Using Trade Policy to Influence Firm Location

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Abstract

This paper examines how governments can use trade policy to influence the location of foreign direct investment (FDI) by multinational firms. In particular, it examines how one country’s trade policy can affect another country’s ability to attract FDI, and how, in the presence of economic integration in the form of a free trade area (FTA), governments can adjust their external trade policies to influence firm location. Interestingly, even if a country cannot itself attract FDI, its government can use trade policy to influence whether or not other countries receive FDI. Conditions are identified under which the formation of a FTA causes “FDI destruction,” a multinational firm’s shutting down its foreign affiliate inside the free trade area.

1. Introduction

As multinational firms have emerged as the dominant players in the global economy, trade economists have tried to understand the causes and consequences of FDI. An important research agenda has been to identify country characteristics that influence a multinational firm’s decision to serve that country via exports or FDI. Two important findings of this research are relevant to the current investigation. First, the “tariff-jumping” motive for FDI has been well-documented (Caves, 1982; Brander and Spencer 1987; Motta, 1992; Hwang and Mai, 2002). Put simply, the higher a country’s tariffs on imports, the more likely a multinational firm will be to establish a foreign affiliate within that country, thereby “jumping” the high tariff barrier. Thus, high (low) tariffs will tend to encourage (discourage) FDI by multinational firms. Second, economic integration tends to encourage multinational firms headquartered outside a preferential trade agreement to establish a foreign affiliate inside the agreement to take advantage of lower internal barriers to trade (Motta and Norman, 1996; Neary, 2002; Ekholm et al., 2004). This is a logical extension of the tariff-jumping motive for FDI: If two countries form a free trade area, it is possible to bypass one country’s high tariff barriers by establishing a foreign affiliate in the other country and exporting inside the free trade area. The important lesson from this research is that a country’s trade policy and membership in preferential trade agreements influence multinational firms’ decisions regarding the location of FDI.

As a rich tradition in public economics tells us, trade policy is not the only type of government policy that influences firms’ location decisions. An extensive literature on tax competition for internationally mobile capital suggests that governments also use tax policy to influence the location of FDI. While such international tax competition is often wasteful, and results in inefficiently low tax rates (Wilson, 1999), Janeba (1998) shows that in the presence of imperfect competition, tax competition for internationally mobile firms can actually be welfare-improving.
Raff (2004) has examined how governments can adjust both tax and trade policy to influence firm location in the presence of economic integration. Raff examines how a high-cost country and a low-cost country will compete in taxes and tariffs to influence the location of FDI by a foreign monopolist, and how each country will adjust its policies in response to economic integration in the form of a free trade agreement (FTA). Raff makes several claims about how governments will respond to integration, and thus how integration will ultimately affect the firm’s location choice. First, Raff claims that a FTA may cause “FDI creation,” meaning that in the absence of a FTA, governments choose policies to encourage the firm to export rather than invest, but in the presence of a FTA, governments adjust their policies to induce the firm to establish a foreign affiliate in the low-cost country. Second, Raff claims that if, in the absence of a FTA, the firm invested in both countries, the FTA will cause “FDI consolidation,” meaning that the firm will shut down its affiliate in the high-cost country and serve both countries from its affiliate in the low-cost country. Finally, Raff claims that a FTA cannot cause “FDI destruction,” meaning that the firm operates at least one foreign affiliate in the absence of a FTA, but in the presence of a FTA, the firm will serve both countries with exports.

This paper uses Raff’s basic model, but makes an alternative assumption about the costs of production in the two countries. Whereas Raff assumes that the firm could profitably serve both countries with an affiliate in the high-cost country, this paper assumes that the firm could never profitably invest in the high-cost country. In other words, Raff assumes that the cost of production in the high-cost country is “not too much bigger” than the cost of production in the low-cost country, but this paper assumes that the cost of production in the high-cost country is “very high.” As a result, the high-cost country will not be able to use its tax rate to influence the firm’s location choice. However, since the government of the high-cost country cares whether or not the firm invests in the low-cost country, it will use its trade policy to influence the firm’s location decision.

The surprising result is that the high-cost country has considerable power to influence the firm’s location decision with only trade policy. Specifically, the high-cost country may be able to prevent the firm from investing in the low-cost country even when the low-cost country wants to attract FDI. Furthermore, a FTA may cause FDI destruction. In other words, the firm may choose to invest in the low-cost country in the absence of a FTA, but when the high-cost country and the low-cost country form a FTA, the high-cost country is able to convince the firm to shut down its foreign affiliate in the low-cost country.

The rest of the paper is organized as follows. Section 2 outlines the specifics of the theoretical model. Section 3 analyzes equilibria in the absence and presence of a FTA for three distinct cases of the model. Section 4 concludes.
2. The model

A monopoly producer of good X operates a plant in country F. Consumers of good X reside in two foreign countries, H and L. The demand for X in country \( i \in \{H, L\} \), \( x_i \), is given by:

\[
x_i = 1 - p_i
\]  

(1)

where \( p_i \) is the price the monopoly firm charges in country \( i \).

The firm must choose the profit maximizing supply mode for serving consumers in H and L. One option is to export to both H and L from the established plant in F, where the constant marginal cost of production is \( f < 1 \). However, the firm may also choose to establish a foreign affiliate in either H or L or both, and pay a fixed (but not sunk) cost of \( G \) per foreign affiliate. If the firm invests abroad, the constant marginal costs of production in H and L are \( h \) and \( l \), respectively, with \( l < h < 1 \). In other words, H is the “high-cost” foreign location, and L is the “low-cost” foreign location.

Given the possibility of foreign direct investment (FDI) in H and/or L, the firm has six potential supply strategies:

1) Export to both H and L from F.
2) Export to H, and establish a foreign affiliate for local sales in L.
3) Export to L, and establish a foreign affiliate for local sales in H.
4) Establish a foreign affiliate in L for both local sales in L and export sales to H.
5) Establish a foreign affiliate in H for both local sales in H and export sales to L.
6) Establish a foreign affiliate in both L and H, using each for local sales only.

The governments of H and L are not indifferent about the firm’s decision, and have policy tools at their disposal to influence the firm’s supply strategy. Specifically, H and L each have three policy instruments:

i) a tariff rate on imports from F, \( r_{iF} \)  
\( i \in \{H, L\} \)

ii) a tariff rate on imports from the other country, \( r_{ij} \)  
\( i, j \in \{H, L\}, i \neq j \)

iii) a tax rate on profits from firm sales originating in \( i \), \( t_i \)  
\( i \in \{H, L\} \)

The governments of H and L choose available policy tools noncooperatively to maximize their respective social welfare functions, which consist of consumer surplus and tax or tariff revenue.
The central question of this paper, then, is how the governments of H and L will use their available policy tools to influence the firm’s supply strategy. Furthermore, how will these decisions change in the presence of a free trade agreement (FTA) between H and L? Note that a FTA between H and L restricts each government’s available policy tools. In particular, a FTA restricts $r_{HL} = r_{LH} = 0$.

The timing of the interactions between H, L, and the firm can be summarized as follows:

Stage 1: H and L choose available policy instruments noncooperatively.

Stage 2: The firm observes the policies chosen by H and L and chooses its supply strategy.

Stage 3: The firm chooses $p_H$ and $p_L$ to maximize profits, given its chosen supply strategy.

The (subgame perfect) equilibria of the model, both with and without a FTA between H and L, can be solved for using backward induction.

We begin by looking at Stage 3, in which the firm chooses its profit maximizing prices, taking as given the values of the taxes and tariffs chosen by H and L, and its own chosen supply strategy.

For illustration, consider that the firm’s chosen supply strategy is 4), in which the firm establishes a foreign affiliate in L to serve customers in both L and H (an activity known as export platform FDI). Then the firm solves the following profit maximization problem:

$$\max_{p_H, p_L} \left[ (1 - t_L)(p_L - l)(1 - p_L) + (p_H - l - r_{HL})(1 - p_H) - G \right]$$  

(2)

The first two terms inside the square brackets represent the firm’s pre-tax profits from serving consumers in L with locally-produced X (gross of the fixed cost of establishing a foreign affiliate in L). The second two terms inside the square brackets represent the firm’s pre-tax profits from serving consumers in H with exports from L, facing H’s tariff rate against imports from L, $r_{HL}$. The final term inside the brackets is the fixed cost of establishing a foreign affiliate in L. Because all of these sales originate in L, all of the profits (net of the fixed cost of establishing a foreign affiliate) are subject to L’s profit tax rate, $t_L$. 

The profit maximizing prices are \( p_L = (1 + l)/2 \) and \( p_H = (1 + l + r_{HL})/2 \). The corresponding quantities are \( x_L = (1 - l)/2 \) and \( x_H = (1 - l - r_{HL})/2 \). This generates an after-tax profit for the firm of

\[
(1 - t_L) \left[ \frac{(1-l)^2}{4} + \frac{(1-l-r_{HL})^2}{4} - G \right]
\]

(3)

Given these prices, the social welfare in L is

\[
\frac{(1-l)^2}{8} + t_L \left[ \frac{(1-l)^2}{4} + \frac{(1-l-r_{HL})^2}{4} - G \right]
\]

(4)

The first term in (4) is the consumer surplus from consuming locally-produced X. The second term in (4) is L’s tax revenue.

The social welfare in H is

\[
\frac{(1-l-r_{HL})^2}{8} + r_{HL} \frac{(1-l-r_{HL})}{2}
\]

(5)

The first term in (5) is the consumer surplus from consuming X imported from L. The second term in (5) is H’s tariff revenue.

H and L will choose their available policy instruments to maximize social welfare. Note that (4) is strictly increasing in \( t_L \), so assuming that L wants to attract FDI, it will want to set \( t_L \) as high as possible as long as the firm will still invest. The same is not true of (5). Assuming that H’s choice of \( r_{HL} \) will not affect the firm’s supply strategy, H faces the following maximization problem:

\[
\max_{r_{HL}} \frac{(1-l-r_{HL})^2}{8} + r_{HL} \frac{(1-l-r_{HL})}{2}
\]

(6)

H’s “optimal tariff” on imports from L is thus \( r_{HL}^* = (1 - l)/3 \). Given this tariff rate, H’s social welfare from importing from L is \( (1 - l)^2/6 \), and the firm’s pre-tax profit from exporting from L to F (gross of the fixed cost of investing in L) is \( (1 - l)^2/9 \).
To this point, the model is very similar to the model in Raff (2004). The major difference between the present model and Raff’s model is a different assumption about the cost parameters in the model. So far, the model assumes that $l < h < 1$. However, Raff further assumes that the cost of production in H ($h$) is “not too much bigger” than the cost of production in L ($l$). In contrast, this paper makes the following assumption:

Assumption 1: $G > \left( \frac{(1-h)^2}{2} \right)$

Assumption 1 does not restrict the difference between $h$ and $l$, but does imply that $h$ is large. In particular, $h$ is large enough that under no circumstances will the firm choose to invest in H. This assumption has important consequences for the model.

First, it restricts the number of reasonable supply strategies for the firm from six to three. In particular, since the firm will never choose to invest in H, the firm’s remaining reasonable supply strategies are to export to both H and L from F, export from F to H and establish a foreign affiliate in L for local sales in L only, or establish a foreign affiliate in L for both local sales in L and export sales to H.

Second, it restricts the relevant policy tools for both H and L. In particular, since H will never attract FDI, $t_H$ is irrelevant. By the same token, since H will never attract FDI, L will never import from H, and thus $r_{LH}$ is irrelevant. This leaves each country with two relevant policy tools in the absence of a FTA. L is left with a tariff rate against imports from F, $r_{LF}$, and a tax rate on profits generated from sales originating in L, $t_L$. It is significant to note that H is left with only trade policy tools: a tariff rate on imports from F, $r_{HF}$, and a tariff rate on imports from L, $r_{HL}$. Thus, even though H cannot itself attract FDI, H cares from which country it imports, and may be able to use its trade policy tools to influence the firm’s decision. Note also that if H and L form a FTA, L does not lose any policy tools (since it never imports from H anyway), but H loses one of its two policy tools, since a FTA restricts $r_{HL} = 0$. The implications of this will be explored in greater detail below.

The follow section derives the equilibrium policies of H and L and the equilibrium supply strategy of the firm, both with and without a FTA between H and L, in the following three cases:

Case I: $l = f$ (benchmark)
Case II: $l > f$
Case III: $l < f$

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1 Using the notation in this paper, Raff (2004) assumes: $G < \frac{5(1-h)^2 - (1-l)^2}{8}$
3. Equilibria

Case I: \( l = f \), no FTA

Case I establishes a benchmark for the analysis. In this case, the cost of production in the firm’s home country is identical to the cost of production in the low-cost foreign country. Thus, there is no ex ante cost advantage to the firm from locating production in one country or the other. This allows us to focus on the effects of policy on the firm’s location choice.

First, consider equilibria in the absence of a FTA between H and L. H has two available policy tools: \( r_{HL} \) and \( r_{HF} \). If the firm chooses to export from F to H, H’s social welfare will be maximized by \( r_{HF}^* = (1 - f)/3 \). Similarly, if the firm chooses to invest in L and export from L to H, H’s social welfare will be maximized by \( r_{HL}^* = (1 - l)/3 \). Since we are looking at the case in which \( l = f \), H is indifferent between these two alternatives, since the social welfare from importing from F at \( r_{HF}^* \), \( (1 - f)^2/6 \), is identical to the social welfare from importing from L at \( r_{HL}^* \), \( (1 - l)^2/6 \). Thus, H will set \((r_{HF}^*, r_{HL}^*)\) in equilibrium in the absence of a FTA between H and L.

The firm’s supply strategy consists of two related choices. First, the firm must choose whether or not to invest in L. If the firm does not invest in L, it must serve L via exports, since investing in H is not a reasonable strategy given Assumption 1. If the firm does invest in L, the second choice is whether to use the affiliate in L for local sales only and export from F to H, or to export from L to H. Consider the firm’s second decision first. If the firm exports from F to H, it will face a tariff rate of \( r_{HF}^* = (1 - f)/3 \) and receive a profit of \( (1 - f)^2/9 \) from these sales. If, on the other hand, the firm exports from L to H, it will face a profit of \( r_{HL}^* = (1 - l)/3 \) and receive a pre-tax profit (gross of the fixed cost of investing in L) of \( (1 - f)^2/9 \) from these sales. Since \( l = f \), the pre-tax profit from exporting from L to H is identical to the profit from exporting from F to H. Thus, for any \( t_L > 0 \), the firm will strictly prefer exporting from F to H to exporting from L to H.

Finally, consider L. Since \( l = f \), L’s social welfare from importing from F and levying its optimal tariff, \( r_{LF}^* = (1 - f)/3 \), is strictly greater than the consumer surplus that consumers in L would receive from consuming locally-produced X. This means that for L to prefer attracting FDI to importing from F requires a positive level of tax revenue, or \( t_L > 0 \). Thus, if the firm invests in L, it will make local sales only, since the firm strictly prefers exporting from F to H to exporting from L to H if \( t_L > 0 \).
For L to prefer attracting FDI for local sales to importing from F requires

\[
\left(\frac{(1-l)^2}{8}\right) + t_L\left(\frac{(1-l)^2}{4} - G\right) \geq \left(\frac{(1-f)^2}{6}\right)
\]  

(7)

The first term on the left-hand side of (7) is the consumer surplus that consumers in L receive from consuming locally-produced X. The second term on the left-hand side of (7) is the tax revenue that L collects for a given \( t_L \). The right-hand side of (7) is L’s social welfare from importing from F and levying its optimal tariff, \( r_{LF}^* = (1 - f)/3 \), on these imports.

Whether or not (7) is satisfied depends on the magnitude of \( G \). If \( G \) is small (large), the firm’s profit from investing in L, and thus L’s tax base, is large (small). The largest value of \( G \) for which (7) could be satisfied is

\[
G = \left(\frac{9(1-l)^2 - 4(1-f)^2}{24}\right)
\]  

(8)

If \( G < G \), then L will set \( r_{LF} = 1 - f \), which would eliminate any profit for the firm from exporting from F to L, and the firm will invest in L. If \( G > G \), then L will set \( r_{LF}^* = (1 - f)/3 \) and \( t_L = 1 \), and the firm will export from F to L.

**Proposition 1.** In the absence of a FTA between H and L in Case I:

(a) if \( G < \underline{G} \), H will set \( (r_{HF} = r_{HF}^*, r_{HL} = r_{HL}^*) \), L will set \( (r_{LF} = 1 - f, t_L = 1) \), and the firm will invest in L for local sales only and export from F to H in equilibrium.

(b) if \( G > \underline{G} \), H will set \( (r_{HF} = r_{HF}^*, r_{HL} = r_{HL}^*) \), L will set \( (r_{LF} = r_{LF}^*, t_L = 1) \), and the firm will export from F to both H and L in equilibrium.

**Case I: \( l = f \), FTA**

Now consider equilibria in the presence of a FTA between H and L. Since the FTA restricts \( r_{HL} = 0 \), H strictly prefers importing from F for any \( r_{HF} \in (0, r_{HF}^*) \). Even though H’s social welfare from importing from F is maximized by \( r_{HF}^* = (1 - f)/3 \), H might be willing to set \( r_{HF} < r_{HF}^* \) to encourage the firm to export from F to H rather than from L to H.

Engaging in export platform FDI in L is much more attractive to the firm in the presence of a FTA than in the absence of a FTA. Since \( r_{HL} = 0 \), the firm’s pre-tax profits from export platform FDI in L are larger than they would be in the absence of a FTA between H and L (when H would set \( r_{HL}^* = (1 - l)/3 \)).
Since any profit that the firm generates in L is L’s tax base, L will also be more willing to attract FDI in the presence of a FTA than in the absence of a FTA. For L to prefer attracting export platform FDI to importing from F requires

\[
\left( \frac{(1-l)^2}{8} \right) + t_L \left( \frac{(1-l)^2}{4} + \frac{(1-l)^2}{4} - G \right) \geq \left( \frac{(1-f)^2}{6} \right)
\]

(9)

The first term on the left-hand side of (9) is L’s consumer surplus from consuming locally-produced X. The second term on the left-hand side of (9) is L’s tax revenue from the firm’s profits from local sales in L and tariff-free exports from L to H, net of the fixed cost of establishing the affiliate in L. The right-hand side of (9) is L’s social welfare from importing from F and levying its optimal tariff, \( r_{LF}^* = (1-f)/3 \).

Whether or not (9) is satisfied depends not only on the parameters \( l, f \) and \( G \), but also on L’s chosen tax rate, \( t_L \). Assuming for a moment that L could impose its maximal tax rate, \( t_L = 1 \), the largest value of \( G \) for which (9) could be satisfied is

\[
G = \left( \frac{15(1-l)^2 - 4(1-f)^2}{24} \right)
\]

(10)

That is, \( \overline{G} \) is the largest possible fixed cost for which L would be willing to attract export platform FDI. If \( G < \overline{G} \), there are values of \( t_L \) for which (9) could be satisfied. If \( G > \overline{G} \), L will prefer importing from F to attracting export platform FDI. Note that \( \overline{G} > G \), confirming that L is more willing to attract FDI in the presence of a FTA than in the absence of a FTA.

In what follows, assume that \( G < \overline{G} \).

Define \( t_L(G) \) as the tax rate that satisfies (9) with equality for a given value of \( G \). For any \( t_L < t_L(G) \), (9) will be violated, and L will prefer importing from F to attracting export platform FDI. For any \( t_L > t_L(G) \), (19) will be satisfied, and L will prefer attracting export platform FDI to importing from F. Thus, \( t_L(G) \) is the lowest possible tax rate L would ever be willing to set. Note that \( \frac{\partial t_L(G)}{\partial G} > 0 \). In other words, the larger the fixed cost of investment, the smaller the firm’s (pre-tax) profit from export platform FDI in L, and thus the larger tax rate will be necessary for L to be willing to attract export platform FDI.
The preceding analysis identifies when L prefers to attract export platform FDI, but the firm’s choice to locate export platform FDI in L is not only a decision about how to serve L, but also a decision about how to serve H. For the firm to prefer engaging in export platform FDI in L to exporting to both H and L from F requires:

\[
(1 - t_L) \left( \frac{(1-l)^2}{4} + \frac{(1-l)^2}{4} - G \right) \geq \left( \frac{(1-f - r_{HF})^2}{4} \right) + \left( \frac{(1-f - r_{LF})^2}{4} \right)
\]

(11)

The left-hand side of (11) is the firm’s after-tax profit from export platform FDI in L. The right-hand side of (11) is the firm’s profit from exporting from F to H and facing a tariff of \( r_{HF} \) and exporting from F to L and facing a tariff of \( r_{LF} \).

Inequality (11) illustrates one of the interesting features of the model. Assuming \( G < \overline{G} \), L wants to set \( r_{LF} = 1 - f \) and set \( t_L \) as high as possible while still satisfying (11). H, on the other hand, strictly prefers importing from F and levying any \( r_{HF} \in (0, r_{HF}^*) \) to importing tariff-free from L, and thus wants to set \( r_{HF} \geq 0 \) as low as possible to violate (11). Thus, in the presence of a FTA between H and L, there exists a Bertrand-type competition between L’s profit tax rate, \( t_L \), and H’s tariff rate on imports from F, \( r_{HF} \). Given this competition between H and L, (11) reduces to

\[
(1 - t_L) \left( \frac{(1-l)^2}{4} + \frac{(1-l)^2}{4} - G \right) \geq \left( \frac{(1-f)^2}{4} \right)
\]

(12)

The left-hand side of (12) is identical to the left-hand side of (11), but the right-hand side of (12) is equal to the right-hand side of (12) for \( r_{HF} = 0 \) and \( r_{LF} = 1 - f \). Define \( \tilde{t}_L(G) \) as the value of \( t_L \) that satisfies (12) with equality for a given \( G \). If \( t_L \leq \tilde{t}_L(G) \), the firm will establish export platform FDI in L. If \( t_L > \tilde{t}_L(G) \), the firm will export to both H and L from F. Note that \( \frac{\partial \tilde{t}_L(G)}{\partial G} < 0 \). In other words, the larger the fixed cost of investment, the smaller the firm’s pre-tax profit from export platform FDI in L, and thus the smaller tax rate necessary for the firm to be willing to establish export platform FDI in L.

Given the competition between H and L to influence the firm’s location choice, for L to prefer to attract export platform FDI requires the tax rate to be “big enough” for a given \( G \). For the firm to be willing to establish export platform FDI in L requires L’s tax rate not to be “too big” for a given \( G \). Define \( \underline{G} \) such that:

\[
t_L(G) = \tilde{t}_L(G)
\]

(13)

\( \underline{G} \) is the largest value of \( G \) for which L will be willing and able to attract export platform FDI. \( \underline{t}_L(G) \), \( \tilde{t}_L(G) \), and \( \underline{G} \) are illustrated in Figure 1.
If $G < \bar{G}$, L will set $t_L = \bar{t}_L(G)$ and $r_{LF} = 1 - f$, and (12) will be satisfied for any $r_{HF} \in (0, 1 - f)$, so the firm will establish export platform FDI in L.

If, on the other hand, $G > \bar{G}$, H will set $r_{HF} = \hat{r}_{HF} \in (0, 1 - f)$, where

$$
(1 - t_L(G)) \left( \frac{(1 - f)^2}{2} - G \right) = \left( \frac{(1 - f - \hat{r}_{HF})^2}{4} \right) + \left( \frac{(1 - f)^2}{9} \right)
$$

The left-hand side of (14) is the firm’s after-tax profit from export platform FDI in L, facing a tax rate of $t_L(G)$. The right-hand side of (14) is the firm’s profit from exports from F to H facing $\hat{r}_{HF}$ and exports from F to L facing $r_{LF}$. In other words, H will set its tariff rate on imports to make the firm just indifferent between export platform FDI in L and exports to both H and L from F. Thus, if $G > \bar{G}$, the firm will export to both H and L from F.

Finally, define $\bar{G}$ such that

$$
(1 - t_L(\bar{G})) \left( \frac{(1 - f)^2}{2} - \bar{G} \right) = \left( \frac{(1 - f)^2}{9} \right) + \left( \frac{(1 - f)^2}{9} \right)
$$

The left-hand side of (26) is the firm’s after-tax profits from export platform FDI in L, facing a tax rate of $t_L(\bar{G})$. The right-hand side of (26) is the firm’s profits from exports from F to H, facing $\hat{r}_{HF}$, and exports from F to L, facing $r_{LF}$. If $G \geq \bar{G}$, H will be able to set $r_{HF}$ and the firm will still choose to export from F to H. If $G < \bar{G}$, H will have to set $\hat{r}_{HF} < r_{HF}$ to entice the firm to export from F to H rather than from L to H.

**Proposition 2.** In the presence of a FTA between H and L in Case I:

(a) if $G \leq \bar{G}$, H will set ($r_{HF} = 0$), L will set ($r_{LF} = 1 - f$, $t_L = \bar{t}_L(G)$), and the firm will establish export platform FDI in L in equilibrium.

(b) if $G \in (\bar{G}, \bar{G})$, H will set ($r_{HF} = \hat{r}_{HF}$), L will set ($r_{LF} = r_{LF}^*$, $t_L = t_L(G)$), and the firm will export from F to both H and L in equilibrium.

(c) if $G \in [\bar{G}, \bar{G})$, H will set ($r_{HF} = r_{HF}^*$), L will set ($r_{LF} = r_{LF}^*$, $t_L = t_L(G)$), and the firm will export from F to both H and L in equilibrium.

(d) if $G \geq \bar{G}$, H will set ($r_{HF} = r_{HF}^*$), L will set ($r_{LF} = r_{LF}^*$, $t_L = 1$), and the firm will export from F to both H and L in equilibrium.

The firm’s equilibrium supply strategies in Case I are illustrated in Figure 2.
Note that in this case in which \( l = f, \ G = G \). This means that if the firm would establish a foreign affiliate in L for local sales only in the absence of a FTA, then in the presence of a FTA, the firm will establish export platform FDI in L. If the firm would export to both H and L in the absence of a FTA, it will do so in the presence of a FTA as well. Thus, in this baseline case in which \( l = f \), a FTA between H and L causes neither FDI creation nor FDI destruction.

**Case II: \( l > f \), no FTA**

Case II, in which the cost of production in the firm’s home country is smaller than the cost of production in L, is very similar to Case I. Relative to Case I, the incentives for the firm to engage in FDI in L and for L to attract FDI are reduced as a result of F’s cost of production advantage over L. This is clearly illustrated by looking at equilibria in the absence of a FTA between H and L.

As in Case I, H’s social welfare from importing L or F is maximized by setting \( r_{HL}^* = (1 - l)/3 \) and \( r_{HF}^* = (1 - f)/3 \), respectively. Because of F’s cost of production advantage in Case II, H strictly prefers importing from F and levying \( r_{HF}^* \) to importing from L and levying \( r_{HL}^* \).

Also because of F’s cost of production advantage, the firm will prefer exporting from F to H and facing \( r_{HF}^* \) to exporting from L to H and facing \( r_{HL}^* \), even if \( t_L = 0 \). Thus, if the firm invests in L, it will establish an affiliate for local sales only, as in Case I.

Also as in Case I, for L to prefer attracting FDI for local sales only to importing from F requires (7) to be satisfied, which is only possible for \( G < G \) as defined in (8). Note that \( \frac{\partial G}{\partial f} > 0 \), so that the smaller \( f \) is relative to \( l \) (the larger F’s cost of production advantage), the smaller the range of values of \( G \) for which the firm would be willing to establish a foreign affiliate in L in the absence of a FTA.

**Proposition 3.** In the absence of a FTA between H and L in Case II:
(a) if \( G < G \), H will set \( (r_{HF} = r_{HF}^*, r_{HL} = r_{HL}^*) \), L will set \( (r_{LF} = 1 - f, t_L = 1) \), and the firm will invest in L for local sales only and export from F to H in equilibrium.
(b) if \( G > G \), H will set \( (r_{HF} = r_{HF}^*, r_{HL} = r_{HL}^*) \), L will set \( (r_{LF} = r_{LF}^*, t_L = 1) \), and the firm will export from F to both H and L in equilibrium.
**Case II: \( l > f \), FTA**

In the presence of a FTA between H and L in Case II, the only difference from Case I is how far H is willing to go to prevent export platform FDI in L. Since a FTA restricts \( r_{HL} = 0 \), for H to prefer importing from F and setting \( r_{HF} \) to importing tariff-free from L requires

\[
\left( \frac{(1-f-r_{HF})^2}{8} \right) + r_{HF}\left( \frac{1-f-r_{HF}}{2} \right) \geq \left( \frac{(1-l)^2}{8} \right)
\]  

(16)

The left-hand side of (16) is H’s social welfare from importing from F and setting \( r_{HF} \). The right-hand side of (16) is H’s social welfare from importing tariff-free from L. Note that since \( l > f \), (16) is actually satisfied for some \( r_{HF} < 0 \). That is, H finds importing from L tariff-free so abhorrent that it would be willing to offer the firm a small import subsidy to entice it to export from F to H rather than from L to H. Define \( \tilde{r}_{HF} < 0 \) as the value of \( r_{HF} \) that satisfies (16) with equality. Thus, \( \tilde{r}_{HF} \) is the smallest value of \( r_{HF} \) that H would be willing to set to prevent the firm from investing in L. Note that in Case I, \( \tilde{r}_{HF} = 0 \). \( \tilde{r}_{HF} \) is illustrated in Figure 3.

As in Case I, L will be willing to attract export platform FDI as long as \( G < \bar{G} \), provided that L can set \( t_L \) high enough to generate sufficient tax revenue. If \( t_L > \bar{t}_L (G) \) as defined by (9), L will prefer attracting export platform FDI to importing from F. If \( t_L < \bar{t}_L (G) \), L will prefer to import from F.

Again as in Case I, the firm will be willing to establishing export platform FDI in L as long as \( t_L \) is not set too high. For L to prefer establishing export platform FDI in L to exporting from F to both H and L requires

\[
(1 - t_L)\left( \frac{(1-l)^2}{4} + \frac{(1-l)^2}{4} - G \right) \geq \left( \frac{(1-f-\tilde{r}_{HF})^2}{4} \right)
\]  

(17)

The left-hand side of (17) is the firm’s after-tax profit from local sales in L and exports from L to H, net of the fixed cost of establishing a foreign affiliate in L. The right-hand side of (17) is the firm’s profit from exporting from F to H facing \( \tilde{r}_{HF} \) and exporting from F to L facing \( r_{LF} = 1-f \). Define \( \bar{t}_L (G) \) as the value of \( t_L \) that satisfies (17) with equality for a given \( G \). If \( t_L < \bar{t}_L (G) \), the firm will establish export platform FDI in L.

If \( t_L > \bar{t}_L (G) \), the firm will export to both H and L from F.
As in Case I, define $G$ such that:

$$t_L(G) = \tilde{t}_L(G)$$

(18)

$G$ is the largest value of $G$ for which $L$ will be willing and able to attract export platform FDI. Note that while $t_L(G)$ is identical to the corresponding function in Case I, $\tilde{t}_L(G)$ is “lower” than the corresponding function in Case I; since the right-hand side of (17) is larger than the right-hand side of (12), for a given value of $G$, a smaller value of $t_L$ will make the firm indifferent between export platform FDI in L and exporting to both H and L in Case II than in Case I. The upshot of this is that $G$ is smaller in Case II than the corresponding $G$ in Case I. That is, the range of values of $G$ for which the firm will establish export platform FDI in L in the presence of a FTA is smaller in Case II than in Case I.

If $G < \bar{G}$, L will set $t_L = \tilde{t}_L(G)$ and $r_{LF} = 1 - f$, and (17) will be satisfied for any $r_{HF} \in (\bar{r}_{HF}, 1 - f)$, so the firm will establish export platform FDI in L. If, on the other hand, $G > \bar{G}$, H will set $r_{HF} = \tilde{r}_{HF} \in (\bar{r}_{HF}, r_{HF}^*)$ as defined by (14) and the firm will export to both H and L from F. Finally, if $G \geq \bar{G}$ as defined by (15), H will be able to set $r_{HF}^*$ and the firm will still choose to export from F to both H and L.

**Proposition 4.** In the presence of a FTA between H and L in Case II:

(a) if $G \leq \bar{G}$, H will set $(r_{HF} = \bar{r}_{HF})$, L will set $(r_{LF} = 1 - f, t_L = \tilde{t}_L(G))$, and the firm will establish export platform FDI in L in equilibrium.

(b) if $G \in (\bar{G}, \bar{G})$, H will set $(r_{HF} = \tilde{r}_{HF})$, L will set $(r_{LF} = r_{LF}^*, t_L = \tilde{t}_L(G))$, and the firm will export from F to both H and L in equilibrium.

(c) if $G \in [\bar{G}, \bar{G})$, H will set $(r_{HF} = r_{HF}^*)$, L will set $(r_{LF} = r_{LF}^*, t_L = \tilde{t}_L(G))$, and the firm will export from F to both H and L in equilibrium.

(d) if $G \geq \bar{G}$, H will set $(r_{HF} = r_{HF}^*)$, L will set $(r_{LF} = r_{LF}^*, t_L = 1)$, and the firm will export from F to both H and L in equilibrium.

In Case II, $G < \bar{G}$, which means that if $G \in (\bar{G}, \bar{G})$, the firm will establish FDI in L for local sales only in the absence of a FTA between H and L, but will export to both H and L in the presence of a FTA. Thus, in Case II, a FTA may cause FDI destruction.

**Proposition 5.** In Case II, if $G \in (\bar{G}, \bar{G})$, a FTA will cause FDI destruction.

The firm’s equilibrium supply strategies in Case II are illustrated in Figure 4.
Case III: $l < f$

Case III is considerably different from Case I and Case II. Whereas in Case I and Case II H was either indifferent between importing from L and importing from F or strictly preferred importing from F, and thus the firm would not export from L to F in the absence of a FTA, in Case III H prefers to import from L, and may be willing to adjust its tariff rates to entice the firm to establish export platform FDI in L. Thus, whereas H and L worked at cross purposes in Case I and Case II, they find a common goal in Case III.

An important consideration for the analysis of Case III is how much smaller $l$ is than $f$.

Consider the following inequality:

$$
\left( \frac{(1-l)^2}{8} \right) \geq \left( \frac{(1-f)^2}{6} \right)
$$

If (19) is satisfied, L has a considerable cost of production advantage over F. This implies two things. First, it implies that the consumer surplus that consumers in L receive from consuming locally-produced X exceeds the social welfare in L from importing from F and levying $r_{LF}^* = (1 - f)/3$. In other words, L does not require any tax revenue to prefer attracting FDI to importing from F. Second, (19) implies that H’s social welfare from importing tariff-free from L is greater than H’s social welfare from importing from F and levying $r_{HF}^* = (1 - f)/3$.

To simplify the analysis of Case III, consider two separate subcases:

Case IIIa: $l < f$, (19) is satisfied
Case IIIb: $l < f$, (19) is violated

The difference between these two subcases from H’s perspective is illustrated in Figure 5.

Case IIIa: $l < f$, (19) is satisfied, no FTA

In this subcase, L has a considerable cost advantage over F. Thus, in the absence of a FTA between H and L, for H to prefer importing from L to importing from F requires:

$$
\left( \frac{(1-l-r_{HL})^2}{8} \right) + r_{HL} \left( \frac{(1-l-r_{HL})}{2} \right) \geq \left( \frac{(1-f)^2}{6} \right)
$$

The left-hand side of (20) is H’s social welfare from importing from L and levying $r_{HL}$. The right-hand side of (20) is H’s social welfare from importing from F and levying $r_{HF}^* = (1 - f)/3$. Since we are considering the case in which (19) is satisfied, note that (20) will be satisfied for some $r_{HL} < 0$. Define $\tilde{r}_{HL} < 0$ as the value of $r_{HL}$ that satisfies (20) with equality. $\tilde{r}_{HL}$ is the smallest value of $r_{HL}$ that H would be willing to set to encourage
the firm to establish export platform FDI in L. Note that the left-hand side of (20) is strictly increasing in $r_{HL}$ in $(\tilde{r}_{HL}, r_{HL}^{*})$.

Although L would be willing to attract FDI even if it could not collect any tax revenue, L’s social welfare is strictly increasing in $t_L$. Thus, to extract the highest possible tax revenue, L will set $r_{LF} = 1 - f$ to discourage the firm from exporting from F to L. Similarly, to extract the largest possible tariff revenue from imports from L, H will set $r_{HF} = 1 - f$. The combination of these two tariffs eliminates any profit the firm would receive from exports to both H and L from F. Thus, for the firm to be willing to establish export platform FDI in L in the absence of a FTA requires:

$$\left(1 - t_L\right)\left(\frac{(1 - l)^2}{4} + \frac{(1 - l - r_{HL})^2}{4} - G\right) \geq 0$$  \hspace{1cm} (21)

The left-hand side of (21) is the firm’s after-tax profit from export platform FDI in L. The right-hand side of (21) is the firm’s profit from serving H and L with exports from F, facing $r_{HF} = 1 - f$ and $r_{LF} = 1 - f$, respectively. Since L does not require any tax revenue to prefer attracting export platform FDI to importing from F, if the firm’s pre-tax profit (inside the brackets) is positive, L will set $t_L = 1$, and (21) will be satisfied with equality. If the firm’s pre-tax profit is negative, L will set $t_L = 0$, and (21) will be violated.

From (21) it is clear that whether or not the firm will invest in L depends on $G$ and $r_{HL}$. Define $\hat{r}_{HL}$ as the value of $r_{HL}$ that satisfies (21) with equality for $t_L = 0$. From (20), the smallest value of $r_{HL}$ that H would be willing to set to encourage the firm to invest in L is $\tilde{r}_{HL}$. Thus, the largest value of $G$ for which (21) could be satisfied is

$$G(\tilde{r}_{HL}) = \left(\frac{(1 - l)^2}{4} + \frac{(1 - l - \tilde{r}_{HL})^2}{4}\right)$$ \hspace{1cm} (22)

If $G > G(\tilde{r}_{HL})$, H will not be willing to set $r_{HL}$ low enough to encourage the firm to invest in L. If $G \leq G(\tilde{r}_{HL})$, H will set $r_{HL} = \hat{r}_{HL}$ and (21) will be satisfied with equality. Note that if $G \leq G(\ r_{HL}^{*})$ where

$$G(r_{HL}^{*}) = \left(\frac{13(1 - l)^2}{36}\right)$$ \hspace{1cm} (23)

then H could set $r_{HL} = r_{HL}^{*}$ and the firm will still be willing to establish export platform FDI in L.
Proposition 6. In the absence of a FTA between H and L in Case IIIa:
(a) if \( G \leq G(r_{HL}^*) \), H will set \( (r_{HF} = 1 - f, r_{HL} = r_{HL}^*) \), L will set \( (r_{LF} = 1 - f, t_L = 1) \), and the firm will establish export platform FDI in L in equilibrium.
(b) if \( G \in (G(r_{HL}^*), G(\tilde{r}_{HL})) \), H will set \( (r_{HF} = 1 - f, r_{HL} = \tilde{r}_{HL}) \), L will set \( (r_{LF} = 1 - f, t_L = 1) \), and the firm will establish export platform FDI in L in equilibrium.
(c) if \( G > G(\tilde{r}_{HL}) \), H will set \( (r_{HF} = r_{HF}^*, r_{HL} = \tilde{r}_{HL}) \), L will set \( (r_{LF} = r_{LF}^*, t_L = 0) \), and the firm will export to both H and L from F.

Case IIIa: \( l < f \), (19) is satisfied, FTA

In this case, a FTA between H and L may actually make both countries worse off. Since a FTA restricts \( r_{HL} = 0 \), H will no longer be able to subsidize imports from L. This will reduce the range of values of \( G \) for which the firm is willing to establish export platform FDI in L. With a FTA, the largest value of \( G \) for which the firm is willing to establish export platform FDI in L is

\[
G = \left( \frac{(1-l)^2}{2} \right)
\]

Proposition 7 In the presence of a FTA between H and L in Case IIIa:
(a) if \( G \leq G \), H will set \( (r_{HF} = 1 - f) \), L will set \( (r_{LF} = 1 - f, t_L = 1) \), and the firm will establish export platform FDI in L in equilibrium.
(b) if \( G > G \), H will set \( (r_{HF} = r_{HF}^*) \), L will set \( (r_{LF} = r_{LF}^*, t_L = 0) \), and the firm will export to both H and L from F.

In Case IIIa, \( G < G(\tilde{r}_{HL}) \), which means that if \( G \in (G, G(\tilde{r}_{HL})) \), the firm will establish export platform FDI in L in the absence of a FTA between H and L, but will export to both H and L in the presence of a FTA. Thus, in Case IIIa, a FTA may cause FDI destruction because H was willing and able to subsidize imports from L in the absence of a FTA, but was not able to subsidize imports from L in the presence of a FTA.

Proposition 8. In Case IIIa, if \( G \in (G, G(\tilde{r}_{HL})) \), a FTA will cause FDI destruction.

The firm’s equilibrium supply strategies in Case IIIa are illustrated in Figure 6.
**Case IIIb:** $l < f$, (19) is violated, no FTA

In the absence of a FTA between H and L, Case IIIa is similar to Case IIIb. As in Case IIIa, H may be willing to set $r_{HL} < r_{HL}^*$ in order to encourage the firm to establish export platform FDI. The smallest value of $r_{HL}$ that H would be willing to set is again $\hat{r}_{HL}$ as defined by (20), however since (19) is violated, $\hat{r}_{HL} > 0$. Thus, the largest value of $G$ for which the firm will establish export platform FDI in L is $G(\hat{r}_{HL})$ as defined by (22). If $G > G(\hat{r}_{HL})$, H will not be willing to set $r_{HL}$ low enough to encourage the firm to invest in L. If $G \leq G(\hat{r}_{HL})$, H will set $r_{HL} = \hat{r}_{HL}$ as defined by (21), and the firm will establish export platform FDI in L. As in Case IIIa, if $G \leq G(\hat{r}_{HL})$ as defined by (23), H can set $r_{HL} = r_{HL}^*$ and the firm will still be willing to establish export platform FDI in L.

**Proposition 9.** In the absence of a FTA between H and L in Case IIIb:
(a) if $G \leq G(r_{HL}^*)$, H will set $(r_{HF} = 1 - f, r_{HL} = r_{HL}^*)$, L will set $(r_{LF} = 1 - f, t_L = 1)$, and the firm will establish export platform FDI in L in equilibrium.
(b) if $G \in (G(r_{HL}^*), G(\hat{r}_{HL}))$, H will set $(r_{HF} = 1 - f, r_{HL} = \hat{r}_{HL})$, L will set $(r_{LF} = 1 - f, t_L = 1)$, and the firm will establish export platform FDI in L in equilibrium.
(c) if $G > G(\hat{r}_{HL})$, H will set $(r_{HF} = r_{HF}^*, r_{HL} = \hat{r}_{HL})$, L will set $(r_{LF} = r_{LF}^*, t_L = 0)$, and the firm will export to both H and L from F.

**Case IIIb:** $l < f$, (19) is violated, FTA

In the presence of a FTA between H and L, Case IIIb is more similar to Case I and Case II than to Case IIIa. Since (19) is violated, H will prefer importing from F and levying $r_{HF}^*$ to importing from L tariff-free. Thus, as in Case I and Case II, L will be willing to attract export platform FDI provided it can collect sufficient tax revenue, but H will be willing to set $r_{HF} < r_{HF}^*$ to prevent the firm from investing in L. For H to prefer imports from F to tariff-free imports from L requires:

$$
\frac{(1 - f - r_{HF})^2}{8} + r_{HF}\left(\frac{(1 - f - r_{HF})}{2}\right) \geq \frac{(1 - l)^2}{8}
$$

(25)

The left-hand side of (25) is H’s social welfare from importing from F and levying a tariff of $r_{HF}$. The right-hand side of (25) is H’s social welfare from importing from L tariff-free. Define $\tilde{r}_{HF}$ as the value of $r_{HF}$ that satisfies (25) with equality. Note that since (19) is violated, $\tilde{r}_{HF} < r_{HF}^*$, but since $l < f$, $\tilde{r}_{HF} > 0$. Thus, $\tilde{r}_{HF} \in [0, r_{HF}^*]$ is the smallest value of $r_{HF}$ that H would be willing to set to encourage the firm not to establish export platform FDI in L.
As in Case I and Case II, L is willing to attract export platform FDI as long as it can collect sufficient tax revenue, or \( t_L \geq \underline{r}_L(G) \) as defined by (9). The largest value of \( G \) for which L will be willing to attract FDI is \( \overline{G} \) as defined by (10). If \( G > \overline{G} \), L will set \( t_L = \underline{r}_L(G) \) and \( r_{LF} = r_{LF}^* \) to induce the firm to export from F to L. For the firm to be willing to invest in L requires \( t_L \leq \underline{r}_L(G) \) as defined by (17). Thus, the largest value of \( G \) for which the firm will establish export platform FDI in L in the presence of a FTA is \( \overline{G} \) as defined by (18). If \( G < \overline{G} \), L will set \( t_L = \underline{r}_L(G) \), and the firm will establish export platform FDI in L. If \( G > \overline{G} \), L will set \( t_L = \underline{r}_L(G) \), and the firm will export to both H and L from F. As in Case I and Case II, if \( G > \overline{G} \), H will be able to set \( r_{HF} = \hat{r}_{HF} \in (\underline{r}_{HF}, r_{HF}^*) \) as defined by (14) and the firm will export to both H and L from F. Finally, if \( G < \overline{G} \) as defined by (15), H will be able to set \( r_{HF}^* \) and the firm will still choose to export from F to both H and L.

**Proposition 10.** In the presence of a FTA between H and L in Case IIIb:

(a) if \( G \leq \overline{G} \), H will set \( r_{HF} = \overline{r}_{HF} \), L will set \( r_{LF} = 1 - \hat{f}, t_L = \underline{r}_L(G) \), and the firm will establish export platform FDI in L in equilibrium.

(b) if \( G \in (\overline{G}, \overline{G}) \), H will set \( r_{HF} = \hat{r}_{HF} \), L will set \( r_{LF} = r_{LF}^*, t_L = \underline{r}_L(G) \), and the firm will export from F to both H and L in equilibrium.

(c) if \( G \in [\overline{G}, \overline{G}) \), H will set \( r_{HF} = r_{HF}^* \), L will set \( r_{LF} = r_{LF}^*, t_L = \underline{r}_L(G) \), and the firm will export from F to both H and L in equilibrium.

(d) if \( G \geq \overline{G} \), H will set \( r_{HF} = r_{HF}^* \), L will set \( r_{LF} = r_{LF}^*, t_L = 1 \), and the firm will export from F to both H and L in equilibrium.

In Case IIIb, \( \overline{G} < G(\overline{r}_{HL}) \), which means that if \( G \in (\overline{G}, G(\overline{r}_{HL})) \), the firm will establish export platform FDI in L in the absence of a FTA between H and L, but will export to both H and L in the presence of a FTA. Thus, in Case IIIb, a FTA may cause FDI destruction because H prefers importing from L in the presence of a FTA, but prefers importing from F in the absence of a FTA.

**Proposition 11.** In Case IIIb, if \( G \in (\overline{G}, G(\overline{r}_{HL})) \), a FTA will cause FDI destruction.

The firm’s equilibrium supply strategies in Case IIIb are illustrated in Figure 7.
4. Conclusions

This paper has shown that even if a country cannot itself attract FDI, it has considerable power, through its trade policies, to influence a multinational firm’s location decisions. Because a country’s optimal tariffs are positive in this model, economic integration in the form of a FTA may generate competition between the low-cost country’s tax rate and the high-cost country’s external tariff rate to influence the firm’s location decision. In some cases, the high-cost country may be able to “win” this competition, in the sense that it is able to set its external tariff rate low enough to prevent the firm from investing in the low-cost country. Because of this competition, a FTA may cause FDI destruction, meaning that the monopolist operated a foreign affiliate in the low-cost country in the absence of a FTA, but the competition between the integrating countries in the presence of a FTA induces the firm to serve the FTA with exports.

This paper leaves several interesting questions unanswered. For example, what are the welfare effects of economic integration in the form of a FTA for the integrating countries? Does this model provide new insights into the trade creation and trade diversion effects of economic integration? What about the relationship between bilateral trade liberalization and multilateral trade liberalization? between trade liberalization and investment liberalization? These are all potential areas for future research using this relatively simple model.
References


For illustration, \( l = f = 0.2 \)

\[ t_{L,\text{lower}}(z) = t_{L}(G), \] the minimum tax rate for which L prefers attracting FDI to importing

\[ t_{L,\text{upper}}(z) = \bar{t}_{L}(G), \] the maximum tax rate for which the firm will establish FDI in L

The intersection defines \( G \), the maximum value of \( G \) for which L attracts FDI.

For \( G \leq \bar{G} \), L will set \( \bar{t}_{L}(G) \), and the firm will establish export platform FDI in L.

For \( G > \bar{G} \), L will set \( t_{L}(G) \), and the firm will export to both H and L from F.
Figure 2

Firm’s equilibrium supply strategies in Case I: \( l = f \)

No FTA: exports from F to H
FDI for local sales in L
increasing \( G \) →

\[ G \]

FTA: export platform FDI in L

exports from F to H
exports from F to L

Proposition 1. In the absence of a FTA between H and L in Case I:
(a) if \( G < G \), H will set \((r_{HF} = r_{HF}^*, r_{HL} = r_{HL}^*)\), L will set \((r_{LF} = 1 - f, t_L = 1)\), and the firm will invest in L for local sales only and export from F to H in equilibrium.
(b) if \( G > G \), H will set \((r_{HF} = r_{HF}^*, r_{HL} = r_{HL}^*)\), L will set \((r_{LF} = r_{LF}^*, t_L = 1)\), and the firm will export from F to both H and L in equilibrium.

Proposition 2. In the presence of a FTA between H and L in Case I:
(a) if \( G \leq G \), H will set \((r_{HF} = 0)\), L will set \((r_{LF} = 1 - f, t_L = t_L(G))\), and the firm will establish export platform FDI in L in equilibrium.
(b) if \( G \in (G, G)\), H will set \((r_{HF} = r_{HF}^*)\), L will set \((r_{LF} = r_{LF}^*, t_L = t_L(G))\), and the firm will export from F to both H and L in equilibrium.
(c) if \( G \in [G, G]\), H will set \((r_{HF} = r_{HF}^*)\), L will set \((r_{LF} = r_{LF}^*, t_L = t_L(G))\), and the firm will export from F to both H and L in equilibrium.
(d) if \( G \geq G \), H will set \((r_{HF} = r_{HF}^*)\), L will set \((r_{LF} = r_{LF}^*, t_L = 1)\), and the firm will export from F to both H and L in equilibrium.
For illustration, \( l = 0.2, f = 0.1 \)

fromF(\( r_{HF} \)) is H’s social welfare from importing from F and levying \( r_{HF} \)

fromL(\( r_{HF} \)) is H’s social welfare from importing from L tariff-free

The intersection defines \( \tilde{r}_{HF} \), the minimum value of \( r_{HF} \) for which H prefers importing from F to importing from L. Note that since \( l > f \), \( \tilde{r}_{HF} < 0 \).

For \( r_{HF} < \tilde{r}_{HF} \), H prefers importing from L tariff-free to importing from F and levying \( r_{HF} \).

For \( r_{HF} \in [\tilde{r}_{HF}, r_{HF}^*] \), H prefers importing from F and levying \( r_{HF} \) to importing from L tariff-free.
Figure 4

Firm’s equilibrium supply strategies in Case II: \( l > f \)

\[
\begin{align*}
\text{No FTA:} & \quad \text{exports from F to H} \\
& \quad \text{FDI for local sales in L} \\
& \quad \text{increasing } G \rightarrow \overline{G} \\
G: & \quad \text{exports from F to H} \\
& \quad \text{exports from F to L} \\
\text{FTA:} & \quad \text{export platform FDI in L} \\
& \quad \text{FDI destruction}
\end{align*}
\]

**Proposition 3.** In the absence of a FTA between H and L in Case II:
(a) if \( G < \underline{G} \), H will set \( (r_{HF} = r_{HF}^*, r_{HL} = r_{HL}^*) \), L will set \( (r_{LF} = 1 - f, t_L = 1) \), and the firm will invest in L for local sales only and export from F to H in equilibrium.
(b) if \( G > \overline{G} \), H will set \( (r_{HF} = r_{HF}^*, r_{HL} = r_{HL}^*) \), L will set \( (r_{LF} = r_{LF}^*, t_L = 1) \), and the firm will export from F to both H and L in equilibrium.

**Proposition 4.** In the presence of a FTA between H and L in Case II:
(a) if \( G \leq \underline{G} \), H will set \( (r_{HF} = \overline{r}_{HF}) \), L will set \( (r_{LF} = 1 - f, t_L = \overline{t}_L(G)) \), and the firm will establish export platform FDI in L in equilibrium.
(b) if \( G \in (\underline{G}, \overline{G}) \), H will set \( (r_{HF} = \hat{r}_{HF}) \), L will set \( (r_{LF} = r_{LF}^*, t_L = \overline{t}_L(G)) \), and the firm will export from F to both H and L in equilibrium.
(c) if \( G \in (\overline{G}, \overline{G}) \), H will set \( (r_{HF} = r_{HF}^*) \), L will set \( (r_{LF} = r_{LF}^*, t_L = \overline{t}_L(G)) \), and the firm will export from F to both H and L in equilibrium.
(d) if \( G \geq \overline{G} \), H will set \( (r_{HF} = r_{HF}^*) \), L will set \( (r_{LF} = r_{LF}^*, t_L = 1) \), and the firm will export from F to both H and L in equilibrium.

**Proposition 5.** In Case II, if \( G \in (\underline{G}, \overline{G}) \), a FTA will cause FDI destruction.
For illustration, $l = 0.05, f = 0.2$  

In both Case IIIa and Case IIIb,

from $F(r_{HF})$ is H’s social welfare from importing from F and levying $r_{HF}$

from $L(r_{HF})$ is H’s social welfare from importing from L tariff-free

In Case IIIa, there is no value of $r_{HF}$ for which H prefers importing from F

In Case IIIb, H prefers importing from F and levying any $r_{HF} \in [\tilde{r}_{HF}, r_{HF}^*]$ to importing from L tariff-free. Note that since $l < f$, $\tilde{r}_{HF} > 0$.

For $r_{HF} < \tilde{r}_{HF}$, H prefers importing from L tariff-free to importing from F and levying $r_{HF}$.

For $r_{HF} \in [\tilde{r}_{HF}, r_{HF}^*]$, H prefers importing from F and levying $r_{HF}$ to importing from L tariff-free.
Firm’s equilibrium supply strategies in Case IIIa: \( l < f \), (19) is satisfied

**No FTA:**
- Export platform FDI in L
- Exports from F to H
- Exports from F to L
- Increasing \( G \rightarrow G(r_{HL}^*)G(\tilde{r}_{HL}) \)

**FTA:**
- Export platform FDI in L
- Exports from F to H
- Exports from F to L

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**Proposition 6.** In the absence of a FTA between H and L in Case IIIa:
(a) if \( G \leq G(r_{HL}^*) \), H will set \((r_{HF} = 1 - f, r_{HL} = r_{HL}^*)\), L will set \((r_{LF} = 1 - f, t_L = 1)\), and the firm will establish export platform FDI in L in equilibrium.
(b) if \( G \in (G(r_{HL}^*), G(\tilde{r}_{HL})) \), H will set \((r_{HF} = 1 - f, r_{HL} = \tilde{r}_{HL})\), L will set \((r_{LF} = 1 - f, t_L = 1)\), and the firm will establish export platform FDI in L in equilibrium.
(c) if \( G > G(\tilde{r}_{HL}) \), H will set \((r_{HF} = r_{HF}^*, r_{HL} = \tilde{r}_{HL})\), L will set \((r_{LF} = r_{LF}^*, t_L = 0)\), and the firm will export to both H and L from F.

**Proposition 7.** In the presence of a FTA between H and L in Case IIIa:
(a) if \( G \leq G \), H will set \((r_{HF} = 1 - f)\), L will set \((r_{LF} = 1 - f, t_L = 1)\), and the firm will establish export platform FDI in L in equilibrium.
(b) if \( G > G \), H will set \((r_{HF} = r_{HF}^*)\), L will set \((r_{LF} = r_{LF}^*, t_L = 0)\), and the firm will export to both H and L from F.

**Proposition 8.** In Case IIIa, if \( G \in (G, G(\tilde{r}_{HL})) \), a FTA will cause FDI destruction.
Firm’s equilibrium supply strategies in Case IIIb: $l < f$, (19) is violated

**Proposition 9.** In the absence of a FTA between H and L in Case IIIb:
(a) if $G \leq G (r_{HL}^*)$, H will set $(r_{HF} = 1 - f, r_{HL} = r_{HL}^*)$, L will set $(r_{LF} = 1 - f, t_L = 1)$, and the firm will establish export platform FDI in L in equilibrium.
(b) if $G \in (G (r_{HL}^*), G (\bar{r}_{HL}))$, H will set $(r_{HF} = 1 - f, r_{HL} = \bar{r}_{HL})$, L will set $(r_{LF} = 1 - f, t_L = 1)$, and the firm will establish export platform FDI in L in equilibrium.
(c) if $G > G (\bar{r}_{HL})$, H will set $(r_{HF} = r_{HF}^*, r_{HL} = \bar{r}_{HL})$, L will set $(r_{LF} = r_{LF}^*, t_L = 0)$, and the firm will export to both H and L from F.

**Proposition 10.** In the presence of a FTA between H and L in Case IIIb:
(a) if $G \leq \underline{G}$, H will set $(r_{HF} = \underline{r}_{HF})$, L will set $(r_{LF} = 1 - f, t_L = t_L (G))$, and the firm will establish export platform FDI in L in equilibrium.
(b) if $G \in (\underline{G}, \bar{G})$, H will set $(r_{HF} = \bar{r}_{HF})$, L will set $(r_{LF} = r_{LF}^*, t_L = t_L (G))$, and the firm will export from F to both H and L in equilibrium.
(c) if $G \in (\underline{G}, \bar{G})$, H will set $(r_{HF} = r_{HF}^*)$, L will set $(r_{LF} = r_{LF}^*, t_L = t_L (G))$, and the firm will export from F to both H and L in equilibrium.
(d) if $G \geq \bar{G}$, H will set $(r_{HF} = r_{HF}^*)$, L will set $(r_{LF} = r_{LF}^*, t_L = 1)$, and the firm will export from F to both H and L in equilibrium.

**Proposition 11.** In Case IIIb, if $G \in (\underline{G}, \bar{G} (\bar{r}_{HL}))$, a FTA will cause FDI destruction.