

Totally differentiating the profit functions and using the

[6]See Shapiro (1984) or Dixit (1986) for a discussion of the conditions for the existence and uniqueness of the equilibrium.

first-order conditions gives

$$d\Pi_{xi}/dt_{xi} = P'_x(X_i)x_i(dx_i^*/dt_{xi}) > 0 \qquad (10)$$

and

$$d\Pi_{xi}^*/dt_{xi} = P'_x(X_i)x_i^*(dx_i/dt_{xi}) - x_i^* < 0 \ . \qquad (11)$$

Not surprisingly, an increase in the tariff increases the output and profit of the domestic firm at the expense of the foreign rival. Furthermore, it is easy to show that $d^2\Pi_{xi}/dt_{xi}^2 > 0$ and $d^2\Pi_{xi}^*/dt_{xi}^2 > 0.$[7]

The Exporting Sector

The other n firms in the home country produce solely for export. In each exporting industry a single domestic firm exports its entire produce to a foreign market and competes in that market with a single foreign firm. The inverse demand function in the foreign market for a typical exporting industry is denoted by $P_y^*(Y_j)$ (j=1, . . ., n) where

$$Y_j = y_j + y_j^* \qquad (12)$$

is the total supply to the market, y_j is the exports of the domestic firm in industry j and y_j^* is the output of the foreign firm in industry j. Again the demand function is downward-sloping and linear. As in the import-competing sector, the firms use identical single-factor constant returns to scale production technology. The profit functions of the two firms are given by

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[7]To show this, one must recognize that $d^2x_i/dt_x^2 = d^2x_i^*/dt_x^2 = 0$.

$$\Pi_{yj} = P_y^*(Y_j)y_j - (w\beta)y_j \qquad (13)$$

and

$$\Pi_{yj}^* = P_y^*(Y_j)y_j^* - (w^*\beta)y_j^* \qquad (14)$$

where β is the units of labor required to produce one unit of the good.
It is assumed that access to the foreign market is not impeded by
protection. What is important, for the purposes of this paper, is the
manner in which profits of the domestic exporting firm are affected by
changes in the domestic wage rate. Qualitatively, an increase in the cost
of production, via an increase in the wage rate, has the same impact on
the profits of the domestic exporting firm as an increase in the tariff
has on the profits of the foreign exporting firms. An increase in the
wage rate reduces the competitiveness of the exporting firm reducing
profits at a decreasing rate (i.e., $d\Pi_{yj}/dw < 0$ and $d^2\Pi_{yj}/dw^2 > 0$).

The Domestic Labor Market

The labor market is perfectly competitive. Each of the many (m + n)
firms act as if the wage is independent of their output level. The
economy-wide demand for labor is

$$L^d = \sum_{i=1}^{m} L_{xi} + \sum_{j=1}^{n} L_{yj} . \qquad (15)$$

where L_{xi} is the demand for labor of firm i in the import-competing
sector; and L_{yj} is the demand for labor by firm j in the exporting sector.
As the domestic firms in each sector are the same

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$$L^d = m(\alpha x_i) + n(\beta y_j) \ . \tag{16}$$

The wage is flexible and adjusts to clear the labor market so that

$$m(\alpha x_i) + n(\beta y_j) = L^s \tag{17}$$

where L^s is the fixed labor supply.

Now consider the impact of an increase in the common tariff ($t_x = t_{xi}$ for all i) on the demand for labor and wages. By totally differentiating (17) and solving gives

$$dw/dt_x = \frac{m\alpha P_y'}{2m\alpha^2 P_y' + 2n\beta^2 P_x'} \tag{18}$$

which is greater than zero.

The Common Tariff and Profits

Consider the impact of an increase in the common tariff level on the profits of domestic firms. As shown above, the tariff will increase wages and hence the cost of production in both sectors. In the import-competing sector, this increase will be more than offset by the direct advantage provided by the tariff itself. In the exporting sector, however, there is no compensating effect of the tariff.

Differentiating the profit function of a typical import-competing firm with respect to t_x, and using the first-order condition (6) gives

$$d\Pi_{xi}/dt_x = P'_x(X_i)x_i(dx_i^*/dt_x)$$
$$+ P'_x(X_i)x_i(dx_i^*/dw)(dw/dt_x) - \alpha x_i dw/dt_x \ . \qquad (19)$$

The first line of the expression captures the direct positive effect the tariff has on the firm's profits, while the second part captures the indirect negative impact on profits of the increase in the domestic wage resulting from the tariff. It is easy to show that

$$d\Pi_{xi}/dt_x = (2/3)x_i[1 - \frac{2m\alpha^2 P'_y}{2m\alpha^2 P'_y + 2n\beta^2 P'_x}] \ , \qquad (20)$$

which is positive, indicating that the direct effect the tariff has on profits outweighs the indirect effect of the increase in the wage.

The impact of an increase in the tariff on the profits of firms in the exporting sector is given by

$$d\Pi_{yj}/dt_x = P'_y(Y_j)y_j(dy_j^*/dw)(dw/dt_x) - \beta y_j(dw/dt_x) \ , \qquad (21)$$

which is negative. Furthermore, both $d^2\Pi_{xi}/dt_x^2$ and $d^2\Pi_{yj}/dt_x^2$ are positive. The profits of the firms as a function of the tariff are displayed in Figure 1.[8]

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[8] The profit function is drawn assuming $\Pi_{yj} >$ for all $t_x \in [0, \bar{t}_x]$.

II. The Political Model and Tariff Policy Contests

Because tariffs are usually determined in a domestic political market, we model protection as the outcome of a lobbying contest between the domestic import-competing and exporting firms. Politicians in the central government determine policy on a range of issues, most of which do not affect the profits of firms in either sector. However, they sometimes decide issues related to trade policy. These policies are made by majority rule within the government. Political members of the government do not have a predetermined stance on any policy. Rather, they determine their policy positions based on the lobbying of special interest groups.[9] The politicians use these lobbying resources to sway voters, who are imperfectly informed. The politician's sole objective is to be reelected.

Because the expected profits of the import-competing firms and the exporting firms vary with the domestic tariff, firms have the incentive to allocate expenditure's to lobby policymakers. The outcome of the lobbying contest is uncertain and depends upon the relative lobbying expenditures of the interest groups for and against the policy. The probability that the import-competing interests will win the policy contest is given by

$$\theta = \frac{S_x}{S_y + S_x} \tag{22}$$

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[9]This assumption is not vital. It could be that politicians represent a particular constituency, and hence have a predetermined policy position, but the extent to which they promote that policy stance in the government depends upon the pressure placed upon them by their constituents. This, in turn, is determined by the lobbying activity of the constituency.

where $S_x = \sum_{i=1}^{m} S_{xi}$ where S_{xi} is the lobbying expenditure of a typical firm

in the import-competing sector and $S_y = \sum_{j=1}^{n} S_{yj}$ where S_{yj} is the lobbying

expenditure of a typical firm in the exporting sector.[10]

To pool their funds into the lobbying contest, firms form lobby

groups.[11] These lobby groups collect contributions from their members and

lobby politicians. The formation of lobby groups, however, is not a

costless endeavor. There are costs to organizing the group, collecting

lobbying contributions, making contact with politicians, etc. (Olson 1965,

pp.10-11). These expenses are fixed costs of entry into the

policy-forming contest. If these costs are high relative to the potential

gains of contesting the policy, we may observe one or both groups deciding

not to enter the political process. In other words, policies may be

uncontested by lobby groups in some cases.

Determination of the Tariff Platforms and Lobbying Expenditures in the Event of a Policy Contest

Firms face a sequential decision-making process. First, firms must

decide whether to incur the fixed costs of entering the political process.

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[10] Other characterizations of tariff-setting behavior in a representative
democracy have been described in the literature. Findlay and Wellisz
(1982) specify the tariff as a function of the lobbying inputs of pro- and
anti-trade interests. Young and Magee (1986) and Hillman and Ursprung
(1988) model tariff formation as the outcome of an electoral contest
between two political parties who design their tariff platforms to
maximize their chances of electoral success. The probability of electoral
success depends, at least in part, upon the campaign contributions of pro-
and anti-trade interest groups. Without explicitly modeling the behavior
of the politicians, this paper determines the tariff similarly to Hillman
and Ursprung's method.

[11] We often observe industry associations playing the role of these lobby
groups.

Second, if they decide to enter, they must determine their desired tariff and their lobbying expenditures.

Initially assume that firms in both sectors decide to contest the tariff policy. In this case the fixed costs are sunk and hence can be ignored in determining firms' profit-maximizing desired tariffs and lobbying expenditures. Once the firms in both sectors have decided to contest the tariff policy, they play the following two-stage game. In the first stage the import-competing firms and the exporting firms simultaneously announce their desired tariffs given by t_{x1} and t_{x0} ($t_{x1} \geq t_{x0}$) respectively. In the second stage, the firms simultaneously announce their lobbying expenditures. The subgame-perfect Nash equilibrium can be determined by working backward. First, we determine the Nash equilibrium lobbying expenditures given t_{x1} and t_{x0}. Then, using the expected profits of firms in each sector consistent with these lobbying expenditures, we determine the Nash equilibrium tariff announcements.

Consider the subgame in which the desired tariffs of the import-competing and exporting firms are given by t_{x1} and t_{x0}. Assuming that the firms are risk neutral, they will make lobbying contributions to maximize expected profit. A typical firm in the import-competing sector will select lobbying expenditure S_{xi} to maximize

$$E\Pi_{xi} = \theta \Pi_{xi}(t_{x1}) + (1-\theta)\Pi_{xi}(t_{x0}) - S_{xi} . \tag{23}$$

Setting $\dfrac{\delta E\Pi_{xi}}{\delta S_{xi}}$ equal to zero yields the optimal lobbying contribution

$$S_{xi} = - \sum_{\substack{k=1 \\ k \neq i}}^{m} S_{xk} - S_y + \{S_y[\Pi_{xk}(t_{x1}) - \Pi_{xk}(t_{x0})]\}^{1/2} . \qquad (24)$$

This equation reflects the pure public good nature of lobbying contributions. Contributions by any firms in the sector yield benefits to all firms by increasing the probability of success of their preferred policy. Each firm is willing to contribute up to the point that the increase in expected profit at the margin equals one dollar. There is a one-to-one trade-off between the contributions of other firms in the sector and firm i. Since all firms in the import-competing sector are identical, the total lobbying expenditure by the sector is[12]

$$S_x = - S_y + \{S_y[\Pi_{xi}(t_{x1}) - \Pi_{xi}(t_{x0})]\}^{1/2} . \qquad (25)$$

A typical firm in the exporting sector will, given the desired tariff (t_{x0}), select S_{yj} to maximize expected profits given by

$$E\Pi_{yj} = \theta \Pi_{yj}(t_{x1}) + (1-\theta)\Pi_{yj}(t_{x0}) - S_{yj} . \qquad (26)$$

This yields the following reaction function of the exporting sector

$$S_y = - S_x + \{S_x[\Pi_{yj}(t_{x0}) - \Pi_{yj}(t_{x1})]\}^{1/2} . \qquad (27)$$

Solving for the Nash equilibrium levels of S_x and S_y, for given levels

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[12]This is the reaction function of the import-competing sector given the export sector's lobbying expenditure S_y.

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of t_{x1} and t_{x0}, gives

$$S_x(t_{x0}, t_{x1}) = \frac{\Delta\Pi_{yj} \Delta\Pi_{xi}^2}{[\Delta\Pi_{xi} + \Delta\Pi_{yj}]^2} \tag{28}$$

and

$$S_y(t_{x0}, t_{x1}) = \frac{\Delta\Pi_{xi} \Delta\Pi_{yj}^2}{[\Delta\Pi_{xi} + \Delta\Pi_{yj}]^2} \tag{29}$$

where $\Delta\Pi_{xi} = \Pi_{xi}(t_{x1}) - \Pi_{xi}(t_{x0})$ and $\Delta\Pi_{yj} = \Pi_{yj}(t_{x0}) - \Pi_{yj}(t_{x1})$.

Proposition

Given there is a policy contest, the subgame perfect Nash equilibrium tariffs of the import-competing firms and the exporting firms will be the prohibitive tariff and the zero tariff respectively.

Proof

In the event of a policy contest, with tariff announcements of t_{x0} and t_{x1}, the expected profits of a typical import-competing and exporting firm (rearranging equations 23 and 26) are

$$E\Pi_{xi} = \theta\Delta\Pi_{xi} + \Pi_{xi}(t_{x0}) - S_x/m \tag{30}$$

and

$$E\Pi_{yj} = (1-\theta)\Delta\Pi_{yj} + \Pi_{yj}(t_{x1}) - S_y/n \tag{31}$$

where $\theta = \dfrac{\Delta\Pi_{xi}}{\Delta\Pi_{xi} + \Delta\Pi_{yj}}$.

Assume that the firms in the two sectors announce different tariffs

(i.e., $t_{x1} > t_{x0}$).[13] Is it in the interests of the firms in each sector to increase or decrease their tariffs? Firms in the two sectors will select their desired tariff levels to maximize their expected profits given the tariff level proposed by the other sector. For an import-competing firm

$$dE\Pi_{xi}/dt_{x1} = (d\theta/dt_{x1})\Delta\Pi_{xi} + \theta(d\Pi_{xi}/dt_{x1}) - (dS_x/dt_{x1})/m . \qquad (32)$$

where $d\Pi_{xi}/dt_{x1}$ is defined in equation (19), and dS_x/dt_{x1} is the change in the aggregate lobbying expenditure of the import-competing firms in response to an increase in t_{x1}. Expanding gives

$$
\begin{aligned}
dE\Pi_{xi}/dt_{x1} = \{\ &\Delta\Pi_{xi}\ [\Delta\Pi_{xi} + \Delta\Pi_{yj}]^{-3}\ \} \\
&\{\ [d\Pi_{xi}/dt_{x1}]\ [\Delta\Pi_{xi}^2 + 3\Delta\Pi_{xi}\Delta\Pi_{yj} + 2(\tfrac{m-1}{m})\Delta\Pi_{yj}^2] \\
&+ [d\Pi_{yj}/dt_{x1}]\ [\Delta\Pi_{xi}^2(\tfrac{m+1}{m}) + \Delta\Pi_{xi}\Delta\Pi_{yj}(\tfrac{m-1}{m})]\}\ . \qquad (33)
\end{aligned}
$$

As $\Pi_{xi}(t_x)$ and $\Pi_{yj}(t_x)$ are convex, $dE\Pi_{xi}/dt_{x1}$ is greater than zero.[14] An increase in the desired tariff will increase the expected profits of all the import-competing firms. Similarly, for an exporting firm

$$
\begin{aligned}
dE\Pi_{yj}/dt_{x0} = \{\ &\Delta\Pi_{yj}\ [\Delta\Pi_{xi} + \Delta\Pi_{yj}]^{-3}\ \} \\
&\{\ [d\Pi_{yj}/dt_{x1}]\ [\Delta\Pi_{yj}^2 + 3\Delta\Pi_{xi}\Delta\Pi_{yj} + 2(\tfrac{n-1}{n})\Delta\Pi_{xi}^2] \\
&+ [d\Pi_{xi}/dt_{x1}]\ [\Delta\Pi_{yj}^2(\tfrac{n+1}{n}) + \Delta\Pi_{xi}\Delta\Pi_{yj}(\tfrac{n-1}{n})]\}\ , \qquad (34)
\end{aligned}
$$

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[13] It should be noted that within a sector all firms are identical and hence desire the same tariff.

[14] If both Π_{xi} and Π_{yj} are convex, then $(d\Pi_{xi}/dt_{x0})\Delta\Pi_{yj} + (d\Pi_{yj}/dt_{x0})\Delta\Pi_{xi} < 0$ and $(d\Pi_{xi}/dt_{x1})\Delta\Pi_{yj} + (d\Pi_{yj}/dt_{x1})\Delta\Pi_{xi} > 0$.

which is less than zero. Consequently, if $t_{x1} > t_{x0}$, the Nash equilibrium involves the import-competing firms lobbying for a prohibitive tariff and the exporting firms lobbying for a zero tariff.

What if the firms in each sector select the same tariff (i.e., $t_{x0} = t_{x1} = t_{x2}$)? In this case the tariff is certain and the profits of a typical import-competing and exporting firm will be $\Pi_{xi}(t_{x2})$ and $\Pi_{yj}(t_{x2})$ respectively. In this case will it be in the interests of firms in either sector to deviate from t_{x2}? We know from above that if it is in the interests of firms in either sector to deviate, they will do so by setting either a zero or prohibitive tariff.

If $t_{x0} = t_{x1} = t_{x2}$, setting a prohibitive tariff will change the expected profits of an import-competing firm by

$$dE\Pi_{xi} = \frac{\Delta\Pi_{xi}^2 [\Delta\Pi_{xi} + \Delta\Pi_{yj}(\frac{m-1}{m})]}{(\Delta\Pi_{xi} + \Delta\Pi_{yj})^2} \tag{35}$$

where in this case $\Delta\Pi_{xi} = \Pi_{xi}(\tilde{t}_x) - \Pi_{xi}(t_{x2})$ and $\Delta\Pi_{yj} = \Pi_{yj}(t_2) - \Pi_{yj}(\tilde{t}_x)$. Setting a zero tariff will change the expected profits of an exporting firm by

$$dE\Pi_{yj} = \frac{\Delta\Pi_{yj}^2 [\Delta\Pi_{yj} + \Delta\Pi_{xi}(\frac{n-1}{n})]}{(\Delta\Pi_{xi} + \Delta\Pi_{yj})^2} \tag{36}$$

where in this case $\Delta\Pi_{xi} = \Pi_{xi}(t_{x2}) - \Pi_{xi}(0)$ and $\Delta\Pi_{yj} = \Pi_{yj}(0) - \Pi_{yj}(t_{x2})$. both of which are greater than zero. Consequently, firms in both sectors

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will find it in their interests to deviate from the tariff. The Nash equilibrium is therefore a divisive equilibrium where the exporting firms lobby for a zero tariff and the import-competing firms lobby for a prohibitive tariff.

When we add the costs of coalition building, the expected profits of firms in each sector in the event of a contest are given by

$$E\Pi^c_{xi} = \Pi_{xi}(0) + \frac{\Delta\Pi^{c\,2}_{xi}[\Delta\Pi^c_{xi} + \Delta\Pi^c_{yj}(\frac{m-1}{m})]}{(\Delta\Pi^c_{xi} + \Delta\Pi^c_{yj})^2} - F_x/m \qquad (37)$$

$$E\Pi^c_{yj} = \Pi_{yj}(\bar{t}_x) + \frac{\Delta\Pi^{c\,2}_{yj}[\Delta\Pi^c_{yj} + \Delta\Pi^c_{xi}(\frac{n-1}{n})]}{(\Delta\Pi^c_{xi} + \Delta\Pi^c_{yj})^2} - F_y/n \qquad (38)$$

where $\Delta\Pi^c_{xi} = \Pi_{xi}(\bar{t}_x) - \Pi_{xi}(0)$; $\Delta\Pi^c_{yj} = \Pi_{yj}(0) - \Pi_{yj}(\bar{t}_x)$. [15]

III. The Dynamic Tariff Equilibrium

The tariff is determined by a political process that involves several stages. In the first stage, the import-competing firms decide whether to enter the political process and lobby for a tariff (denoted by t^{*1}_x). The exporting firms then decide whether to enter the political process to counter that tariff. If the exporting firms decide to enter the political arena, the previously described policy contest develops. If the exporting firms choose not to enter, their policy preferences do not come into play and the import-competing firms get their desired tariff unopposed and

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[15] Assuming that the fixed costs are equally shared between all firms in each sector.

incur only the fixed entry cost of entering the political process.

The dynamics of the model are driven by learning. In each period the political equilibrium changes because import-competing firms learn more about the exporters' critical tariff. A key simplifying assumption is that politicians and individual firms act as though they are only concerned about the next political term and not about subsequent elections. In other words, the political process is myopic in the sense that politicians and firms are only concerned about setting tariffs to maximize profits and political support over the next political cycle and not subsequent terms. While this assumption greatly simplifies the dynamics, it allows for more complex within-period behavior.

Exporting firms will pay the fixed cost and enter the political process only if the expected profits associated with doing so exceed the profits when they do not contest the proposed tariff (t_x^{*1}). This condition is reached iff

$$\Pi_{yj}(t_x^{*1}) \; < \; \Pi_{yj}(\bar{t}_x) + \frac{\Delta\Pi_{yj}^{c\,2}[\Delta\Pi_{yj}^c + \Delta\Pi_{xi}^c (\frac{n-1}{n})]}{(\Delta\Pi_{xi}^c + \Delta\Pi_{yj}^c)^2} - F_y / n \; . \qquad (39)$$

Therefore, there exists a critical tariff $\hat{t}_x$, such that if $t_x^{*1} > \hat{t}_x$, the exporting firms will contest the policy. While all firms are fully aware of the costs of organizing firms in their own sector, they are uncertain about the costs of their opponents. Consequently, the import-competing firms are uncertain about their opponent's costs and hence are uncertain about the critical tariff $\hat{t}_x$.

While the import-competing firms don't know $\hat{t}$, they assume that it

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has the cumulative probability distribution $\Phi_1(t_x)$, where

$$\Phi_1(t_x) = \begin{bmatrix} 0 \text{ for } t_x \le 0 \\ \Phi_1(t_x) \text{ for } 0 < t_x \le \bar{t}_x \\ 1 \text{ for } t_x > \bar{t}_x \end{bmatrix} \qquad (40)$$

with $d\Phi_1(t_x)/dt_x > 0$ and $d^2\Phi_1(t_x)/dt_x^2 \ge 0$ indicating that the perceived probability of a contest increases with the tariff at a non-decreasing rate.

Now consider the actions of the import-competing firms. The import-competing firms select a tariff to maximize expected profits.

$$E\Pi_{xi}^1(t_x) = \Phi_1(t_x)E\Pi_{xi}^c + [1-\Phi_1(t_x)]\Pi_{xi}(t_x) - F_x/m . \qquad (41)$$

This expected profit function is displayed in Figure 2. For $t_x \le 0$, there is no chance that the exporting firms will contest the policy and hence the profits of an importing competing firm are $\Pi_{xi}(0)$. For $0 < t_x < \bar{t}_x$, there is a positive probability that a contest will occur. The change in expected profits resulting from an increase in the tariff is given by

$$dE\Pi_{xi}^1/dt_x = [d\Phi_1(t_x)/dt_x][E\Pi_{xi}^c - \Pi_{xi}(t_x)]$$
$$+ [1 - \Phi_1(t_x)][d\Pi_{xi}(t_x)/dt_x] . \qquad (42)$$

At $t_x = \bar{t}_x$, the probability of a contest is one, and the profits of an import-competing firm are $E\Pi_{xi}^c$. The slope of the profit function at this point is always negative. At $t_x = 0$, a tariff increase will increase

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expected profits if $[d\Phi_1(0)/dt_x][E\Pi_{xi}^c - \Pi_{xi}(0)] + d\Pi_{xi}(0)/dt_x > 0$ (this will always be the case if $E\Pi_{xi}^c > \Pi_{xi}(0)$, as drawn in Figure 2).

If the import-competing firm decides to enter the political process and lobby for a positive tariff, the equilibrium may not be static. In each period the importing firm gains some information about the exporting firms' costs (and hence the critical tariff) from observing the exporting firms' reaction to the tariff. In each period in which the exporting firms do not contest the tariff, the import-competing firms revise their prior probability about the critical tariff. This may change the equilibrium. Eventually, it may be possible that the tariff exceeds the critical level and a lobbying contest results.

(a) Equilibrium Tariff in the First Period

In the first period, the import-competing firms will select a tariff (t_x^{*1}) to maximize expected profits. If the import-competing firms announce a positive tariff, it will not be less than t_x^b, where $\Pi_{xi}(t_x^b) = E\Pi_{xi}^1(t_x^b) = E\Pi_{xi}^c$. Furthermore, the slope of the profit function is positive at t_x^b and negative at $\bar{t}_x$. The tariff, t_x^{*1}, that maximizes expected profits must lie between t_x^b and $\bar{t}_x$. Increasing the fixed cost F_x shifts the expected profit function parallel downward. The expected profit function for various levels of the fixed cost are displayed in Figure 2. It is clear from Figure 2 that there are two possible equilibriums in the first period.

(a.1) $t_x^1 = 0$

If the import-competing firms decide to enter the political process,

the best they can do is earn $\Pi_{x1}(t_x^{*1}) - F_x/m$ in the first period.

If $F_x > m[E\Pi_{x1}^1(t_x^{*1}) - \Pi_{xi}(0)]$, (for example $F_x = F_{x2}$), the fixed costs are sufficiently high to make it unprofitable to enter and the tariff remains at zero.

(a.2) $t_x^1 = t_x^{*1}$

If the fixed entry costs are below $m[E\Pi_{xi}^1(t_x^{*1}) - \Pi_{xi}(0)]$ (for example, $F_x = F_{x1}$), the expected profits from entry are greater than the profits of not entering the political arena, and the import-competing firms will lobby for the tariff t_x^{*1}.

(b) Equilibrium Tariff in the Second Period

If the import-competing firms win a tariff, the exporting firms will decide whether to contest the policy, mindful of their expected profits if they do contest. Two cases are possible and are analyzed in turn.

(b.1) Exporting Firms do not Contest the Tariff Policy (i.e., $t_x^{*1} < \hat{t}_x$)

The fact that the exporting firms do not enter the political contest yields information about their costs and critical tariff ($\hat{t}_x$). The import-competing firms now realize that $\hat{t}_x$ lies above the current tariff. This alters their prior beliefs about the probability of a contest. It is now known that $\hat{t}_x \in [t_x^{*1}, \bar{t}_x]$. The probability of a contest becomes $\Phi_2(t_x)$, where

$$\Phi_2(t_x) = \begin{cases} 0 \text{ for } t_x < t_x^{*1} \\ \Phi_2(t_x) \text{ for } t_x^{*1} \le t_x \le \bar{t}_x \\ 1 \text{ for } t_x > \bar{t}_x \end{cases} \tag{43}$$

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where $d\Phi_2(t_x)/dt_x > 0$, and $d^2\Phi_2(t_x)/dt_x^2 \geq 0$.

The expected profits of an importing competing firm become

$$E\Pi_{xi}^2 = \Phi_2(t_x)E\Pi_{xi}^c + [1 - \Phi_2(t_x)]\Pi_{xi}(t_x) - F_x/m \qquad (44)$$

and

$$dE\Pi_{xi}^2/dt_x = [1 - \Phi_2(t_x)][d\Pi_{xi}(t_x)/dt_x]$$
$$+ [d\Phi_2(t_x)/dt_x][E\Pi_{xi}^c - \Pi_{xi}(t_x)] . \qquad (45)$$

As there is no chance of a contest for $t_x \leq t_x^{*1}$, the expected profit function consists of the function $\Pi_{xi}(t_x)$ up to that point. For $t_x > t_x^{*1}$, there is a probability the export firms will contest. At $t_x = \bar{t}_x$, there will be a policy contest so, $E\Pi_{xi}^2 = E\Pi_{xi}^c$ and the slope of the expected profit function is negative. However, as $\Pi_{xi}(t_x) > E\Pi_{xi}^c$ at $t_x = t_x^{*1}$, the direction of the change in expected profits due to an increase in the tariff is uncertain.

There are two possible outcomes if the exporting firms do not contest the policy.

(i) $t_x^2 = t_x^{*1}$

If $dE\Pi_{xi}^2/dt_x < 0$ at $t_x = t_x^{*1}$, the equilibrium tariff will not change. As it is not in the interests for either the import-competing firms to lobby for a higher tariff, or the exporting firms to contest the policy, the tariff remains at t_x^{*1}.

(ii) $t_x^2 = t_x^{*2} > t_x^{*1}$

If $d\mathrm{E}\Pi_{xi}^2/dt_x > 0$ at $t_x = t_x^{*1}$, the import-competing firms will lobby

for a higher tariff. In this case the tariff (t_x^{*2}) that maximizes

expected profits will lie strictly between t_x^{*1} and $\bar{t}_x$. This equilibrium

is displayed in Figure 3. So long as $t_x^{*2} < \hat{t}_x$, the exporting firms will

not contest the policy and the process is repeated.

(b.2) Export Firm Contests the Tariff Policy (i.e., $\hat{t}_x \geq t_x^{*1}$)

If the initial equilibrium tariff exceeds the critical tariff, the

exporting firms will contest the policy. If this is the case, the contest

will degenerate into one in which the exporting firms demand a zero tariff

and the import-competing firms demand a prohibitive tariff. Because of

the all-or-nothing nature of the contest, the tariff policy will either be

free trade ($t_x=0$) or prohibition from trade ($t_x=\bar{t}_x$) with the following

probabilities

$$\Pr\{t_x=0\} = \frac{\Delta\Pi_{yj}^c}{\Delta\Pi_{xi}^c + \Delta\Pi_{yj}^c} \qquad (46)$$

$$\Pr\{t_x=\bar{t}_x\} = \frac{\Delta\Pi_{xi}^c}{\Delta\Pi_{xi}^c + \Delta\Pi_{yj}^c} \qquad (47)$$

Therefore, if there is a liberalization, it will be a large

liberalization. Once the agents favoring a free trade policy contest the

tariff, they find it in their interest to lobby for a complete

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liberalization. Curiously though, the act of contesting the tariff policy may have the perverse result of pushing the country toward autarky. Efforts to liberalize may be counterproductive if those supporting the tariff have sufficient political power.

IV. Concluding Remarks

The primary contribution of this paper is to show that there is a dynamic political process behind protection and liberalizations that is consistent with the stylized facts in tariff-setting behavior. In many developing countries, we often observe periods of gradually increasing protection followed by liberalizations, which are, in turn, reversed by further periods of increasing protection. Without altering the structure of the economy or the composition of coalitions, we find that increasing levels of protection may yield a liberalization. Uncertainty about the exporting sector's cost of coalition formation generates a political outcome in which the tariff increases over time until it is either reversed by a liberalization or pushed further toward autarky.

Because liberalizations are modeled as the outcome of an endogenous political process—and are not imposed on a country from external forces— the credibility of any trade liberalization is entirely dependent on the relative strength of the import-competing and exporting sectors and on the uncertainty remaining about the export sector's cost of coalition building. If uncertainty about the costs of coalition building remain—because of changes in demand of production structure, for example—then a tariff cycle will perpetuate.

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Figure 1

Profit Function of a Typical Domestic Firm
in the Import-Competing and Exporting Sectors
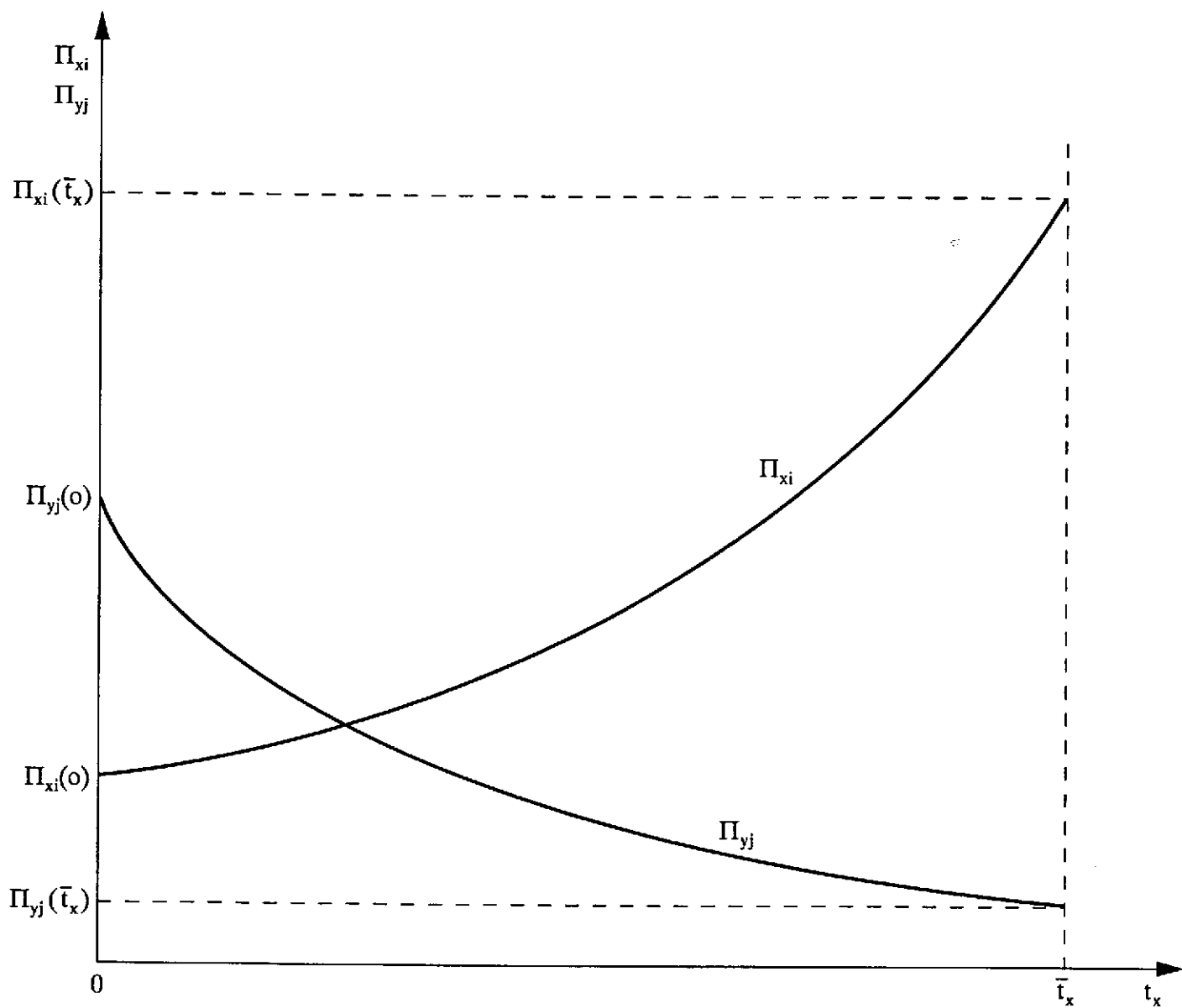
Figure 2

Expected Profits of the Importing-Competing
Firms for Different Fixed Costs
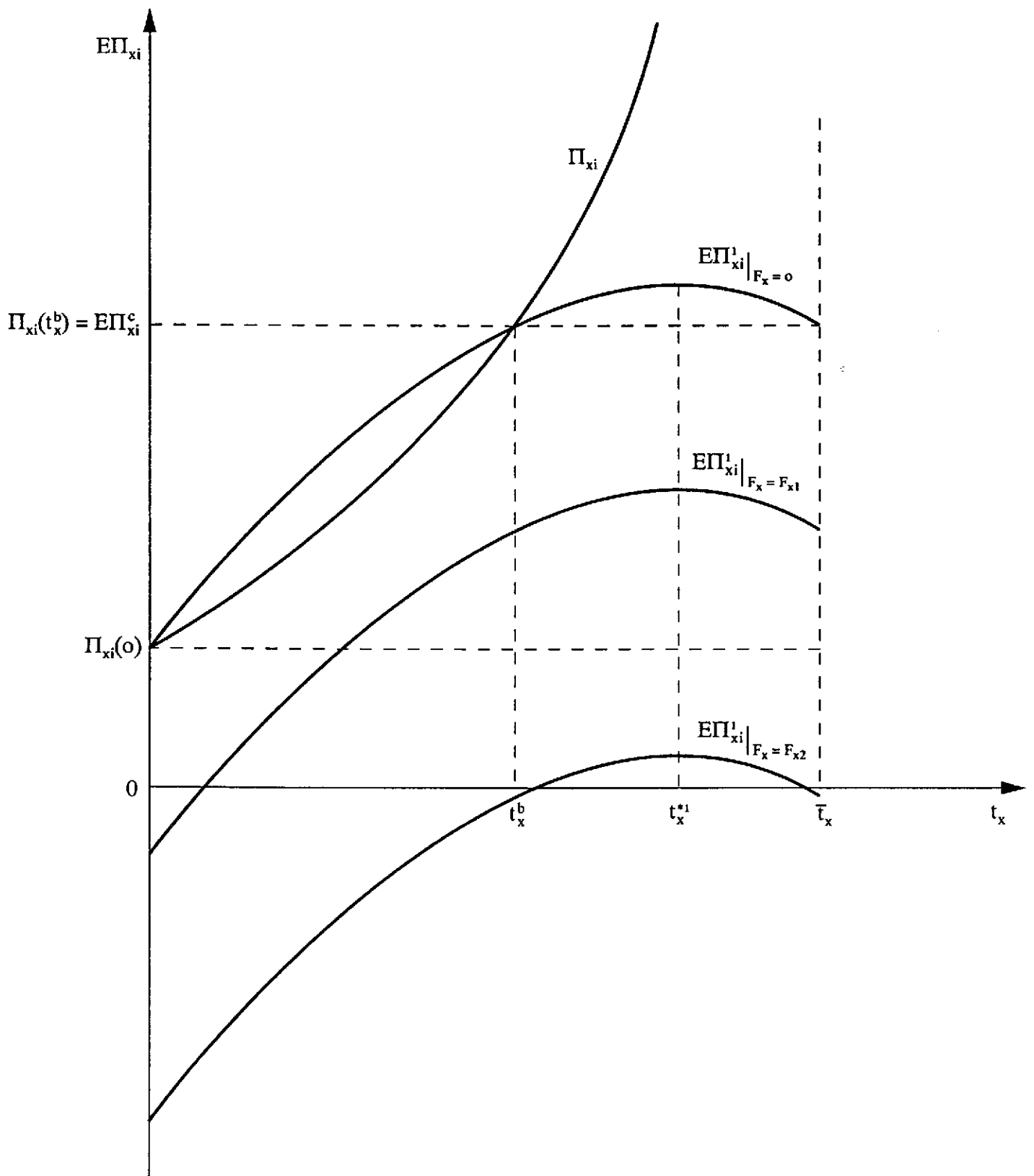
Figure 3
Dynamic Tariff Equilibrium
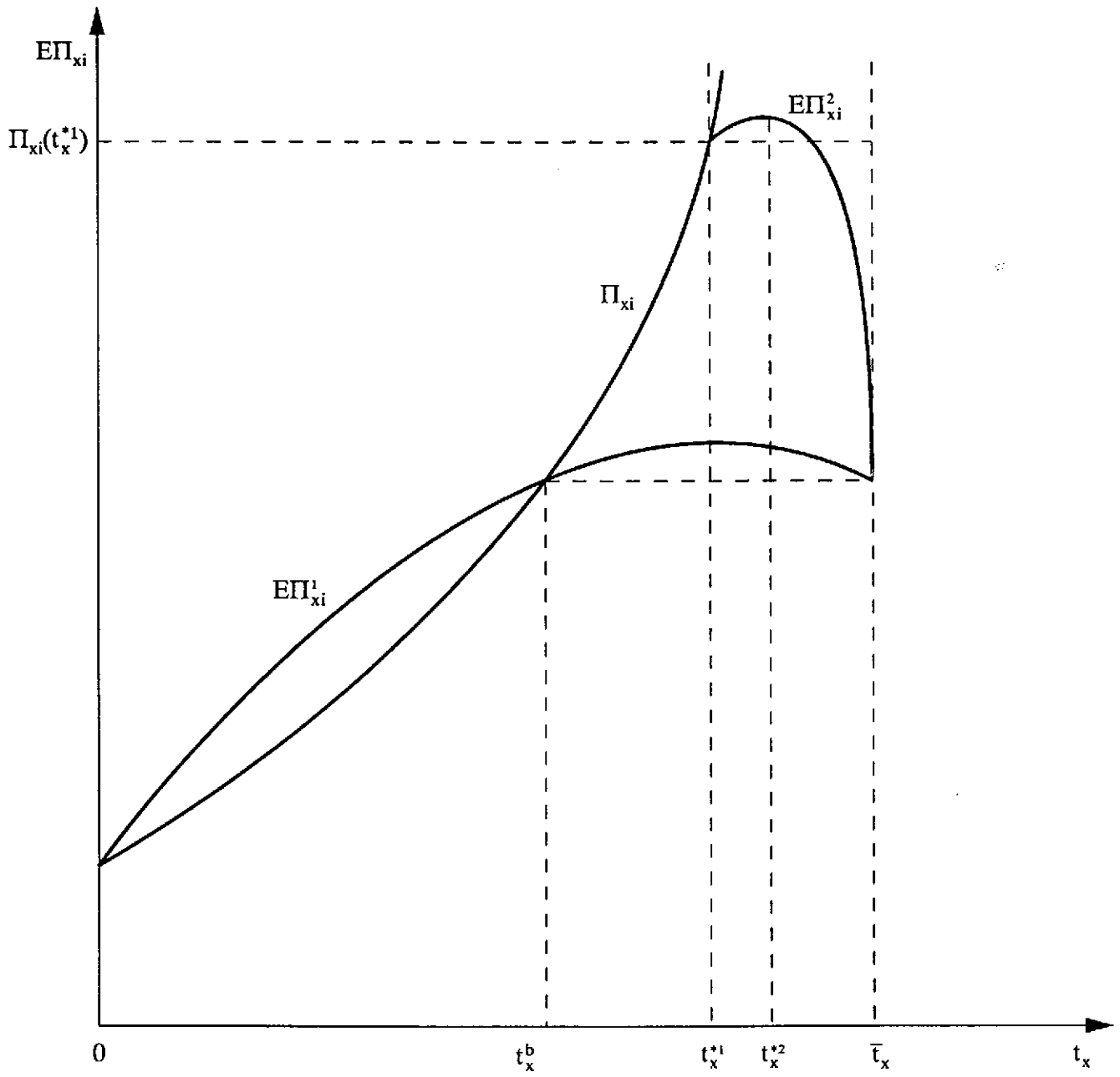
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