Trade Imbalance and Domestic Market Competition Policy

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Abstract

This study investigates the effect of a country’s suppression of competition in its market for non-tradables. It assumes that the initial equilibrium is stationary and demonstrates that if competition is suppressed in a small country, the country’s trade surplus increases in the short run. In the large country case, the same change creates an excess demand for future tradables and affects the relative price between present and future tradables. Using a two-country model, the study shows that this price change redistributes real wealth from the country with a trade deficit to the country with a trade surplus.
1. Introduction

Many policymakers appear to accept as fact the proposition that a country's suppression of domestic market competition, i.e., competition in the non-tradable service sector, can result in a surplus in that country's trade account. On this basis, for example, the U.S. has long urged Japan to promote competition in its non-tradables market as a means of reducing the U.S. trade deficit with Japan.\(^1\) However, neither the proposition itself nor its normative implications has yet been examined in a rigorous economic framework. This gap in the literature may be attributable to the lack of a model in which a country's trade balance can be related to the organization of that country's non-tradables market.

In order to capture this relationship, the present study builds a perfect foresight equilibrium model with infinitely-lived representative consumers and provides local characterizations for the effects of a country's suppression of competition on its trade balance, on world prices of present and future tradables and on utilities of that country and its trading partner country.\(^2\) As in the static model of Sanyal and Jones (1982), international trade is assumed to involve a non-consumable middle product, which the service sector transforms into a final consumable good that is not tradable internationally. The degree of competition in the market for the non-tradable consumable good is treated as a policy instrument of the government.\(^3\) The initial equilibrium that holds before a change

\(^1\)See, for example, the final report of the Structural Impediments Initiative (SII) talks held between Japan and the U.S. in 1989 and 1990. Many Japanese policymakers also agree with this view, as is shown in the highly influential Maekawa Report (submitted to the Prime Minister of Japan, 1986).

\(^2\)This model setting is prompted partly by the familiar observation in the policy-oriented literature that trade imbalance does not matter because it simply reflects the borrowing and lending decisions of rational economic agents; in order to reexamine such an observation, it is desirable to adopt a model that is based on the full intertemporal optimization of agents. As a result, such issues as bankruptcy and a country's abuse of credits are abstracted from in this study.

\(^3\)Two types of anti-competitive policies may serve as barriers to entry by foreign firms. The "first" type of policy specifically prevents foreign firms from entering domestic markets. In the recent Kodak-Fuji-Film case, Kodak argues that such a policy was adopted against Kodak by the Japanese government (see Eastman Kodak, 1995). The "other" type of policy treats foreign and domestic firms equally. For example, in the case of Toy's-R-Us, the Japanese Large Store Law (which has since then been revised) prevented the toy retailer from opening stores in Japan, but the Law imposed the same restrictions on Japanese retailers. The common feature of these policies is that they raise the degree of market distortion. By capturing the impact of an anti-
in a country's competition policy is assumed to be stationary. This assumption is adopted not just to simplify comparative dynamics but to exclude the time-dependent effect of a policy change attributable to the time dependence of an initial equilibrium and to focus on the effect of an exogenous change that is intrinsically non-uniform over time. In particular, this assumption makes it possible to highlight the difference between short-run and long-run responses to a particular exogenous change in a unified framework.

This difference is clearly reflected in my first result, which demonstrates that a small country's suppression of competition in its non-tradables market changes its trade account in the surplus direction at present and in the deficit direction in the future. This effect, which I call a short-run trade surplus creation effect, is attributable to the assumption that, within their wealth constraints, the consumers can freely smooth out their consumption over time and that on the production side, the input and output levels are freely adjustable except for the output level of tradables at time 0: These assumptions reflect the general perception that intertemporal adjustment can be carried out more flexibly on the consumption side than on the production side and that adjustment on the production side is more flexible in the long run than in the short-run.

If the suppression of domestic market competition increases the trade surplus, why should it matter? This is a question often raised in the policy-oriented literature. In fact, if adopted by a small country, such a policy harms only that country without affecting the rest of the world. If it is adopted by a large country, however, this is no longer the case. This is because the short-run trade surplus creation effect shifts the country's net demand for tradables from the present towards the future. This creates a world excess demand for future tradables, which is absorbed by a change in the price path so as to achieve a new equilibrium. This price change has the effect of redistributing real wealth between the large country and its trading partner country, provided that trade imbalance is present in the initial equilibrium.

In the second part of the study, this redistributive effect is characterized in a two-country setting under the assumption that the two countries' trade accounts are not balanced in the initial (stationary) equilibrium. This imbalance is attributed to the historically given foreign credits and debts that are assumed to competitive policy by the degree of market distortion, the analysis in this study can accommodate both types of anti-competitive policies.
exist at the present (i.e., time 0). It is demonstrated that a country's suppression of domestic market competition benefits a country that is in trade surplus in the initial equilibrium and harms a country in deficit. This implies that the suppression of competition in the non-tradables market will function as a beggar-thy-neighbor policy for a trade-surplus country; a country can benefit itself but at the cost of its trading partner. For a trade-deficit country, however, the same policy does not serve as a beggar-thy-neighbor policy, although the promotion of competition does.

These results are first derived in a simple example by solving locally the equilibrium system with respect to a change in the home country's policy. The generality of the results is then demonstrated in a general setting with respect to the law of demand imposed on what I call a long-run derived demand function. My analysis shows that this long-run derived demand function may serve as a useful tool for explaining the generality of comparative dynamics results in the existing literature (for such results see, for example, Lipton and Sachs (1983), Devereux and Shi (1990), Ono and Shibata (1992) and Yano (1993)).

In addition to studies concerning the large-country case, a number of studies have dealt with trade balance issues in a small country model with infinitely-lived agents (see, for example, Obstfeld, 1982, Matsuyama, 1987, Sen and Turnovsky, 1989, and Brock and Turnovsky, 1993). In analyzing the effect of a distortionary policy on a small country's trade balance, this study can be compared with Sen and Turnovsky (1989), who demonstrate that a tariff increases the trade balance in the surplus direction in the short run and relate that effect to the contractionary effect of a tariff causing the decumulation of the long-run capital stock. Although the suppression of domestic market competition has a similar contractionary effect, as this study demonstrates, the creation of a short-run trade surplus and the

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4This assumption makes it possible to capture the redistributional effect that emerges from the existence of a trade imbalance in the initial equilibrium. Similar assumptions have been adopted in the existing literature; for example, see Ono and Shibata, 1992. The fact that even in a stationary equilibrium, a country's trade balance may not be zero because of the existence of foreign credits and debts at time 0 is pointed out by the earlier work of Gale (1971).

5Earlier, Judd (1985) adopts such a method for characterizing comparative dynamics in a different context.

6A large number of studies exist that investigate the effect of a tariff on trade balances using different models. Those studies generally find that a tariff shifts the trade balance in the surplus direction, although the reasons differ; for references, see the excellent survey in Sen and Turnovsky (1989).
decumulation of the long-run stock are mirror images of each other that can be attributed to the differences in the adjustability of economic activities between the long run and the short run and between production and consumption.

I do not claim that the findings of this study explain specific real-world phenomena. Nor do I pretend that the assumptions on which they are based are "realistic" for such a purpose. My results do, however, shed new light on certain effects of domestic market competition policy that have been overlooked in the existing literature. I do not argue, for example, that the short-run trade surplus creation effect revealed in this study explains why many policymakers seem to believe that a country's promotion of competition may reduce that country's trade surplus; this belief is more likely to be the outcome of the casual observation that such a policy should result in an increase in consumption, thereby stimulating imports. From a theoretical viewpoint, however, it is obvious that this casual observation is deceptive, because a country's dynamic behavior is subject to a wealth constraint that requires the total present value of consumption over time to be equal to its wealth. In consequence, a country's consumption cannot be expanded unilaterally without a matching increase in its wealth, which counteracts the surplus reduction effect that increased consumption might create. On balance, therefore, it is not a priori the case that the promotion of competition can reduce the trade surplus. My result reveals, however, that, at a level deeper than the level of that casual observation, there is a fundamental relationship that contributes to the creation of a trade surplus in the short run.

In what follows, I will introduce the model in Section 2. Section 3 will be concerned with the direct effect on trade balance in the small-country case. Section 4 will be concerned with the redistributional effect in the large-country case. Section 5 is for some concluding remarks.

2. Model

As discussed in the Introduction, this study constructs a dynamic model with infinitely-lived representative consumers in which trade balance issues can be related to the organization of a non-tradables market. Although the comparative

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7 In this paper, for example, it is assumed that trade imbalance exists in the initial stationary equilibrium as a consequence of foreign credits and debts at the present moment. Whether or not a particular real-world case of trade imbalance can be explained in such a way can be determined only by empirical analysis.
dynamic analysis of such a model is technically more complicated than that of a model with a shorter time horizon (a two-period model, for example), as this study shows, the model tends to generate more clean-cut results, which can highlight the difference between short-run and long-run adjustments.\(^8\)

In order to render comparative dynamics tractable, assume that there is only one non-tradable consumption good, \(C\); and one tradable middle product, \(M\): In order to produce output in a particular period, middle product \(M\) must be purchased one period prior to that period. Under this assumption, a surplus in a country's trade account in a particular period is equal to the value of good \(M\) output minus that of good \(M\) input in that period. In that good \(C\) is a non-tradable and is produced from good \(M\) and labor, sector \(C\) may be thought of as a service sector including, among others, wholesalers and retailers. Call the period between time \(t - 1\) and time \(t\) period \(t\). The market opens and clears at time \(t = 0; 1; \ldots\):

First, focus on the home country. Following the standard literature, assume that the behavior of each country's consumers can be described by that of a representative agent. The home country's period-wise utility function is \(\lim_{t \to 0} v(c_t; l_t) = u(c_t) + v(l_t)\), where \(c_t\) and \(l_t\) are the aggregate consumption demands for good \(C\) and leisure, respectively, at time \(t\). This utility function, which depends not only on the consumption of good \(C\) but also of leisure, is adopted so that a separation of the good-\(C\) price from its marginal cost actually has a distortionary effect; as explained at the end of the next section, in a general equilibrium setting, no distortionary effect would be created if utility function \(v\) were to depend only on \(C\).

Intertemporal preferences are expressed by \(U = \sum_{t=1}^{T} \frac{1}{T} \lim_{t \to 0} \lim_{t \to 1} v(c_t; l_t)\), where \(0 < \frac{1}{T} < 1\). Denote by \(p_t\) the present value price of good \(C\) at time \(t\) and by \(w_t\) that of leisure (i.e., the wage rate) at time \(t\). The representative agent is constrained by wealth constraint \(\sum_{t=1}^{T} (pc_t + w_t) = W\); wealth \(W\) will be explicitly defined.

\(^8\) Although the technical side of the characterization of comparative dynamics would be straight-forward in a two-period model, the results would become highly complicated. This is because, for the purpose of this study, it is necessary to assume that a consumer's utility in each period depends on at least two consumables (the final consumption good and leisure in the above model). Thus, the comparative dynamics depends on the interaction of at least four goods; as is well-known, it is difficult to obtain clean comparative dynamics results in such a model. In a two-period model, moreover, the distinction between the present and future periods tends to become arbitrary. This obscures the distinction between short-run and long-run adjustments, on which this study focuses.
below. The representative agent maximizes \( \Pi_t = \sum_{i=1}^{P} \frac{1}{2} \frac{\partial}{\partial v_t} v(c_t; \cdot_t) \) subject to the wealth constraint. The first order conditions of this optimization are

\[
\frac{1}{2} \frac{\partial}{\partial u(c_t)} = \pi_t \quad \text{and} \quad \frac{1}{2} \frac{\partial}{\partial v_0(t)} = \omega_t; \tag{2.1}
\]

where \( \pi \) is the associated Lagrangian multiplier.

Let \( q_t \) be the present-value price of \( M \) at time \( t \). In each sector, the technology of an individual firm is described by a standard neoclassical production function that does not vary across firms. Thus, the marginal cost of an individual firm is constant and equal to \( MC_{it} = a_Y q_{it} + a_L w_t; i = M, C; \) where \( (a_Y, a_L) \) is the cost-minimizing combination of good-\( M \) and labor inputs for producing one unit of output, given \( w_t = q_{i_t} \). The market for \( M \) is perfectly competitive. Thus, the profit maximization of an individual good-\( M \) producer implies that the output price, \( q_t \), is equal to the marginal cost, \( MC_{it} \); i.e.,

\[
q_t = a_Y q_{it} + a_L w_t. \tag{2.2}
\]

Assume that a country’s government controls the degree of competition in its market for good \( C \). This creates a distortion in the market for \( C \); which separates the price of good \( C \) from the marginal cost of \( C \). The government’s competition policy is to influence the degree of this distortion. One way to incorporate this aspect into the model explicitly is to assume that the sellers in the market for \( C \) are identical and that the government controls the number of those sellers, \( N \). \( ^9 \) The sellers behave in Cournot-Nash fashion. That is, given a market elasticity of demand at time \( t \); \( \eta_t \), an individual firm’s perceived marginal revenue is \( MR_{Ct} = \left[ 1 - \frac{1}{N_t} \right] p_t \). The profit maximization of an individual good-\( C \) producer is described by the condition that the marginal revenue, \( MR_{Ct} \), is equal to the marginal cost; \( MC_{Ct} \); i.e,

\[
\frac{1}{2} \frac{\partial}{\partial p_t} \mu_t = a_Y q_{Ct} + a_L w_t; \tag{2.3}
\]

\( ^9 \) In the real world, there are a number of ways by which a government may influence the degree of competition: for example, by setting up artificial entry barriers into particular industries; artificially segmenting markets into multiple sections; changing the intensity with which antitrust laws are enforced; and allowing and/or directing trade associations to play cartel-like roles. Since the mid-1980s, for example, Japan has been criticized for the use of such policy tools (Johnson, 1982, Prestowitz, 1988, and Tyson, 1993). On the U.S. side, the revision of antitrust enforcement in the 1980s is often viewed as a reaction to Japanese industrial policy.
where \( \hat{1} = 1 \equiv N \); which captures the degree of imperfect competition in the market for the consumption good, \( C \); \( \hat{1} = 0 \) and \( \hat{1} = 1 \) correspond respectively to the limit cases in which the good-C market is perfectly competitive and purely monopolistic. (In the following analysis, \( \hat{1} \) is treated as a real number.) If \( \hat{1} \equiv t \) is thought of as the government’s policy variable, the results below can be obtained without relying on the Cournot-Nash process developed here.

Assume that the home country owns \( \hat{1} \) units of labor, which can be either consumed by consumers as leisure or used by sectors \( M \) and \( C \) as input. Let \( y_t; t = 1; 2; \ldots \); be the output level of good \( M \) at time \( t \). The full employment condition in the labor market can be written as
\[
\alpha_{LM} t y_t + \alpha_{LC} t c_t + \hat{1} t = \hat{1}.
\]
(2.4)

Let \( x_{t-1}; t = 1; 2; \ldots \); be the home country’s aggregate demand for middle product \( M \) at time \( t-1 \), which is the sum of the input demand of sector \( M \), \( \alpha_{YM} t y_t \), and that of sector \( C \), \( \alpha_{YC} t c_t \); i.e.,
\[
x_{t-1} = \alpha_{YM} t y_t + \alpha_{YC} t c_t.
\]
(2.5)

At \( t = 0 \); the home country is endowed with a fixed amount of good \( M \) and a historically determined foreign credit, \( C \). The home country’s wealth, \( W \); is equal to the sum of foreign credit \( C \); the sum of the present values of good-M and good-C endowments, \( q_0 y_0 + \sum_{t=1}^{\hat{1}} w_t \); and the sum of the present values of monopolistic profits, \( \sum_{t=1}^{\hat{1}} p_t c_t \); Thus, the representative consumer’s wealth constraint can be written as
\[
\sum_{t=1}^{\hat{1}} (p_t c_t + w_t) = C + q_0 y_0 + \sum_{t=1}^{\hat{1}} w_t + \sum_{t=1}^{\hat{1}} p_t c_t = W.
\]
(2.6)

As (2.1) indicates, \( p_t \equiv \frac{1}{\hat{1}} \) may be thought of as the current-value price of good \( C \) at time \( t \); in a similar sense, \( q_t \equiv \frac{1}{\hat{1}} \) may be thought of as the current-value price of good \( M \) at time \( t \). Thus, the current value of the home country’s trade surplus at time \( t \) is equal to \( s_0 = q_t (y_t - x_t) \equiv \frac{1}{\hat{1}} \) and
\[
s_t = q_t (y_t - x_t) \equiv \frac{1}{\hat{1}}
\]
(2.7)
for \( t = 1; 2; \ldots \). With this definition, the wealth constraint (2.6) can be transformed
into the intertemporal external balance equation,

\[ X_t - \frac{1}{2} S_t = \bar{C} \quad t = 0 \]  

(2.8)

Equations (2.7) and (2.8) demonstrate that a country can become a net exporter (or importer), \( y_t > x_t \); by running a trade surplus, \( S_t > 0 \) (or deficit), so long as a country satisfies wealth constraint (2.8).

Since the absolute levels of present-value prices do not matter in the general equilibrium model, the price of one good can be fixed at an arbitrary level. As seen below, it is convenient to normalize the sequence of present-value prices by setting \( q_0 = \frac{1}{2} \): This completes the description of the model on the home country’s side. Since the foreign country’s side is similar, its description will be provided as it becomes necessary.

3. Short-Run Trade Surplus Creation

In this section, I make a local characterization of the effect of a small country’s suppression of competition in its non-tradables market on that country’s present and future trade balances by totally differentiating the equilibrium with respect to a change in the degree of competition, \( d\alpha \). By focusing on the small country case, the direct effect of suppression of competition can be separated from the indirect effect that appears as a result of a change in the prices of tradables in the world market.

In the analysis below, the initial equilibrium path is assumed to be stationary. As discussed in the Introduction, this assumption is adopted not just to simplify comparative dynamics. More importantly, it permits the capture of that part of the dynamic effect of a policy change that is intrinsically time independent. In a dynamic model, the effect of an exogenous change is, in general, time dependent. This time dependence may result from the fact that the initial equilibrium is not stationary. Even if the initial equilibrium is stationary, however, an exogenous change may have different effects in the long run and the short run, thereby making the after-change equilibrium path non-stationary. The assumption that the initial equilibrium is stationary makes it possible to highlight these effects.

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10 By (2.2) through (2.5), it holds that \( q_0 \cdot \chi_0 + (1 - \frac{1}{i \cdot t}) \beta \cdot q_0 = q_0 \cdot x_0 + w_0 (i \cdot t) \). This together with wealth constraint (2.6) implies (2.8).
which are intrinsically time dependent, by excluding the part that is attributable to the time dependence of the initial equilibrium.

In the initial stationary equilibrium, the current value prices, \( p_t = \frac{1}{2} t^{-1} \); \( q_t = \frac{1}{2} t^{-1} \); and \( w_t = \frac{1}{2} t^{-1} \); are time-invariant, as (2.1) indicates. As a result, the activities of agents are also time-invariant and can be denoted as \((c_t; \lambda_t; x_t - y_0; y_0) = (c; \lambda; x; y)\); \( a_{ijt} = a_{ij} \); \( t = 1; 2; \ldots \); and \( y_0 = y \); Since \( q_0 = \frac{1}{2} \) by price normalization, \( q_t = \frac{1}{2} t^{-1} \) in the initial stationary equilibrium.

Since, by (2.7), the initial trade surplus is equal to \( s = y - x \); \( t = 0; 1; 2; \ldots \); it follows from (2.8) that
\[
A: \quad q_t = \mu_{MC} q_{t-1} + (1 - \mu_{MC}) y_t
\]
\[
B: \quad p_t = \mu_{MC} q_{t-1} + (1 - \mu_{MC}) y_t
\]
Since \( q_{t-1} = 0 \) for \( t = 1; 2; \ldots \); it follows from equation A that \( y_t = 0 \) for \( t = 1; 2; \ldots \);
If the good-C market becomes less competitive, given the unit cost, the consumables producers may raise the price of C; $p_t$. As the first order condition (2.3) shows, this depends on the extent to which the degree of imperfect competition, $\eta_t$, increases and the perception of good-C producers as to how market elasticity, $\eta_t$, changes.

In order to describe this perception, I follow the standard treatment by assuming that the producers know the shape of the utility function, $u(c_t)$; and believe that even if they change their own output levels, the marginal utility of wealth, $\theta_t$, will be unaffected. For the sake of simplicity, moreover, assume $u(c_t) = \log c_t$. Under this assumption, the market elasticity is perceived to be unitary "$= 1"$; although it is possible to carry out comparative dynamics for the general utility function, I choose not to do so because the results would become dependent upon the third derivative of $u_t$; the sign of which is ambiguous. Given this setting, the first order condition (2.3) implies that if the degree of imperfect competition is increased by $d\eta$, the good-C price will be raised by

$$p_t = d^\eta \eta_{t=1}$$

for $t = 1; 2; \ldots$. Note that if $\eta = 0$ initially, then without any of these assumptions it holds that $p_t = d^\theta; Therefore, if it is assumed that the market is perfectly competitive initially ($\eta = 0$), the assumptions introduced here can be dispensed with altogether.

The change in $p_t$ affects economic activities. On the production side, $(w_t, q_{t=1}) = 0$ implies $a_{it} = 0; Thus, by (2.4) and (2.5),

$$dx_t = a_Y dy_t + a_Y C dc_t \quad \text{and} \quad i = d^t = a_L dy_t + a_L C dc_t.$$  

(3.3)

On the consumption side, it follows from (2.1) that

$$dc_t = j (-c + d^\theta = \{1 j \} \eta)$\text{ and } d^t = j (-c \} \eta) \theta.$$  

(3.4)

where $\text{ and } \eta = (1 j \) \eta$;

Since, as (3.4) demonstrates, the changes in $c_t$ and $\eta_t$ are time-invariant, by (3.3), those in tradable output and input are also time-invariant and can be denoted as

$$dx_t = d^\gamma \text{ and } dy_t = d^\gamma.$$  

(3.5)

In contrast, the change in the trade surplus differs between $t = 0$ and $t = 1; 2; \ldots$; because the initial endowment $y_0$ is fixed. That is to say, since $q_t = \frac{1}{2} \text{ in the }$
initial stationary equilibrium, (2.7) implies

\[ ds_0 = i \ dx_0 \text{ and } ds_t = dy_t - dx_t; \quad t = 1; 2; \ldots \tag{3.6} \]

These facts give rise to the next theorem.

**Theorem 3.1.** Suppose that a small country raises the degree of imperfect competition in its non-tradables market \((^1)\) once and for all. Then, the path of the trade balance \(s_t\) changes as follows:

\[ ds_0 = \frac{\alpha_{Y_C} c(i) \cdot \frac{1}{2}}{\frac{1}{4} \alpha_{YM} (1 - i) + \alpha_{LC} c(1)} > 0; \tag{3.7} \]

\[ ds_t = \frac{1}{2} ds_0 \text{ for } t = 1; 2; \ldots \tag{3.8} \]

**Proof:** Since \( q_t = \frac{1}{2} \) in the initial equilibrium, by (2.8), \( ds_0 = \frac{1}{i} = \frac{1}{4} \sum_{t=1}^{\infty} ds_t \). By (3.5) and (3.6), this implies \( dx^s = \frac{1}{2} dy^s \); Thus, by (3.5), \( dy_t = dx^s = \frac{1}{2} \) and \( dx_{t+1} = dx^s \); By using these expressions together with (3.4), (3.3) can be transformed into a simultaneous system of equations for \( B \) and \( dx^s \); By solving this system, \( ds_0 = i \ dx^s \) can be expressed as (3.7). Since \( q_t = \frac{1}{2} \) in the initial equilibrium, by (2.2), it holds that \( \frac{1}{4} \alpha_{YM} > 0 \); Thus, the right-hand side of (3.7) is positive. Q.E.D.

Theorem 3.1 implies that a small country's suppression of competition in its non-tradables market changes its trade balance in the surplus direction at the present moment of time, \( ds_0 = \frac{1}{i} > 0 \). This effect, which I call a short-run trade surplus creation effect, is attributable to the premise that intertemporal adjustment can be carried out more flexibly on the consumption side than on the production side and that adjustment on the production side is more flexible in the long run than in the short-run. As discussed in the Introduction, this perception is incorporated into my model by the assumption (i) that the representative consumer can, subject to his wealth constraint, freely smooth out his consumption over time and (ii) that the input and output levels of the two sectors are freely adjustable except for the output level of tradables at time \( t = 0; y_0 \); Under this assumption, the behavior of consumers and producers can be described by (2.1), (2.4) and (2.5), which imply (3.3) and (3.4).
For the sake of explanation, suppose that a country suppresses competition in its non-traded (service) sector, C, once and for all at a particular point of time, \( t = 0 \). Since, every period, the firms in sector C can increase their profits by cutting back their supplies of consumables, their input demands for middle products must be reduced not only at time 0 but also at every future point of time.\(^{15}\) Since the country as a whole must keep its wealth constraint, (2.8), these reductions in the input demands for middle products must be matched by reductions in the middle product sector's net supplies.\(^{16}\) If production can be adjusted more elastically in the long run, such a supply reduction tends to be larger in the long run than in the short run. In the world market for tradables, therefore, an excess supply tends to be created in the short run and to be coupled with an excess demand in the long run.\(^{17}\) In other words, the country's trade balance shifts in the surplus direction in the short run, while it shifts in the deficit direction in the long run. Although the specific characterization of comparative dynamics that (3.7) captures depends on a number of other assumptions, the above discussion indicates that the short-run trade surplus creation effect may be observed in a wide class of dynamic models.\(^{18}\)

\(^{15}\) That is, by the first equation of (3.4), the change in the middle product input demand of sector C at \( t = 1 \) is \( a_C C = a_C C^s \), where \( C^s = (b + d^a)(1 - s) \).

\(^{16}\) By the first equation of (3.3), the change in the net supply of \( M \) is \( dy_t i X_t = dy_t i a_M dy_{t+1} i a_C C^s \), where \( C^s \) is as defined in the previous footnote. Thus, by (3.6), it must hold that

\[
\frac{1}{2} \frac{1}{2} (dy_t i a_M dy_{t+1} i a_C C^s) = 0;
\]

\(^{17}\) That is, since \( y_0 \) is fixed by assumption, the equation in the previous footnote can be transformed into

\[
0 = (1 i \frac{1}{2} a_M) \frac{1}{2} (dy_t i a_M dy_{t+1} i a_C C^s) = (1 i \frac{1}{2});
\]

By the second equation of (3.3), \( dy_t \) is time invariant for \( t = 1; 2; \ldots \). Therefore, \( dy_t = \frac{a_C}{a_M} C^s \). Since \( ds_0 = i (a_M dy_t + a_C C^s) \), this implies

\[
ds_0 = i \frac{a_C}{a_M} C^s,
\]

which demonstrates that any reduction in consumption that is uniform over time (\( C^s < 0 \)) creates a trade surplus in the short run (\( ds_0 > 0 \)).

\(^{18}\) The discussions of the previous four footnotes depend only on the conditions that \( C^s = C^s \) for \( t = 1; 2; \ldots \) and that \( dy_0 = 0 \) and \( dy_t = \frac{dy^s}{\frac{1}{2}} \) for \( t = 1; 2; \ldots \). In the present model, these conditions are guaranteed by the basic assumption discussed in footnote 14. However, they are
A similar relationship is observed by Sen and Turnovsky (1989), who demonstrate in the standard trade setting that the imposition of a tariff has a similar short-run trade surplus creation effect. They attribute this effect to the contractionary effect of a tariff that causes the long-run capital stock to fall. The short-run trade surplus creation effect of this study can be given a similar explanation, since the middle product input, $x_t$, can be interpreted as a stock; that is, as shown in the proof of Theorem 3.1, it holds that $dx^s=dy^s = -ds < 0$, which implies a fall in the long-run stock level. This equation demonstrates that the fall in the long-run stock level is a mirror image of the short-run trade surplus creation. This study reveals that these phenomena are attributable to the differences in the adjustability of economic activities between the long run and the short run and between production and consumption.

The next proposition summarizes the main finding of this section.

**Proposition 1.** (short-run trade surplus creation) A small country’s suppression of domestic market competition changes its trade balance in the surplus direction at the present moment $t = 0$ and in the deficit direction at every future moment of time.

In the present study, unlike in the basic two-sector model, I assume that the utility function depends on the consumption of leisure. Before closing this section, it may be useful to discuss the role of this assumption.

To begin with, note that this assumption does not explain the fact that the short-run trade surplus creation effect is independent of the factor intensity ranking between the two sectors. It is well known in the trade literature that in the two-sector, two-factor model, the relationship between the output levels of the sectors and the input levels of the factors depends on the factor intensity ranking of the two sectors (the Rybczinski theorem). In the present model, this Rybczinski theorem-like effect is not at work; as shown in the proof of Theorem 3.1, the output and input levels of tradables are always positively related ($dx^s = dy^s$). This relationship is, as shown in the proof of Theorem 3.1, a direct consequence of the external budget constraint (and $dy^s = 0$) but is not attributable to the assumption that the utility function depends on the consumption of leisure.

---

expected to hold in a wide class of models, given the assumption that the current price path is stationary. The existence of a short-run trade surplus creation effect is robust in that class of models.
In fact, even if the utility function is independent of the consumption of leisure \( v(c, \lambda) = u(c) \); the effect is independent of the factor intensity ranking. In that case, to be precise, the suppression of competition has no effect on allocation; since \( \lambda = 0 \) in this case, \( ds_0 = 0 \) by Theorem 3.1. This reflects the fact that in a general equilibrium model, the suppression of competition in the final consumption good market \( (d^F > 0) \) cannot have a distortionary effect on allocation unless the utility function depends on the consumption of more than one good. The assumption that the utility function depends on the consumption of leisure is adopted in order to guarantee that a distortionary policy can actually influence an allocation. It does not play, however, much more than that role.

4. Redistributional Effects

As shown above, a country's suppression of competition in the non-tradable service sector creates an excess supply of tradables at the present moment and an excess demand for tradables at every future moment. If, therefore, the country is a large country, the excess supply and demand affect the price path. If the country's trade account is not balanced in the initial equilibrium, this price change has the effect of redistributing real wealth between that country and its trading partner countries. In this section, I construct a simple two-country model and, by total differentiation, make a local characterization for this redistributional effect under the assumption that the two countries' trade accounts are not balanced in the initial equilibrium. The assumption of the previous section that the initial equilibrium is stationary is maintained throughout the rest of this study.

\[ ds_0 = i \frac{a_{Y|M}}{a_{Y|M}} i \frac{a_{Y|M}}{a_{L|M}} dc^s; \]

which is implied by the Rybczynski theorem. However, even in this case, the short-run trade surplus creation effect of a reduction in consumption is at work; i.e.; as shown in footnote 17,

\[ ds_0 = i \frac{1}{a_{Y|M}} \frac{1}{a_{Y|M}} dc^s; \]

These two equations imply that \( ds_0 = dc^s = 0 \) in the case in which \( v(c, \lambda) = u(c) \):
4.1. Characterization in a Special Case

In order to render comparative dynamics analytically tractable, I adopt in this subsection the assumption that the utility function is linear in \( v(\cdot) = \cdot \); and that the two countries are identical except for the initial positions of foreign credits and debts. In the next subsection, I will return to the general case and examine the generality of the results obtained here.

In the two-country case, a country's trade surplus equals the other country's deficit, \( s_t = \cdot s^\omega_t \). Assume that in the initial stationary equilibrium, trade is not balanced, \( s = \cdot s^\omega = 0 \); By (3.1), this assumption is equivalent to the assumption that at time \( t = 0 \); there exist foreign credits and debts, \( C = \cdot C^\omega = 0 \); (4.1)

it is implicitly assumed that borrowing and lending were conducted prior to \( t = 0 \).

Let \( e_t = x_t + x^\omega_t \cdot (y_t + y^\omega_t) \) and \( 1_{0^\omega} = q_0 = 1/2 \); \( e_t \) and \( 1_{0^\omega} \) being, respectively, the world excess demand for good \( M \) and the current-value price of good \( M \) at time \( t \); Since \( 1_{0^\omega} \geq 1 \) by price normalization (\( q_0 \geq 1/2 \); \( 1_{0^\omega} = 1 \) for \( t = 0; 1; \ldots \) in the initial stationary equilibrium. If the initial equilibrium prices are kept unchanged, as shown above, the suppression of competition in a country's market for non-tradables creates a short-run excess supply of, and a long-run excess demand for, tradables, \( i.e.; \) given \( d\omega = d\omega = 0 \);

\[
\frac{de_0}{dt} = \cdot \frac{ds_0}{dt} < 0 \text{ and } \frac{de}{dt} = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{ds_0}{dt} > 0 \] (4.2)

In the large-country case, this excess supply and demand must be absorbed by a change in the price path.

It is this price change that creates the redistributional effect. By (2.1), a change in the home country's discounted utility sum can be written as \( dU = \frac{1}{1} (\rho dc + \psi d^\omega_t) \), which may be thought of as a change in real wealth. Given
the change in real wealth may be transformed as
\[ d\bar{U} = \frac{1}{1 - \frac{1}{2}} s_1 \beta + 1_1 \bar{p} \bar{c}_t ; \] (4.3)

where \( q = (1 - \frac{1}{2})^p \sum_{t=1}^{\infty} q_t. \) Moreover, since \( s^\mu = i \sigma; \) the change in the foreign country's real wealth can be expressed as
\[ d\bar{U}^\mu = \frac{1}{1 - \frac{1}{2}} s^\mu + 1_1 \bar{p} \bar{c}_t^\mu ; \] (4.4)

As (4.3) and (4.4) demonstrate, an increase in the price of future good-M outputs \((q > 0)\) tends to increase the real wealth of a net exporter of those outputs and to decrease that of a net importer.

Denote \( \bar{d}e_1 = \lim_{t \to 1} d\bar{e}_1 \) and \( \bar{y}_2 \) \( = \lim_{t \to 1} \bar{y}_2; \) which may be thought of as changes in the long-run world excess demand for and the long-run price of tradables, respectively. The next lemma relates the change in long-run excess demand \( \bar{d}e_1 \) to that in long-run price \( \bar{y}_2 \) and the degree of market competition, \( d\theta \):

**Lemma 1.** It holds that
\[ \bar{d}e_1 = \frac{1}{1 - \frac{1}{2}} \frac{(1 - \frac{1}{2}) \bar{p} \bar{c}_t}{\bar{p} \bar{c}_t} + \frac{1_1 \bar{p} \bar{c}_t}{\bar{p} \bar{c}_t} \] (4.5)

This expression can be derived as follows: Since \( \sigma = 1 \); optimization on the production side implies \( q \bar{y} + (1 - \frac{1}{2}) \bar{p} d\bar{c} = q_1 \bar{y} x + w d(1 - \frac{1}{2}); \) since, as noted in a previous footnote, \( q \bar{y} + (1 - \frac{1}{2}) \bar{p} c = q_1 \bar{y} x + w (1 - \frac{1}{2}); \) this implies the dual relationship
\[ A: \quad \bar{y} d\bar{q} + (1 - \frac{1}{2}) \bar{c} d\bar{p} = x_1 \bar{y} d\bar{q} + (1 - \frac{1}{2}) d\bar{w}; \]

Since \( q_0 = \frac{1}{2} \) by the choice of numeraire, by equation A; the total differentiation of wealth constraint (2.6) yields
\[ B: \quad \frac{X}{(1 - \frac{1}{2})} (\bar{p} \bar{d}c_t + w \bar{d}c_t) = \frac{X}{(1 - \frac{1}{2})} (\bar{q} \bar{y} c_1 + (1 - \frac{1}{2}) \bar{p} \bar{d}c_t); \]

Since \( q_0 = \frac{1}{2} \) in the initial equilibrium, (4.3) follows from equation B.

\[ 21\text{Since } q = \frac{1}{2} \text{ in the initial stationary equilibrium and since } q_0 < \frac{1}{2} \text{ by price normalization, this definition of } q \text{ implies that } \sigma = (1 - \frac{1}{2}) \sum_{t=1}^{\infty} \frac{1}{\frac{1}{2}} \bar{q}; \]
where $\mu_M = a_{YM} = \frac{1}{\alpha}$ and $\mu_C = a_{YC} = \rho$ and where $'$ and $''$ are defined as follows:

$$'
= \frac{\beta y}{\beta y(1 + \mu_M)} + \rho q \mu_C [\mu_C + (1 + \mu_C)]$$

$$''
= \frac{\beta y}{\beta y(1 + \mu_M)} + \rho q \mu_C [\mu_C + (1 + \mu_C)]$$

Proof: Since $\frac{1}{\alpha} = 0$ in the initial equilibrium, $\mu_M = a_{YM} \Rightarrow \mu_C = a_{YC} = \rho$ can be identified with those introduced in footnote 12. I will first demonstrate the following relationships:

$$dx_{t1} = \frac{1}{\mu_M} dy_{t1} + \rho q \mu_C \cdot \mu'_{2t} + \mu'^{2}_{2t}$$

$$dx_{t2} = \frac{1}{\mu_M} dy_{t2} + \rho q \mu_C \cdot \mu'_{2t} + \mu'^{2}_{2t}$$

To this end, take the home country. Since $a_{YM} = \frac{1}{\mu_M}$ and $a_{YC} = \rho q \mu_C$, (2.5) can be expanded as follows:

$$dx_{t1} = \frac{1}{\mu_M} dy_{t1} + \rho q \mu_C \cdot \mu'_{2t} + \mu'^{2}_{2t}$$

$$dx_{t2} = \frac{1}{\mu_M} dy_{t2} + \rho q \mu_C \cdot \mu'_{2t} + \mu'^{2}_{2t}$$

By using the elasticity of substitution $\frac{1}{\alpha} > 0$; express $a_{Y_{it}} \Rightarrow \mu_{Li} = \frac{1}{\alpha}$; $a_{L_{it}} = \frac{1}{\alpha}$; $a_{Y_{it}} = \frac{1}{\alpha}$; and $a_{L_{it}} = \frac{1}{\alpha}$; (2.4, 4.11), $a_{Y_{it}} = (1 + \mu) \cdot \mu_{Li}$; $\mu_{Li} = \frac{1}{\alpha} \cdot \mu_{Li}$; $\mu_{Li} = \frac{1}{\alpha} \cdot \mu_{Li}$; Moreover, it follows from $\mu_{Li} = \frac{1}{\alpha} \cdot \mu_{Li}$; $\mu_{Li} = \frac{1}{\alpha} \cdot \mu_{Li}$; (2.4, 4.11), $a_{Y_{it}} = (1 + \mu) \cdot \mu_{Li}$; $\mu_{Li} = \frac{1}{\alpha} \cdot \mu_{Li}$; and that, by equation B of footnote 3, $\mu_{Li} = \frac{1}{\alpha} \cdot \mu_{Li}$; $\mu_{Li} = \frac{1}{\alpha} \cdot \mu_{Li}$; (2.4, 4.11), it follows from these expressions that $\mu_{Li} = \frac{1}{\alpha} \cdot \mu_{Li}$; $\mu_{Li} = \frac{1}{\alpha} \cdot \mu_{Li}$; By substituting the expressions for $a_{Y_{it}}$ and $\mu_{Li}$ in (4.10), (4.8) can be obtained.

Because $C = i \cdot C' + i \cdot C''$ and $Y_t = Y_t$. Under the hypothesis of the theorem, the two countries have the same technologies. Since they face the same prices of good $M$; $q_i$; as (2.2) shows, $w_t = \xi_t^i$; $a_{Y_{it}} = a_{Y_{it}}^i$ and $a_{L_{it}} = a_{L_{it}}^i$ for $t = 1; 2; \ldots$; Since, as (2.1) shows, (2.2) implies $\frac{1}{\alpha} \cdot \xi_t^i = \xi_t^i$ and since $\frac{1}{\alpha} = \frac{1}{\alpha}$ by assumption, it follows from $w_t = w_t$ that $\xi_t^i = \xi_t^i$. These facts imply that (4.9) can be derived in much the same way as (4.8).
Now, let $x_t = x_t^I + x_t^C$ and $y_t = y_t^I + y_t^C$: By (4.8) and (4.9),

$$dx_t = 1/\mu_M \cdot d^I_t + pcu \cdot d^I + (\mu + \mu) \cdot \mu_M \cdot y_t^I$$  \hspace{1cm} (4.12)

By the definition of a trade surplus, $s_t + s_t^C = q_t(\mu_t, \mu) = 1$, where $s_t = y_t^I + y_t^C$ is fixed. Since $s_t = x_t$ and $q_t = 1/2$ if for $t = 0; 1; \ldots$ in the initial equilibrium, $\mu(s_t + s_t^C) = d_t^C(\mu_t, \mu)$ for $t = 1, 2; \ldots$; and $\mu(s_0 + s_0^C) = \mu d_0$. Since, moreover, \(1 \sum_{t=0}^{t-1} d_t^C = 1 \sum_{t=0}^{t-1} d_t^C = 0\) by (2.8), \(1 \sum_{t=0}^{t-1} d^C = 0\). These facts imply \(1 \sum_{t=1}^{t-1} d^C = 1 \sum_{t=0}^{t-1} d^C = 0\). Therefore, it follows from (4.12) that

$$\sum_{t=0}^{t-1} d^C = i \cdot pcu \cdot d^I + (1 \mu_M)^2 (1/2 \mu_M) \cdot y_t^I$$  \hspace{1cm} (4.13)

Since $dx_t = d^I_t$, (4.12) can be transformed as

$$1/\mu_M (dx_t + d^C) = (1/\mu_M^2 + 1) (dx_t + d^C) = 1 \mu_M (dx_t + d^C) = 0$$  \hspace{1cm} (4.14)

where $dx_t = i \cdot pcu \cdot d^I = (1 \mu_M):$ The characteristic equation of this system is, therefore,

$$1 \mu_M (i \mu_M) = 0$$  \hspace{1cm} (4.15)

Since the initial equilibrium lies on the saddle point, this demonstrates that $d^I_t = 1 \mu_M (dx_t + d^C)$: Since $d_0 = d^I_0 = 0$; this implies $dx_t = (1 \mu_M) d^I_1$ for $t = 0; 1; \ldots$: Thus, $1 \sum_{t=0}^{t-1} d^I_t = 1 \mu_M (1 \mu_M) d^I_1$, which implies, by (4.13),

$$d^I_1 = 1 \mu_M (1 \mu_M) d^I_1 = 1 \mu_M (1 \mu_M) d^I_1 = 1 \mu_M (1 \mu_M) d^I_1$$  \hspace{1cm} (4.16)

Since $d^I_1 = \lim_{t \to 1} d^I_t$ and $d^I = \lim_{t \to 1} d^I_t$ by taking $t \to 1$ in (4.12),

$$d^I_1 = 1 \mu_M (d^I + pcu \cdot d^I)$$  \hspace{1cm} (4.17)

Since $de_t = d^I_t \cdot d^I_t$; $de_t = \lim_{t \to 1} d^I_t = d^I_t \cdot d^I_1$, Thus, (4.5) follows from (4.16) and (4.17). Q.E.D.

Expression (4.5) shows that the "long-run excess demand" for tradables, $e_t$; can be expressed as a function of the "long-run price" of tradables, $1/2 \cdot \lim_{t \to 1} \mu^C$. Since $de_t = 0$ in equilibrium, the equilibrium response of long-run price $1/2$ and utilities $U$ and $U^C$ to a change in $1$ can readily be characterized by using Lemma 1.
Theorem 4.1. Let \( \mu_M = a \gamma M = \frac{1}{2} \) and \( \mu_C = a \gamma C = p \). Suppose that perfect competition is maintained everywhere in the initial equilibrium \( \ell^1 = 1^\mu = 0 \). In the special case introduced in this section, the effects of a country's suppression of competition in its non-tradables market on the long-run price of non-tradables \( \ell^2 \) and the discounted utility sums of the two countries, \( U \) and \( U^\mu \), can be characterized as follows:

\[
\frac{\partial \ell^1}{\partial \ell^1} = \frac{(1_i \frac{1}{2} \ell^0)^2 \ell^0 C}{(1_i \frac{1}{2} \ell^0)^2 (1 + \mu^1 \ell^1)} > 0; \tag{4.18}
\]

\[
\frac{1}{\partial \ell^1} \frac{dU}{d\ell^1} = \frac{1}{\partial \ell^1} \frac{dU^\mu}{d\ell^1} = \frac{(1_i \mu_M) \ell^0}{(1_i \frac{1}{2} (1_i \frac{1}{2} \ell^0))} \frac{\partial \ell^1}{\partial \ell^1}; \tag{4.19}
\]

Proof: In equilibrium, it must hold that \( \epsilon_t = 0 \) for \( t = 1; 2; \ldots \). This implies \( \epsilon_1 = \lim_{t \to 1} \epsilon_t = 0 \): Thus, (4.18) follows from (4.5). In order to derive (4.19), by (4.11), note

\[
q_T(t) = (1_i \frac{1}{2} \ell^0 \frac{1}{2} \ell^1 q_T(t) = (1_i \frac{1}{2} \ell^0 \frac{1}{2} \ell^1 (1_i \mu_M) \frac{\partial \ell^1}{\partial \ell^1}). \tag{4.20}
\]

Thus, (4.19) follows from (4.3) and (4.4). Q.E.D.

Since \( \ell^2 = \ell^1 > 0 \) by (4.18), Theorem 4.1 demonstrates that a country's suppression of competition in its non-tradables market will raise the relative price of future tradables unambiguously in the example of this subsection. This price change creates the effect of redistributing real wealth between that country and its trading partner country, \( dU = dU^\mu = d\ell^1 \). As (4.19) shows, the direction in which real wealth is redistributed can be completely characterized in terms of the sign of \( s \); which captures the trade imbalance assumed to exist in the initial stationary equilibrium.\(^{22}\)

It follows from (4.18) and (4.19) that a country's suppression of competition in its non-tradables market will increase the real wealth of the country whose trade account is initially in surplus while it decreases that of the country whose trade account is initially in deficit.\(^{23}\) This result demonstrates that a country whose trade account is in surplus in the initial stationary equilibrium can use

\(^{22}\)Because this study is concerned with local comparative statics, i.e., the relationship between \((dU; dU^\mu)\) and \( \ell^1 \); the sign of trade imbalance \( s \) is not affected by a change in \( \ell^1 \).

\(^{23}\)That is, it follows from (4.19) that \( s > 0 \) implies \( dU > 0 \) and \( dU^\mu < 0 \) while \( s^\mu > 0 \) implies \( dU^\mu > 0 \) and \( dU < 0 \):
the suppression of competition in its non-tradable market as an instrument for commercial policy. In the neighborhood of a perfectly competitive stationary equilibrium, such a country can make itself better off by suppressing competition in its non-tradable market, which harms its trading partner country. In contrast, a country whose trade account is in deficit makes itself worse off by suppressing competition in its non-tradable market, while it makes its trading partner country better off.

4.2. Generality of the Special Case

Although the local comparative dynamic results of the previous subsection are derived for a special case, they may be extended to a general setting. Since this extension is based on a technically complicated procedure of applying an infinite dimensional implicit function theorem, I present only a sketch.

In the initial stationary equilibrium, as discussed above, the activities of each agent do not vary over time (\(e.g.: c_t = c_1\)), and the present value prices of future goods are discounted by a constant discount rate (\(e.g.: p_t = p_1(1 + i)^{t-1}\)). Thus, by (2.1), \((1 + i)^{t-1} = 0 p_1 = u(c_1)\) for all \(t\); which implies \(1 = 1(1 + i)\): That both countries face the same world price path, \(p_t\); implies that they face the same stationary state interest rate, \(i\): Therefore, if a stationary equilibrium exists, it must hold that \(1 = 1(1 + i) = \frac{1}{2}\): This prompts the assumption of \(1 = \frac{1}{2}\):

Since \(1 = 1\) by the choice of the numeraire, the world excess demand function can be expressed as a function of the prices of tradables, \(\frac{1}{2}, \frac{1}{2}; \ldots\); as well as the parameter of the model; \(e.g.: e_t = e_t(\frac{1}{2}, \frac{1}{2}; \ldots; 1)\): The equilibrium system is, therefore, \(e_t(\frac{1}{2}, \frac{1}{2}; \ldots; 1) = 0; t = 1, 2; \ldots\): In this system, in general, a general equilibrium path of current-value prices can be described by a dynamic system, \(e_t\). That is, if \(1 = \frac{1}{2}\) is the equilibrium price path, then

\[
\frac{1}{2} = f(\frac{1}{2}, \frac{1}{2}; 1); t = 1, 2; \ldots; \quad \text{and} \quad \frac{1}{2} = 1: \quad (4.21)
\]

Let \(\frac{1}{2}\) be the fixed point of dynamic system (4.21), \(\frac{1}{2} = f(\frac{1}{2}; 1)\): For an arbitrarily chosen \(\frac{1}{2} > 0\); by using \(\frac{1}{2}\); denote inductively

\[
e_t(\frac{1}{2}; 1) = \frac{1}{2} + f(\frac{1}{2}, 1(\frac{1}{2}; 1)); (\frac{1}{2} + \frac{1}{2}; 1) + (\frac{1}{2}; 1) + (\frac{1}{2}; 1) + (\frac{1}{2}; 1)
\]

(4.22)

from \(e_t(\frac{1}{2}; 1) = 1\); By using this process, moreover, denote

\[
e_1(\frac{1}{2}; 1) = \lim_{t \to 1} e_t(\frac{1}{2}; 1); e_1(\frac{1}{2}; 1); \ldots; 1)
\]

(4.23)
which I call the long-run excess demand function, relating the "long-run" excess demand for tradables, $e_1$; to the "long-run" price of tradables, $\frac{1}{2}$: This demand function is a derived demand function. It is well defined around the initial stationary equilibrium if the initial stationary equilibrium is saddle-point stable. If $|f(1; 0)| < 1$; moreover, the initial stationary equilibrium is saddle-point stable, where $f_{1*} = @/4$

With this as preparation, the equilibrium system $e(\frac{1}{2}; \frac{1}{2}; \cdots; 1) = 0; t = 1, 2, \cdots$; can be transformed into $e_1 (\frac{1}{2}; 1) = 0$: Comparative dynamics can be characterized by totally differentiating $e_1 (\frac{1}{2}; 1) = 0$ around the initial stationary equilibrium under $\dot{1} = 1$; in which $(\frac{1}{2}; 1) = (1; 0)$: Since $\frac{d}{dt} = 0$ for all $t$, \[ f_{1*} = f_{1*} = f_{1*} = 0 \] Therefore, by (4.23),

$$de_1 = \frac{1}{2} \frac{\partial e_1}{\partial 1} d^1; \quad (4.24)$$

where $\frac{1}{2} = \lim_{t \to 1} f_{1*} = f_{1*}$ \[ .25 \] Since $\frac{1}{2} = f_{1*} (\frac{1}{2}; 1)$ is in equilibrium, $e_1 (\frac{1}{2}; 1) = 0$ for all $t$; which implies that $e_1 (\frac{1}{2}; 1) = 0$ for any $t$: Since this implies $de_1 = 0$; by (4.24), the market clearing change in long-run price is

$$b_1 = d^1 = \frac{1}{2} \frac{\partial e_1}{\partial 1}; \quad (4.25)$$

\[ \text{In order to demonstrate this fact, note that since } \frac{1}{2} = f_1 (\frac{1}{2}; 1) \text{ for any } t; \text{ and } \frac{d}{dt} = f_1 = f_{1*}; \text{ where } f_{1*} = f_{1*} = f_{1*}; \text{ Therefore, by (4.22),} \]

$$\frac{\partial e_1}{\partial 1} = f_{1*} \frac{\partial e_1}{\partial 1} = f_{1*} \frac{\partial e_1}{\partial 1}$$

Since $\frac{d}{dt} (\frac{1}{2}; 1)$’ by definition, and since $|f_{1*}| < 1$ by assumption, this implies

$$\frac{\partial e_1}{\partial 1} = (1; f_{1*}) \frac{\partial e_1}{\partial 1}$$

Finally, since $\frac{d}{dt} (\frac{1}{2}; 1) = \frac{1}{2}$ for any $t$; $\frac{d}{dt} = \gamma = \gamma = 0$; which implies $\gamma = \gamma = 0$;

\[ \text{Since the excess demand function is nite-dimensional, the derivation of (4.24) is not straightforward. The proof of Lemma 1 demonstrates, however, that this differentiability is guaranteed in the special case discussed in the previous subsection; (4.5) corresponds to (4.24).} \]

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Since \( q_t = \nabla^t_q \), it follows from (4.25) that
\[
\frac{1}{c} \frac{dU}{dt} = i \frac{1}{c_p} \frac{dU}{dt} = \frac{(1 - f_{\nabla})}{(1 - \frac{1}{2} f_{\nabla})} \frac{dV}{dt}.
\] (4.26)

As (4.25) and (4.26) demonstrate, the directions in which a change in \( q \) affects \( U \) and \( U^* \) depend on the sign of \( \gamma \). Since, as shown in Section 3, the short run trade surplus creation effect creates an excess supply of tradables at \( t = 0 \); it holds that \( \overline{a}_t = (1 - f_{\nabla}) > 0 \); and (4.25) and (4.26) imply the same results as obtained in Theorem 4.1.

By (4.24), condition \( \gamma < 0 \) implies that \( e_1 \) is decreasing in \( \frac{1}{2} \); i.e., that the law of demand holds between the long-run excess demand for tradables, \( e_1 \); and the long-run price of tradables, \( \frac{1}{2} \). In the literature on comparative statics, as is well known, the law of demand is guaranteed to hold by the so-called Marshall-Lerner condition. In the present case, \( \gamma < 0 \) plays the role of the Marshall-Lerner condition, guaranteeing the law of demand to hold between \( e_1 \) and \( \frac{1}{2} \). With these considerations, I introduce the following terminology.

Definition 1. (the long-run law of demand) The long-run excess demand function \( e_1 \left( \frac{1}{2} ; 1 \right) \) satisfies the long-run law of demand (locally around the initial stationary equilibrium) if \( \gamma < 0 \).

The long-run law of demand implies that if a price path is attracted to a stationary price at the same speed as the equilibrium price path is attracted to the equilibrium stationary price, and if the limit stationary price is too high relative to the equilibrium stationary price, the market will eventually be in excess supply. In the case of \( 0 < f_{\nabla} < 1 \); this may be explained as follows: \( ^{26} \) In Figure 1, point \( E = (1; 1) \) illustrates the initial stationary equilibrium. Curve \( F \) illustrates the graph of \( \frac{1}{2}^t = f \left( \frac{1}{2}; 1 \right) \): When the degree of imperfect competition increases from 0 to 1; the new equilibrium price path, \( \frac{1}{2}^t = f_{\nabla} \left( \frac{1}{2}; 1 \right) \); starts from \( \frac{1}{2} = 1 \), follows curve \( F \) and converges to a stationary price \( \frac{1}{2} \). By construction, price path \( \frac{1}{2}^t = f_{\nabla} \left( \frac{1}{2}; 1 \right) \) follows curve \( F' \) that is constructed by shifting curve \( F \) in

\[ \begin{align*}
\text{This follows from the fact that (4.21) implies } & \nabla_{t+1} = f_{\nabla} \nabla_t + f_{\nabla} d^t; \text{ that } \frac{1}{2}^t \cdot 1 \text{ and that if } f_{\nabla} < 1. \\
\text{This is a counterpart of (4.19). In fact, as (4.11) and (4.25) show, } f_{\nabla} = & \mu \text{ holds in the special case.} \\
\text{A similar explanation can be given for the case of } & f_{\nabla} < 1 \text{ as well.}
\end{align*} \]
parallel along the 45 degree line so that \( F^0 \) intersects the 45\(^\pm\) line at \( E^0 = (\frac{1}{2}; \frac{1}{2}) \): As Figure 1 shows, if and only if \( \frac{1}{2} > \frac{1}{4} \), \( \frac{1}{2} > \frac{1}{4} \) for \( t = 1; 2; \ldots \); i.e.; price path \( \frac{1}{2} \) is too high relative to the equilibrium price path of tradables, \( \frac{1}{2} \); except for \( t = 0 \), at which \( \frac{1}{2} = 1 \); the long-run law of derived demand \( (\frac{1}{2} < 0) \) stipulates that in this case, the market for tradables will eventually be in excess supply, i.e.; \( \epsilon(\frac{1}{2}; 1) > \epsilon(\frac{1}{2}; 1) = 0 \) for sufficiently large \( t \):

As (4.25) and (4.26) show, the direction of the effect on long-run price and utilities of the home and foreign countries in the general case is the same as that obtained in Theorem 4.1 if \( \frac{1}{2} < 0 \); i.e.; if the long-run excess demand function satisfies the long-run law of demand. This demonstrates that in the example in which Theorem 4.1 is derived, \( \frac{1}{2} < 0 \) is satisfied unambiguously. Thus, the findings of this subsection as well as those of Theorem 4.1 can be summarized as follows:

**Proposition 2.** If the long-run excess demand function \( \epsilon(\frac{1}{2}; 1) \) satisfies the long-run law of demand (locally around the initial stationary equilibrium), a country's suppression of domestic market competition raises the long-run price of tradables.

**Proposition 3.** Suppose that the long-run excess demand function \( \epsilon(\frac{1}{2}; 1) \) satisfies the long-run law of demand (locally around the initial stationary equilibrium). Then, a country's suppression of competition in its non-tradables market increases the discounted utility sum of the country whose trade account is in surplus in the initial stationary equilibrium and decreases that of the country whose trade account is in deficit.

The above extension of Theorem 4.1 is based on three basic conditions. The first condition is that the initial stationary equilibrium is saddle-point stable. This assumption is standard in the literature on comparative dynamics; if the assumption does not hold, comparative dynamics is intractable by a local characterization (see, for example, Nishimura and Yano, 1995). The assumption guarantees that if the initial stationary equilibrium is an interior solution, so is the new equilibrium that will hold after an infinitesimal exogenous change. This is because, given an infinitesimal exogenous change, the stationary state to which the new equilibrium will converge lies in a small neighborhood of the initial stationary equilibrium. The second condition is the long-run law of derived demand, which is a dynamic version of the Marshall-Lerner condition, as discussed above. Note that, under this assumption, for any values of parameter \( \frac{1}{2} \) sufficiently near \( \frac{1}{2} = 0 \);
an equilibrium is locally unique. The third condition is the existence of an initial stationary equilibrium. This condition can be guaranteed by the assumption that all consumers have an identical discount factor, ½ which characterizes the time preference of consumers. As is well-known, if consumers have different discount factors, all but those with the largest ½ will eventually consume nothing. Therefore, in order to allow for the possibility that consumers may have different time preferences, it is necessary to work with a model with more general intertemporal utility functions.

4.3. Strategic Use of Competition Policies

One of the most common beggar-thy-neighbor policies is the imposition of a tariff. Provided that it does not provoke a retaliatory action by the trading partner country, a country can use such a policy to increase its own real wealth by reducing the trading partner country’s real wealth. Proposition 3 demonstrates that a country whose trade account is in surplus in the initial stationary equilibrium can create a similar effect by suppressing competition in its own domestic market. Although, in this sense, the imposition of a tariff and the suppression of competition create similar effects, they are different in the nature of retaliatory actions that these policies may trigger.

This difference is clear in a game-like situation in which two countries strategically set their policies. In the standard tariff case, a likely outcome of such a game is a state of tariff war, in which both countries restrict trade by imposing retaliatory tariffs against each other. In the present case, in contrast, a tariff war-like state is unlikely to emerge. As Proposition 3 demonstrates, the country whose trade account is in surplus in the initial stationary state can become better off by suppressing competition in its non-tradables market. However, the country in deficit becomes worse off by such a policy. This suggests that in a game of competition policies, a likely outcome would be a state in which the surplus country restricts trade by suppressing competition in its non-tradables market while the deficit country promotes trade by maintaining perfect competition.

Because this study is concerned with local comparative dynamics, it is not necessary to exclude the existence of another equilibrium outside the neighborhood of the initial equilibrium. In other words, as in the standard literature on local comparative dynamics and statics, this study does not deny the possibility that an equilibrium may make a discrete jump to a totally different equilibrium after an exogenous change.
This is because the effect of a country's suppression of competition on the relative price of future and present tradables does not depend on the sign of that country's trade balance in the initial equilibrium. The redistribution effect of this price movement, however, depends on the sign of a country's trade balance, as (4.26) shows. As a result, the welfare effect of the suppression of competition depends on the sign of a country's trade balance.

5. Concluding Remarks

This study has developed a dynamic model in which a country's trade balance can be related to competition policies that the country may impose on its domestic market for non-tradable consumption goods and services. Using the method of local comparative dynamics, it characterizes the effect of a country's suppression of competition in its non-tradables market on trade balance under the assumption that the initial equilibrium is stationary. My main findings are that a country's suppression of competition in its market for non-tradable consumption goods (i) increases that country's trade surplus in the short run (a short-run trade surplus creation effect) and (ii), in a two-country setting, benefits the country whose trade account is in surplus in the initial stationary equilibrium and harms the country in deficit.

The latter result implies that, for a trade surplus country, the suppression of competition in the non-tradables market may serve as a beggar-thy-neighbor policy, benefiting itself but at a cost to its trading partner. In contrast, a trade deficit country's suppression of competition harms the country itself while benefiting its trading partner. This result provides a possible explanation for why a surplus country's government may wish to suppress competition in its non-tradables sector. On the other hand, the present model provides no reason why a trade deficit country's government might wish to permit the existence of imperfect competition in its own non-tradables market. Note that this study is not intended to explain why a country's policymakers may wish to have a trade surplus or a deficit, which is assumed to be a consequence of dynamic optimization of private agents.\textsuperscript{30}

\textsuperscript{30}In order to examine such an issue, it is necessary to examine different countries' motivations to hold deficits and surpluses. For example, a country may wish to abuse credits by running deficits indefinitely and then declaring bankruptcy (this observation is due to an anonymous referee). It would be interesting to examine under what circumstances such a strategy becomes viable.

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The results of this study may be extended in a number of directions. In this study, a local comparison is made between the equilibria in two different regimes; in one regime, the home country maintains perfect competition in its market for non-tradable final consumption goods, and in the other, it allows imperfect competition in that market. This comparison reveals not only the difference between those equilibria but also the effect of an unanticipated change in the degree of competition at time 0. It is of interest to compare this effect with that of a change in the degree of competition that is anticipated to occur at a future point of time. Such an analysis may be particularly relevant for an economy in which deregulation is expected in the near future, for example, the current Japanese economy.

It may be desirable to characterize the redistributional effect, which results from a change in the relative price between present and future tradables, in the case in which the sign of a country's trade balance switches over time. In order to focus on that aspect of the effect of an exogenous change that is intrinsically time-dependent, this study adopts the assumption that the initial equilibrium is stationary. Under this assumption, the trade imbalance existing in the initial stationary equilibrium must be attributed to the existence of historically given foreign credits and debts at time 0. It is, therefore, of interest to examine the redistributional effect in the more general case by relaxing this assumption.

In the present setting, it is difficult analytically to characterize either the optimal degree of competition or the Nash equilibrium of a game in which the countries set their respective optimal degrees of competition. This is because, as a country changes the degree of competition, the equilibrium does not remain stationary and because it is analytically intractable to characterize the effect of a policy change on a non-stationary initial equilibrium. A full characterization of such an equilibrium either by a simulation method or in a finite time-horizon model would be an interesting subject for future research.

This study focuses on a country's domestic market competition policy. As a result, the case in which a country controls the degree of competition in the market for tradables (middle products) is not treated here. This reflects the fact that a single country's government has minimal influence on the degree of competition in a world market in which foreign suppliers exist. Indeed, the U.S. permits the extraterritorial application of its anti-trust laws, i.e., application to anti-competitive conduct by foreign firms outside of the U.S. However, such a case is the exception, and even the U.S. has been quite hesitant to apply its laws
extraterritorially in practice. If, in the future, extraterritorial applications are expected to play a more important role, it would be of interest to extend this study to cover the effect of a country's competition policy in the world market for tradables.

This study assumes that there is only one tradable good in the world market. This assumption makes it possible to focus on an intertemporal substitution effect, i.e.; a shift in excess demand between future and present tradables triggered by a policy change. This setting, however, ignores an intersectoral substitution effect, i.e.; a shift in excess demand between a country's exports and its imports. In a model in which countries trade different goods in each period, the short-run trade surplus creation effect and the resulting redistributio nal effect would depend on both intersectoral and intertemporal substitution effects.

In order to focus on the basic distortionary effect of suppression of domestic market competition, I have adopted a perfect foresight equilibrium model, in which any equilibrium is Pareto optimal if perfect competition is maintained everywhere. For the sake of comparison, however, it would be of interest to investigate the international effects of domestic competition policies in different models, such as the overlapping generations model, as well.

References


