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Royale with Cheese: The Effect of Globalization on the Variety of Goods*

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Abstract

The key result of the so-called "New Trade Theory" is that countries gain from falling trade costs by an increase in the number of varieties available to consumers. Though the number of varieties in a given country rises, it is also true that global variety decreases from increased competition wherein imported varieties drive out some local varieties. This second result is a major issue for anti-trade activists who criticize the move towards free trade as promoting "homogenization" or "Americanization" of varieties across countries. We present a model of endogenous entry with heterogeneous firms which models this concern in two ways: a portion of a consumer's income is spent overseas (i.e. tourism) and an existence value (a common tool in environmental economics where simply knowing that a species exists provides utility). Since lowering trade costs induces additional varieties to export and drives out some non-exported varieties, these modifications result in welfare losses not accounted for in the existing literature. Nevertheless, it is only through the existence value that welfare can fall as a result of declining trade barriers. Thus, for these criticisms of globalization to dominate, it must be that this loss in the existence value outweighs the direct benefits from consumption.

Keywords: Trade Theory; Globalization; Variety; Tourism
JEL Classification: F10; F12; F13

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1 Introduction

Among the many criticisms of globalization is the concern that foreign produced varieties drive out local ones. The interplay between trade and variety has been a focus for international trade researchers since Krugman (1979). This work highlights the fact that although the number of varieties across the world fall with trade as imported varieties drive out local ones, welfare rises as average costs fall and the number of varieties within a country - including locally-made and imported varieties - increases. Recent advances with firm heterogeneity (e.g. Melitz, 2003) reinforce these ideas with a selection effect whereby high productivity exporting firms drive out low productivity non-exporters. Nevertheless, these arguments miss a fundamental aspect of the concern over globalization and variety, namely that anti-globalization activists are as concerned with the *overseas* variety as with the varieties at home. This critique laments that when an agent travels overseas, the presence of exported varieties from home lessens the foreignness of the other country. For example, a McDonald's in Beijing signals the loss of a local, non-exported Chinese culinary experience. Thus, tourism offers one avenue by which domestic agents care about overseas variety. Alternatively, critics argue that, even in the absence of direct consumption of foreign non-exported varieties, there is value to simply knowing of their existence (what we will refer to as the "existence value").[1] This paper builds on the existing literature by incorporating these two features into a Melitz-style model of endogenous entry and monopolistic competition. We demonstrate that, even when there is a preference for foreign varieties over exported domestic varieties, that welfare from consumption and income increases as trade costs fall. This is countered by a decline in the existence value. Thus, unless one is willing to attach a sufficiently high benefit to the existence value relative to the benefits arising from domestic consumption, this potential downside of globalization is overridden by its benefits.

In setting up our model, we intentionally do so in a way that gives this criticism the greatest benefit of the doubt. In particular, our preference structure for overseas consumption

[1] "Existence value" is sometimes referred to as "passive use value".

modifies the basic Dixit-Stiglitz setup in which all varieties are equally valued. Instead, we assume that, for equal quantities, the utility a home consumer in the foreign country derives from a foreign, non-exported variety is greater than or equal to that from a foreign, exported variety. This in turn is greater than or equal to the utility derived from a home-produced, exported variety. To make the comparisons more concrete, consider an American in Ireland. Whereas the standard Dixit-Stiglitz preferences would have the consumer view a pint of Budweiser (an American variety exported to Ireland) the same as a pint of Guinness (an Irish variety available in America) or a pint of Porterhouse (an Irish variety only available in Ireland), we allow for the possibility that the consumer strictly prefers drinking Porterhouse to Guinness due to its "foreignness" and likewise that a Guinness is preferable to Budweiser. Thus, all else equal, if an American variety drives out an Irish variety, this is a net utility loss, a loss that is especially acute if that Irish variety is only available while in Ireland. Thus, if there is an increase in globalization, modeled as a fall in trade costs, this would tend to imply a welfare loss as additional American varieties, such as Miller, drive out indigenous, hard to find Irish microbrews such as Galway Hooker.[2]

In addition to tourism, we introduce an existence value, that is, a benefit that arises simply from knowing that a variety exists even if it is never used or consumed. The use of existence values in environmental economics dates back to Krutilla (1967).[3] In that literature, they appeal to the notion that species, forests, or other natural resources provide benefit simply from knowing that they are out there. Here, one could attribute such utility to travel shows or the like, i.e. even though an agent will never travel to a given country and consume their non-exported products, the agent enjoys the notion that they are out there.[4] Thus, as is well known from the New Trade Theory, when trade costs fall and the number of varieties available in the world as a whole falls, this would result in a welfare decrease.

[2]May such a thing never come to pass.

[3]Horowitz, McConnell, and Murphy (2008) provide a recent overview of existence values in environmental economics.

[4]If one doubts the possibility of such existence values, one need look no further than the multitude of travel journalists, including the incomparable Rick Steves.

Despite these changes, however, we find that welfare will tend to rise as trade costs fall. A fall in trade costs results in three things from the perspective of a home consumer. First, there is an increase in imports to home from foreign (i.e. more Guinness in America). This effect increases welfare and has been well documented elsewhere. Second, and something not found in the literature, there is an increase in exports from home to foreign (i.e. more Budweiser in Ireland) which results in an ambiguous welfare effect. This ambiguity arises because, although highly-prized non-exported foreign varieties are driven from the market causing a welfare loss, the lower cost of domestic exports somewhat offsets this. While the net effect is ambiguous it does give some credence to the concerns of anti-globalization activists. Nevertheless, the combined impact of the home and foreign market changes is unambiguously positive, that is, the benefits to domestic consumption outweigh any potential losses from overseas consumption. Finally, there is a third effect on the existence value. Since increased trade reduces the number of varieties across the globe, this represents an welfare loss. However, for increased globalization to lower welfare, it must be the case that this indirect loss outweighs the welfare gains from direct consumption (which obviously cannot happen if there is no existence value). Thus, even when stacking the deck in favor of the anti-trade contingent, our model suggests that this particular concern over globalization may well be superseded by other, first-order effects.

The rest of the paper proceeds as follows. Section 2 lays out the basic model and its equilibrium, illustrating the role of tourism and the existence value. Section 3 analyzes the change in welfare arising from a fall in trade costs. Section 4 concludes.

2 The Model

Our model builds off of the well-known Melitz (2003) model. There are two countries, Home and Foreign. We will refer to the home country as the domestic country to ease discussion. Foreign variables will be labeled with *s. Home (Foreign) is exogenously endowed with $\bar{L}$

($\bar{L}^*$) units of labor which is the sole factor of production. Without loss of generality, let $\bar{L} \geq \bar{L}^*$. There are two sectors. Sector 1 is the numeraire and consists of a homogeneous good (y) that is produced under constant returns to scale, freely traded, and sold in a perfectly competitive market. Sector 2 consists of a continuum of differentiated goods, each variety of which is indexed by i. As is standard in the Melitz model, this is produced under increasing returns to scale in a monopolistically competitive market with free entry. Unlike sector 1, this market faces trade barriers. With the exception of the potential differing labor endowments countries are identical. Therefore, analyzing the situation for Home informs us of the analogous situation for Foreign and we will refer to the foreign country only when necessary.

2.1 Sector 1

The price of y is normalized to 1. Assuming that one unit of labor is needed for production, this normalizes the wage in each country to unity. Finally, we assume that in equilibrium a positive amount of y is produced and consumed in each country.

2.2 Consumers

Let the utility function for a representative agent in home take the following form

$$U = \mu_1 \ln(X_1) + \mu_2 \ln(X_2) + \Phi(a_D, a_D^*) + Y \tag{1}$$

where

$$X_1 = \left(\int_{i \in \Omega_1} x_k(i)^\rho di \right)^{\frac{1}{\rho}}, \tag{2}$$

$$X_2 = \left[\alpha^{\frac{1}{\varepsilon}} \left(\int_{i \in \Omega_2} x(i)^\rho di \right) + \beta^{\frac{1}{\varepsilon}} \left(\int_{i \in \Omega_3} x(i)^\rho di \right) + \gamma^{\frac{1}{\varepsilon}} \left(\int_{i \in \Omega_4} x(i)^\rho di \right) \right]^{\frac{1}{\rho}} \tag{3}$$

$$\mu_1 > 0, \ \mu_2 \geq 0, \text{ and } 0 \leq \alpha \leq \beta \leq \gamma,$$

and $\varepsilon = 1/(1-\rho)$ is the elasticity of substitution. Thus preferences admit a quasi-linear form that is linear in the numeraire and non-linear in domestic consumption (X_1), overseas consumption through tourism (X_2), and the existence value ($\Phi(.)$, which is increasing in the cutoffs for domestic and foreign entry, two terms discussed momentarily). The set of varieties are defined as follows. Ω_1 is the set of varieties available to a home-based consumer for consumption in the home country. This set comprised of domestically produced varieties and imported foreign varieties. Using the analogy from the introduction, Ω_1 would include Budweiser (an exported American variety), Rogue (a non-exported American variety), and Guinness (an exported Irish variety). This is standard in the new trade theory. Ω_2 is the set of varieties available for consumption in Foreign that originate in Home (i.e. Budweiser).[5] Ω_3 is the set of varieties available for consumption in both Home and Foreign that originate in Foreign (i.e. Guinness). Ω_4 is the set of varieties available for consumption *only* in Foreign (i.e. Porterhouse). These varieties are obviously made in Foreign. Note that by assuming that $\gamma \geq \beta \geq \alpha$, we are allowing both for the possibility that a home consumer treats all varieties available in Foreign equally and for a possibility in which she prefers Foreign-made varieties while in in Foreign. Note that one could alternatively assume that a Home consumer in Foreign prefers Home-made varieties (i.e. that there is "homesickness").[6] However, since increased availability of Home varieties would then be a benefit for Home consumers overseas, an argument that runs counter to the critique of globalization we address, we do not admit this possibility here in order to make the strongest possible case against trade liberalization.

[5]Note that $\Omega_2 = \Omega_3^*$, i.e. Budweiser to an American in Ireland is comparable to Budweiser to an Irishman in America. Similarly, $\Omega_3 = \Omega_2^*$.

[6]Alternatively, one can consider a setting where Home products are safer or more reliable than Foreign made varieties, in which case both Home and Foreign consumers would place a higher value on Home varieties in both locations. Although this is an interesting avenue of thought, it breaks the symmetry of our model and we leave it to future research.

Demand of each good for a consumer of Home nationality is the following:

$$x_1(i) = \frac{p(i)^{-\varepsilon}\mu_1}{\mathcal{P}_1^{1-\varepsilon}} \tag{4}$$

$$x_2(i) = \frac{p^*(i)^{-\varepsilon}\alpha\mu_2}{{\mathcal{P}_2}^{1-\varepsilon}} \rightarrow \text{Budweiser} \tag{5}$$

$$x_3(i) = \frac{p^*(i)^{-\varepsilon}\beta\mu_2}{{\mathcal{P}_2}^{1-\varepsilon}} \rightarrow \text{Guinness} \tag{6}$$

$$x_4(i) = \frac{p^*(i)^{-\varepsilon}\gamma\mu_2}{{\mathcal{P}_2}^{1-\varepsilon}} \rightarrow \text{Porterhouse} \tag{7}$$

where $p(i)$ is the price of variety i sold in home, $p^*(i)$ is the price of variety i sold in foreign, and[7]

$${\mathcal{P}_1}^{1-\varepsilon} = \int_{i\in\Omega_1} p(i)^{1-\varepsilon}di \tag{8}$$

$${\mathcal{P}_2}^{1-\varepsilon} = \alpha\int_{i\in\Omega_2} p^*(i)^{1-\varepsilon}di + \beta\int_{i\in\Omega_3} p^*(i)^{1-\varepsilon}di + \gamma\int_{i\in\Omega_4} p^*(i)^{1-\varepsilon}di. \tag{9}$$

Thus, aggregate Home demand for variety i produced and sold by a home country firm is as follows:

$$Q_D(i) = \begin{cases} x_1(i) + x_4^*(i) & \forall i \in \Omega_1 - \Omega_2 \\ x_1(i) + x_3^*(i) & \forall i \in \Omega_2 \end{cases}, \tag{10}$$

and aggregate Foreign demand for variety i produced and sold by a home country firm (i.e. this firms export demand) is

$$Q_X(i) = x_1^*(i) + x_2(i)\ \forall i \in \Omega_2. \tag{11}$$

[7]Note that the price index for Home's consumption *in* Foreign is *not* the same as the price index for Foreign's consumption in Foreign. These are different because while a Foreign consumer weights each variety she consumes in Foreign the same, the Home tourist weighs certain varieties consumed in Foreign differently.

2.3 Heterogeneous Firms

A firm must pay a fixed cost f_E (measured in units of labor) in order to enter the industry. If this cost is paid, the firm then draws a constant output-per-unit-labor coefficient $1/a$ from the Pareto distribution $G(a)$.[8] Once this coefficient is observed, a firm decides to exit and not produce or remain. If it chooses to remain, it must then decide whether to serve only the domestic market or additionally the foreign market. By serving the domestic market the firm must incur an additional fixed cost f_D. If it chooses to export to the foreign market, it must pay $f_X > f_D$. Production exhibits constant returns to scale with labor as the only factor of production.

The decision to become a firm and which market to service depends on the associated profit for each type. Recall that the numeraire yields wages equal to one in both countries, thus the operating profits for a Home firm with variety i selling only domestically is

$$\begin{aligned} \pi_D(i) &= \left[p(i) - a_i\right] Q_D(i) - f_D \quad \forall i \in \Omega_1 - \Omega_2^* = \Omega_4 \\ &= \left[p(i) - a_i\right] \left[\frac{\mu_1}{\mathcal{P}_1^{1-\varepsilon}} + \frac{\gamma\mu_2}{\mathcal{P}_2^{*1-\varepsilon}}\right] p_k(i)^{-\varepsilon} - f_D. \end{aligned}$$

Note that a firm does not realize it can affect $\mathcal{P}_1$, or $\mathcal{P}_2^*$. Thus, a firm selling domestically will charge a price equal to a constant markup over marginal cost, $p(i) = \frac{a_i}{\rho}$. Therefore, the operating profit function for a purely domestic firm is

$$\pi_D(i) = a_i^{1-\varepsilon} B_D - f_D \tag{12}$$

where

$$B_D = \frac{1}{\varepsilon \rho^{1-\varepsilon}} \left[\frac{\mu_1}{\mathcal{P}_1^{1-\varepsilon}} + \frac{\gamma\mu_2}{\mathcal{P}_2^{*1-\varepsilon}}\right]$$

[8]The Pareto distribution has the following cumulative distribution function:

$$G(a) = \left(\frac{a}{a_U}\right)^{\sigma}, \ 0 < a < a_U.$$

We follow Helpman et al. (2004) and Chor (2009) and assume the $\sigma > \varepsilon - 1$.

Firms that want to become an exporter pay an additional fixed cost f_X and face symmetric trade costs in the form of melting-iceberg transport cost $\tau > 1$.[9] Moveover their demand at home is different because the demand from foreign tourist changes, i.e. once Guinness is available in America, this changes how an American in Ireland views the beer. Thus the operating profit (*new* domestic plus *additional* operating export profits) for a firm that exports is

$$\pi_X = a_i^{1-\varepsilon} B_X - f_D - f_X \ \forall i \in \Omega_2. \tag{13}$$

where

$$B_X = \frac{1}{\varepsilon \rho^{1-\varepsilon}} \left[\frac{\mu_1}{\mathcal{P}_1^{1-\varepsilon}} + \frac{\beta \mu_2}{\mathcal{P}^*{}_2^{1-\varepsilon}} \right] + \frac{1}{\varepsilon} \left(\frac{\tau}{\rho} \right)^{1-\varepsilon} \left[\frac{\mu_1}{\mathcal{P}_1^{*1-\varepsilon}} + \frac{\alpha \mu_2}{\mathcal{P}_2{}^{1-\varepsilon}} \right]$$

Note that since $f_X > f_D$, any exporting firm will also find it profitable to sell domestically. This is the purpose of including firm heterogeneity in the model. Without it, it would be possible for some firms based in Home to sell only in Foreign, clouding the interpretation of changes in the mass of varieties across the world as new exporters crowd out domestic varieties. Further, it ensures that lost varieties are precisely those small overseas producers whose product is available only in their local market, bringing our analysis as close as possible to the argument of the anti-globalization critics.

2.4 Equilibrium

In terms of firm activity, we have three equilibrium conditions. First, a firm will produce domestically if there exists nonnegative profits. This yields a cutoff productivity level a_D which represents the firm indifferent between supplying the domestic market and exiting. Noting that since trade costs (τ) and expenditures on the heterogeneous good (μ_1 and μ_2) are identical across countries we can appeal to symmetry and drop the country indicator (*)

[9] A firm must ship τ units for one unit to arrive.

for notational ease, this is implicitly given by:

$$\frac{1}{\varepsilon}\left(\frac{a_D}{\rho}\right)^{1-\varepsilon}\left[\frac{\mu_1}{\mathcal{P}_1^{1-\varepsilon}}+\frac{\gamma\mu_2}{\mathcal{P}_2^{1-\varepsilon}}\right]=f_D \tag{14}$$

Firms that are more productive than this cutoff will serve the domestic market, which includes both local consumers and tourists from overseas. Firms that are less productive will not enter. Note that this implies that the existence value $\Phi(a_D, a_D^*)$ is implicitly a function of the total mass of varieties across the planet.

Second, a firm will become an exporter if the profits from becoming an exporter are at least as big as the decrease in domestic profits, that results from $\beta \leq \gamma$, which means that the firm will potentially lose some of its appeal with foreign tourists.[10] This results in a cutoff a_X for which firms at least as productive as this will export and those that are less productive than this will serve at most the domestic market only. This is implicity given by:

$$\frac{1}{\varepsilon}\left(\frac{a_X}{\rho}\right)^{1-\varepsilon}\left[\frac{\big(\beta-\gamma+\tau^{1-\varepsilon}\alpha\big)\mu_2}{\mathcal{P}_2^{1-\varepsilon}}+\frac{\tau^{1-\varepsilon}\mu_1}{\mathcal{P}_1^{1-\varepsilon}}\right]=f_X. \tag{15}$$

Figure 1 uses these firm cutoffs to illustrate the firm indices/varieties that belong to each particular set of varieties. It can be seen that a Home consumer, while in Home, consumes all varieties produced in Home ($0 < a \leq a_D$) along with the varieties produced in Foreign and exported to Home ($0 < a^* \leq a_X^*$). Similarly, when an agent from Home travels to Foreign and consumes as a tourist, she consumes varieties that are produced in Home and exported to Foreign ($0 < a \leq a_X$), as well as all varieties produced in Foreign. However, we have allowed for the agent to weight varieties that are available to them at home ($0 < a^* \leq a_X^*$) differently than those varieties only available in Foreign ($a_X^* < a \leq a_D^*$).

[10]Note that if $\beta > \gamma$, there exists the possibility that a firm would choose to export at a loss because it is then a familiar variety to tourists from overseas (i.e. it switches from a γ to a β variety), raising profits from domestic sales to tourists.

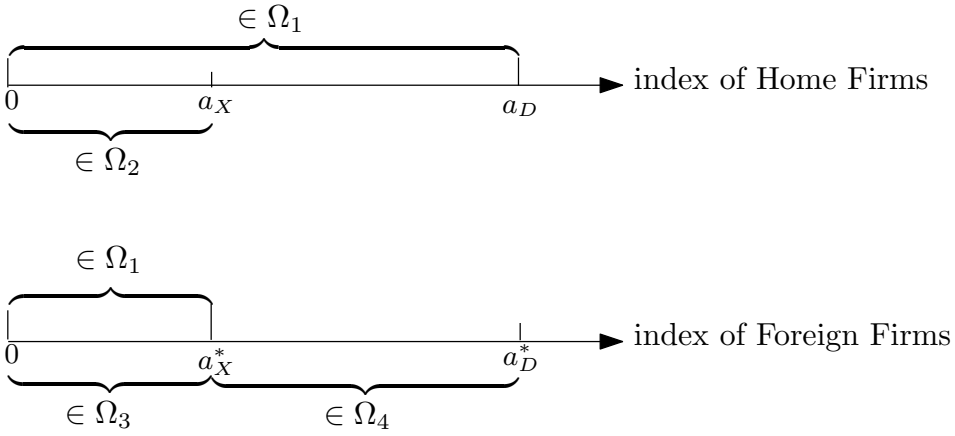


Figure 1: Home's Consumption in Equilibrium with Trade

Third, an entrepreneur will take a draw as long as the expectation of profits $\bar{\pi}$ is positive.[11] This results in a free entry condition given by:[12]

$$[V(a_D) - V(a_X)]B_D - [G(a_D) - G(a_X)]f_D + V(a_X)B_X - G(a_X)[f_X + f_D] = f_E \tag{16}$$

where

$$V(z) = \int_0^z a^{1-\varepsilon} dG(a).$$

Using the above two results, we can rewrite this as:

$$\frac{(\varepsilon - 1)[a_D^\sigma f_D + a_X^\sigma f_X]}{[\sigma - \varepsilon + 1]a_U^\sigma} = f_E \tag{17}$$

Thus, the equilibrium price indices are:

$$\mathcal{P}_1^{1-\varepsilon} = \frac{N_E}{\rho^{1-\varepsilon}} \left(\frac{\sigma}{(\sigma - \varepsilon + 1)a_U^\sigma} \right) \left[a_D^{\sigma-\varepsilon+1} + \tau^{1-\varepsilon} a_X^{\sigma-\varepsilon+1} \right] \tag{18}$$

$$\mathcal{P}_2^{1-\varepsilon} = \frac{N_E}{\rho^{1-\varepsilon}} \left(\frac{\sigma}{(\sigma - \varepsilon + 1)a_U^\sigma} \right) \left[\gamma a_D^{\sigma-\varepsilon+1} + (\beta + \alpha\tau^{1-\varepsilon} - \gamma) a_X^{\sigma-\varepsilon+1} \right] \tag{19}$$

where N_E denotes the number (mass) of entrants; i.e. those taking a draw but not necessarily

[11] For simplicity, we assume the "probability of death" in Melitz (2003) in each period is equal to one, making our model a one shot version of his.

[12] Detailed derivations are in Appendix A.

operating.[13] It will be useful to utilize the ratio of (18) and (19):

$$\frac{\mathcal{P}_1^{1-\varepsilon}}{\mathcal{P}_2^{1-\varepsilon}} = \frac{a_D^{\sigma-\varepsilon+1} + \tau^{1-\varepsilon} a_X^{\sigma-\varepsilon+1}}{\gamma a_D^{\sigma-\varepsilon+1} + (\beta + \alpha\tau^{1-\varepsilon} - \gamma) a_X^{\sigma-\varepsilon+1}}, \tag{20}$$

leaving us with four equations ((14), (15), (17), and (20)) and four unknowns (a_D, a_X, $\mathcal{P}_1$, and $\mathcal{P}_2$).

3 The Welfare Impact of Freer Trade

In order to determine the impact of falling trade costs on welfare, we must derive the comparative statics of the above system of equations. Totally differentiating (14), (15), (17), and (20), we derive the following set of comparative statics.[14]

$$\frac{\partial a_D}{\partial \tau} = \frac{a_D}{\varepsilon f_D}\left(\frac{1}{\Upsilon}\right)\left[\frac{\mu_1}{\mathcal{P}_1^{2(1-\varepsilon)}} + \frac{\alpha\gamma\mu_2}{\mathcal{P}_2^{2(1-\varepsilon)}}\right]\left(\frac{a_X a_D}{\rho^2}\right)^{1-\varepsilon}\frac{N_X\sigma}{(\sigma-\varepsilon+1)\tau^\varepsilon} > 0 \tag{21}$$

$$\frac{\partial a_X}{\partial \tau} = \frac{-a_D^\sigma}{a_X^{\sigma-1} f_X \varepsilon}\left(\frac{1}{\Upsilon}\right)\left[\frac{\mu_1}{\mathcal{P}_1^{2(1-\varepsilon)}} + \frac{\alpha\gamma\mu_2}{\mathcal{P}_2^{2(1-\varepsilon)}}\right]\left(\frac{a_X a_D}{\rho^2}\right)^{1-\varepsilon}\frac{N_X\sigma}{(\sigma-\varepsilon+1)\tau^\varepsilon} < 0 \tag{22}$$

$$\frac{\partial \mathcal{P}_1}{\partial \tau} = \frac{\mathcal{P}_1^\varepsilon\left(\Upsilon_3 - \alpha\Upsilon_2\right)}{\Upsilon}\left(\frac{a_X}{\rho}\right)^{1-\varepsilon}\frac{N_X\sigma}{(\sigma-\varepsilon+1)\tau^\varepsilon} > 0 \tag{23}$$

$$\frac{\partial \mathcal{P}_2}{\partial \tau} = \frac{\mathcal{P}_2^\varepsilon\left(\alpha\Upsilon_1 - \Upsilon_4\right)}{\Upsilon}\left(\frac{a_X}{\rho}\right)^{1-\varepsilon}\frac{N_X\sigma}{(\sigma-\varepsilon+1)\tau^\varepsilon} \tag{24}$$

where

$$\Upsilon = 1 + \frac{N_D N_X \mu_1 \mu_2}{(\varepsilon-1)(\sigma-\varepsilon+1) f_D f_X}\left[\left(\frac{a_D a_X}{\rho \mathcal{P}_1 \mathcal{P}_2}\right)^{1-\varepsilon}\frac{\sigma[\beta + (\alpha-\gamma)\tau^{1-\varepsilon} - \gamma]}{\varepsilon}\right]^2 > 0, \tag{25}$$

[13] The number (mass) of domestic and exported varieties are the respectively:

$$N_D = G(a_D)N_E = \left(\frac{a_D}{a_U}\right)^\sigma N_E$$
$$N_X = G(a_X)N_E = \left(\frac{a_X}{a_U}\right)^\sigma N_E$$

[14] Detailed derivations are in Appendix B.

and

$$\Upsilon_3 - \alpha\Upsilon_2 = \left(1 + N_D\left(\frac{(\gamma-\alpha)a_D^{1-\varepsilon}}{f_D} + \frac{(\gamma-\beta)a_X^{1-\varepsilon}}{f_X}\right)\frac{\sigma a_D^{1-\varepsilon}}{\varepsilon(\varepsilon-1)}\frac{\gamma\mu_2}{P_2^2}\right) > 0 \quad (26)$$

$$\alpha\Upsilon_1 - \Upsilon_4 = \left(\alpha - N_D\left(\frac{(\gamma-\alpha)a_D^{1-\varepsilon}}{f_D} + \frac{(\gamma-\beta)a_X^{1-\varepsilon}}{f_X}\right)\frac{\sigma a_D^{1-\varepsilon}}{\varepsilon(\varepsilon-1)}\frac{\mu_1}{P_1^2}\right). \quad (27)$$

These results are intuitive. As trade barriers fall, firms that were not interested in exporting begin doing so, increasing the exporter cutoff a_X. This competition drives some low productivity firms from the market, lowering a_D. The net effect of this is to increase the price index for domestic consumption $\mathcal{P}_1$. These results match those found elsewhere. In our model, we additionally have the impact of falling trade barriers on the overseas consumption (through tourism) price index $\mathcal{P}_2$. This change is ambiguous because although the falling trade barriers tend to increase $\mathcal{P}_2$, one must consider changes in the mix of varieties overseas. First, the increase in home exports drives out some foreign non-traded varieties. Since foreign non-trade varieties are less valued than home-made varieties, this tends to lower $\mathcal{P}_2$. In addition, this is reinforced by the increase in exported foreign-made varieties, moving some foreign varieties from the treasured Ω_4 set to the less valued Ω_3 set. This is illustrated in Figure 2; as trade barriers lower, the varieties in the sets Ω_2 and Ω_3 increase, while the varieties belonging to Ω_4 diminish as this set is eroded from both sides. Which effect dominates depends on parameter values and most obviously on the ranking of α, β, and γ. If we assume that $\alpha = \beta = \gamma$, this second effect disappears and, as with domestic consumption, $\mathcal{P}_2$ strictly rises as trade barriers fall.

Since a_D falls with the decline in trade barriers, the mass of varieties available across the planet will fall. Nevertheless, as has been highlighted elsewhere, this does not necessarily mean that the mass of varieties in a given location declines. This depends on whether or not new exporters offsets the decline in domestic varieties. Defining the total mass of varieties available for consumption in a particular country as $N_C = N_D + N_X$, the effect of trade

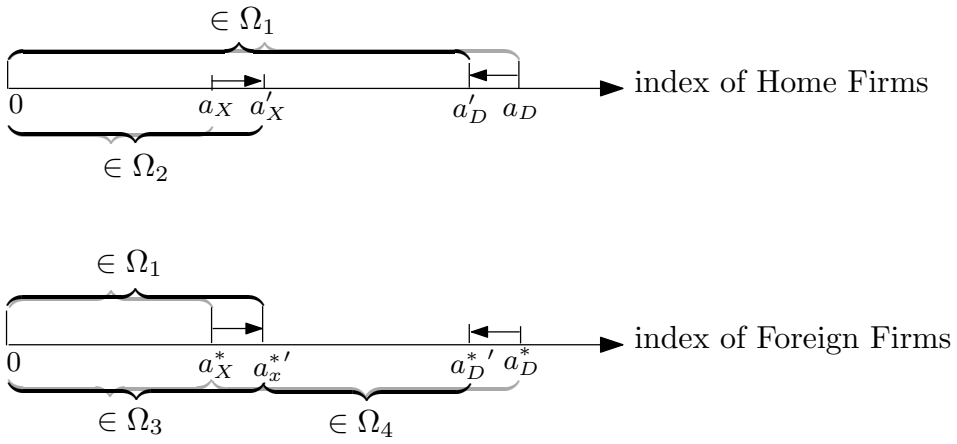


Figure 2: Home's Consumption with Lower Trade Barriers

barriers is

$$\begin{aligned}\frac{\partial N_C}{\partial \tau} &= \frac{\sigma a_D^{\sigma-1} N_E}{a_U^{\sigma}} \frac{\partial a_D}{\partial \tau} + \frac{\sigma a_X^{\sigma-1} N_E}{a_U^{\sigma}} \frac{\partial a_X}{\partial \tau} \\ &= \frac{\sigma N_E}{a_U^{\sigma}} \left[a_D^{\sigma-1} \frac{\partial a_D}{\partial \tau} - \frac{a_D^{\sigma-1} f_D}{f_X} \frac{\partial a_D}{\partial \tau} \right] \\ &= \frac{\sigma N_E a_D^{\sigma-1}}{a_U^{\sigma}} \left[\frac{f_X - f_D}{f_X} \right] \frac{\partial a_D}{\partial \tau} > 0\end{aligned}$$

and the mass of varieties falls along with trade barriers. Note that this does not imply lower welfare since this loss must be weighed against lower prices resulting from lower costs.

Recalling that since by free entry average profits are zero, the indirect utility function for the representative consumer is:

$$V_k = \mu_1 \ln(X_1) + \mu_2 \ln(X_2) + \Phi(a_D, a_D^*) + L_k - \mu_1 - \mu_2 \tag{28}$$

Differentiating (28) with respect to τ yields:

$$\frac{\partial V}{\partial \tau} = \frac{\mu_1}{X_1} \frac{\partial X_1}{\partial \tau} + \frac{\mu_2}{X_2} \frac{\partial X_2}{\partial \tau} + 2\Phi'(a_D, a_D^*) \frac{\partial a_D}{\partial \tau} \tag{29}$$

Through algebra shown in Appendix C, (29) becomes

$$\frac{\partial V}{\partial \tau} = -\frac{1}{\Upsilon}\left(\frac{a_X}{\rho}\right)^{1-\varepsilon}\frac{N_X\sigma}{(\sigma-\varepsilon+1)\tau^{\varepsilon}}\left[\frac{\mu_1}{\mathcal{P}_1^{1-\varepsilon}}+\frac{\alpha\mu_2}{\mathcal{P}_2^{1-\varepsilon}}+\left(\frac{\gamma\mathcal{P}_1^{1-\varepsilon}-\mathcal{P}_2^{1-\varepsilon}}{(\mathcal{P}_1\mathcal{P}_2)^{1-\varepsilon}}\right)\Psi\right]+2\Phi'(a_D,a_D^*)\frac{\partial a_D}{\partial \tau} \tag{30}$$

where

$$\Psi = \left(\frac{(\gamma-\alpha)a_D^{1-\varepsilon}}{f_D}+\frac{(\gamma-\beta)a_X^{1-\varepsilon}}{f_X}\right)\frac{\sigma a_D^{1-\varepsilon}N_D}{\varepsilon(\varepsilon-1)}\frac{\mu_1}{\mathcal{P}_1^{1-\varepsilon}}\frac{\mu_2}{\mathcal{P}_2^{1-\varepsilon}} > 0$$

and

$$\left(\frac{\gamma\mathcal{P}_1^{1-\varepsilon}-\mathcal{P}_2^{1-\varepsilon}}{(\mathcal{P}_1\mathcal{P}_2)^{1-\varepsilon}}\right) = -\frac{N_X a_X^{1-\varepsilon}}{(\mathcal{P}_1\mathcal{P}_2\rho)^{1-\varepsilon}}\left(\frac{\sigma[\beta+(\alpha-\gamma)\tau^{1-\varepsilon}-\gamma]}{(\sigma-\varepsilon+1)}\right) > 0.$$

Thus, the sum of the first two terms in (29) is positive. This means that, ignoring changes in the existence value, welfare is decreasing in trade costs. Thus, as trade becomes freer, welfare improves. This is because the losses associated with the decrease in highly valued non-tradable foreign varieties (both through exit and switching to exported varieties) are more than overcome by the gains associated with cheaper exports (be they foreign varieties in home or home varieties in foreign). The existence value effect, however, is unambiguously negative. Therefore, the net impact on welfare of a decline in trade costs is ambiguous. However, for it to be negative as the anti-globalization activists claim, it must be the case that the welfare effect of the decline in the existence value is greater than the gains from actual consumption. Thus, although theoretically possible, this would require some potentially extreme assumptions on parameter values. Finally, note that by symmetry, this also implies when ignoring existence value changes a decline in trade costs results in a welfare gain to the world.

4 Conclusion

The purpose of this paper has been to seriously consider the possibility that because typical trade models do not adequately consider the value consumers place on overseas varieties, an oversight that could overstate the benefits resulting from trade liberalization. We show

that, when building a model that favors the view of anti-globalization critics, there is some ground by which to argue that the presence of domestic varieties overseas lowers welfare. This obtains from two factors. First, it is possible that the fall in trade costs can lower the welfare from overseas consumption. However, any potential negative effect is more than offset by a rise in welfare from domestic consumption, resulting in an unambiguous consumption-driving welfare gain. Second, the existence value from simply knowing that varieties are in the world unambiguously falls. Nevertheless, for the net effect on welfare to be negative, it must be that this existence value dominates the welfare gains arising from the actual consumption of overseas varieties.

This should not be taken to mean that there are no losses from liberalization. First, since the existence value falls, one can argue that the welfare gains of lowered trade costs are overstated, even if the net effect is still a welfare increase. Second, this is but one avenue by which trade could impact welfare. There exists a plethora of models by which allowing freer trade can lead to lower equilibrium welfare.[15] Therefore, while it is not our contention that there is no scope for lower trade costs to lower equilibrium welfare, our results do suggest that it may be necessary to consider alternative channels in order to argue against lowering trade barriers.

[15]See, for example, Rauch and Trindade (2009) and Disdier, Head, and Mayer (2010) which both look at the effect of globalization on cultural diversity.

APPENDIX

A Free Entry

The free entry condition implies that expected profits $\bar{\pi}$ must be zero. Thus the free entry condition is

$$[V(a_D) - V(a_X)]B_D - [G(a_D) - G(a_X)]f_D + V(a_X)B_X - G(a_X)[f_X + f_D] = f_E \quad \text{(A-1)}$$

where

$$V(z) = \int_0^z a^{1-\varepsilon} dG(a)$$

In order to provide analytical solutions, we assume $G(a)$ follows the Pareto distribution. Thus:

$$G(a) = \left(\frac{a}{a_U}\right)^{\sigma}, \ 0 < a < a_U \quad \text{(A-2)}$$

$$V(a) = \frac{\sigma}{\sigma - \varepsilon + 1}\left(\frac{a}{a_U}\right)^{\sigma} a^{1-\varepsilon}, \ 0 < a < a_U \quad \text{(A-3)}$$

Plugging this into the free entry condition yields:

$$f_E = \frac{1}{\varepsilon a_U^{\sigma}}\left\{\frac{\sigma\rho^{\varepsilon-1}}{\sigma - \varepsilon + 1}\left(a_D^{1-\varepsilon+\sigma}\left[\frac{\mu_1}{\mathcal{P}_1^{1-\varepsilon}} + \frac{\gamma\mu_2}{\mathcal{P}_2^{1-\varepsilon}}\right] + a_X^{1-\varepsilon+\sigma}\left[\frac{\left(\beta - \gamma + \tau^{1-\varepsilon}\alpha\right)\mu_2}{\mathcal{P}_2^{1-\varepsilon}} + \frac{\tau^{1-\varepsilon}\mu_1}{\mathcal{P}_1^{1-\varepsilon}}\right]\right) - \varepsilon(a_D^{\sigma} f_D + a_X^{\sigma} f_X)\right\}$$

Using the equilibrium conditions (14) and (15), this can simplify to

$$f_E = \frac{(\varepsilon - 1)[a_D^{\sigma} f_D + a_X^{\sigma} f_X]}{[\sigma - \varepsilon + 1]a_U^{\sigma}} \quad \text{(A-4)}$$

B Comparative Statics

For algebraic ease define the following:

$$P_1 \equiv \mathcal{P}_1^{1-\varepsilon} = \frac{N_E}{\rho^{1-\varepsilon}}\left(\frac{\sigma}{(\sigma-\varepsilon+1)a_U^{\sigma}}\right)\left[a_D^{\sigma-\varepsilon+1}+\tau^{1-\varepsilon}a_X^{\sigma-\varepsilon+1}\right] \quad \text{(B-1)}$$

$$P_2 \equiv \mathcal{P}_2^{1-\varepsilon} = \frac{N_E}{\rho^{1-\varepsilon}}\left(\frac{\sigma}{(\sigma-\varepsilon+1)a_U^{\sigma}}\right)\left[\gamma a_D^{\sigma-\varepsilon+1}+(\beta+\alpha\tau^{1-\varepsilon}-\gamma)a_X^{\sigma-\varepsilon+1}\right] \quad \text{(B-2)}$$

The equilibrium conditions are

$$\frac{1}{\varepsilon}\left(\frac{a_D}{\rho}\right)^{1-\varepsilon}\left[\frac{\mu_1}{P_1}+\frac{\gamma\mu_2}{P_2}\right] = f_D \quad \text{(B-3)}$$

$$\frac{1}{\varepsilon}\left(\frac{a_X}{\rho}\right)^{1-\varepsilon}\left[\frac{\left(\beta-\gamma+\tau^{1-\varepsilon}\alpha\right)\mu_2}{P_2}+\frac{\tau^{1-\varepsilon}\mu_1}{P_1}\right] = f_X \quad \text{(B-4)}$$

$$\frac{(\varepsilon-1)[a_D^{\sigma}f_D+a_X^{\sigma}f_X]}{[\sigma-\varepsilon+1]a_U^{\sigma}} = f_E \quad \text{(B-5)}$$

Totally differentiating yields the following comparative statics:

$$\frac{\partial a_D}{\partial\tau} = -\frac{\rho^{\varepsilon-1}}{\varepsilon f_D(\varepsilon-1)a_D^{\varepsilon-2}}\left[\frac{\mu_1}{P_1^2}\frac{\partial P_1}{\partial\tau}+\frac{\gamma^{\varepsilon}\mu_2}{P_2^2}\frac{\partial P_2}{\partial\tau}\right]$$

$$\frac{\partial a_X}{\partial\tau} = \frac{\rho^{\varepsilon-1}}{\varepsilon f_X(\varepsilon-1)a_X^{\varepsilon-2}}\left\{\frac{(1-\varepsilon)}{\tau^{\varepsilon}}\left(\frac{\alpha\mu_2}{P_2}+\frac{\mu_1}{P_1}\right)-\frac{\left(\beta-\gamma+\tau^{1-\varepsilon}\alpha\right)\mu_2}{P_2^2}\frac{\partial P_2}{\partial\tau}-\frac{\tau^{1-\varepsilon}\mu_1}{P_1^2}\frac{\partial P_1}{\partial\tau}\right\}$$

$$\frac{\partial a_X}{\partial\tau} = \frac{-a_D^{\sigma-1}f_D}{a_X^{\sigma-1}f_X}\frac{\partial a_D}{\partial\tau}$$

$$\frac{\partial P_1}{\partial\tau} = \left(\frac{1}{\Upsilon_1+\Upsilon_3-1}\right)\left\{\frac{(P_1\Upsilon_3-P_2\Upsilon_2)}{N_E}\frac{\partial N_E}{\partial\tau}+(\Upsilon_3-\alpha\Upsilon_2)\left(\frac{a_X}{\rho}\right)^{1-\varepsilon}\frac{(1-\varepsilon)N_X\sigma}{(\sigma-\varepsilon+1)\tau^{\varepsilon}}\right\}$$

$$\frac{\partial P_2}{\partial\tau} = \left(\frac{1}{\Upsilon_1+\Upsilon_3-1}\right)\left\{\frac{P_2\Upsilon_1-P_1\Upsilon_4}{N_E}\frac{\partial N_E}{\partial\tau}+(\alpha\Upsilon_1-\Upsilon_4)\left(\frac{a_X}{\rho}\right)^{1-\varepsilon}\frac{(1-\varepsilon)N_X\sigma}{(\sigma-\varepsilon+1)\tau^{\varepsilon}}\right\}$$

where

$$\begin{aligned}
\Upsilon_1 &\equiv 1 + N_D \left(\frac{a_D^{1-\varepsilon}}{f_D} - \frac{(\tau a_X)^{1-\varepsilon}}{f_X} \right) \frac{\sigma a_D^{1-\varepsilon}}{\varepsilon(\varepsilon-1)} \frac{\mu_1}{P_1^2} \\
\Upsilon_2 &\equiv N_D \left(\frac{a_D^{1-\varepsilon}}{f_D} - \frac{(\tau a_X)^{1-\varepsilon}}{f_X} \right) \frac{\sigma a_D^{1-\varepsilon}}{\varepsilon(\varepsilon-1)} \frac{\gamma\mu_2}{P_2^2} \\
\Upsilon_3 &\equiv 1 + N_D \left(\frac{\gamma a_D^{1-\varepsilon}}{f_D} - \frac{(\beta + \alpha\tau^{1-\varepsilon} - \gamma) a_X^{1-\varepsilon}}{f_X} \right) \frac{\sigma a_D^{1-\varepsilon}}{\varepsilon(\varepsilon-1)} \frac{\gamma\mu_2}{P_2^2} \\
\Upsilon_4 &\equiv N_D \left(\frac{\gamma a_D^{1-\varepsilon}}{f_D} - \frac{(\beta + \alpha\tau^{1-\varepsilon} - \gamma) a_X^{1-\varepsilon}}{f_X} \right) \frac{\sigma a_D^{1-\varepsilon}}{\varepsilon(\varepsilon-1)} \frac{\mu_1}{P_1^2} \\
\Upsilon &\equiv \Upsilon_1 + \Upsilon_3 - 1
\end{aligned}$$

It follows that $\frac{\partial N_E}{\partial \tau} = 0$. Further, note that

$$\frac{\partial P}{\partial \tau} = (1-\varepsilon)\mathcal{P}^{-\varepsilon} \frac{\partial \mathcal{P}}{\partial \tau}.$$

Thus, the comparative statics can be written as

$$\frac{\partial a_D}{\partial \tau} = \frac{a_D}{\varepsilon f_D} \left(\frac{1}{\Upsilon} \right) \left[\frac{\mu_1}{\mathcal{P}_1^{2(1-\varepsilon)}} + \frac{\alpha\gamma\mu_2}{\mathcal{P}_2^{2(1-\varepsilon)}} \right] \left(\frac{a_X a_D}{\rho^2} \right)^{1-\varepsilon} \frac{N_X \sigma}{(\sigma - \varepsilon + 1)\tau^\varepsilon} > 0 \tag{B-6}$$

$$\frac{\partial a_X}{\partial \tau} = \frac{-a_D^\sigma}{a_X^{\sigma-1} f_X \varepsilon} \left(\frac{1}{\Upsilon} \right) \left[\frac{\mu_1}{\mathcal{P}_1^{2(1-\varepsilon)}} + \frac{\alpha\gamma\mu_2}{\mathcal{P}_2^{2(1-\varepsilon)}} \right] \left(\frac{a_X a_D}{\rho^2} \right)^{1-\varepsilon} \frac{N_X \sigma}{(\sigma - \varepsilon + 1)\tau^\varepsilon} < 0 \tag{B-7}$$

$$\frac{\partial \mathcal{P}_1}{\partial \tau} = \frac{\mathcal{P}_1^\varepsilon \big(\Upsilon_3 - \alpha \Upsilon_2 \big)}{\Upsilon} \left(\frac{a_X}{\rho} \right)^{1-\varepsilon} \frac{N_X \sigma}{(\sigma - \varepsilon + 1)\tau^\varepsilon} \tag{B-8}$$

$$\frac{\partial \mathcal{P}_2}{\partial \tau} = \frac{\mathcal{P}_2^\varepsilon \big(\alpha \Upsilon_1 - \Upsilon_4 \big)}{\Upsilon} \left(\frac{a_X}{\rho} \right)^{1-\varepsilon} \frac{N_X \sigma}{(\sigma - \varepsilon + 1)\tau^\varepsilon} \tag{B-9}$$

where

$$\Upsilon = 1 + \frac{N_D N_X \mu_1 \mu_2}{(\varepsilon - 1)(\sigma - \varepsilon + 1) f_D f_X} \left[\left(\frac{a_D a_X}{\rho \mathcal{P}_1 \mathcal{P}_2} \right)^{1-\varepsilon} \frac{\sigma[\beta + (\alpha - \gamma)\tau^{1-\varepsilon} - \gamma]}{\varepsilon} \right]^2 > 0.$$

This inequality follows because we assume $\sigma > \varepsilon - 1$, an assumption and result also made by Helpman et al. (2004), and $\alpha \leq \beta \leq \gamma$.

C Welfare

The indirect utility function for the representative consumer is

$$V_k = \mu_1 \ln(X_1) + \mu_2 \ln(X_2) + \Phi(a_D, a_D^*) + I - \mu_1 - \mu_2 \tag{C-1}$$

with $I = L_k + N_D\bar{\pi}_D + N_X\bar{\pi}_X$, where $\bar{\pi}$ is average profit, but average profit is zero. Differentiating with respect to τ yields:

$$\frac{\partial V}{\partial \tau} = \frac{\mu_1}{X_1}\frac{\partial X_1}{\partial \tau} + \frac{\mu_2}{X_2}\frac{\partial X_2}{\partial \tau} + 2\Phi'(a_D, a_D^*)\frac{\partial a_D}{\partial \tau} \tag{C-2}$$

Note that

$$\frac{1}{\hat{X}_1}\frac{\partial \hat{X}_1}{\partial \tau} = \frac{-1}{\mathcal{P}_1}\frac{\partial \mathcal{P}_1}{\partial \tau} \quad \text{and} \quad \frac{1}{\hat{X}_2}\frac{\partial \hat{X}_2}{\partial \tau} = \frac{-1}{\mathcal{P}_2}\frac{\partial \mathcal{P}_2}{\partial \tau}.$$

Thus (C-2) becomes

$$\frac{\partial V_k}{\partial \tau} = \frac{-\mu_1}{\mathcal{P}_1}\frac{\partial \mathcal{P}_1}{\partial \tau} - \frac{\mu_2}{\mathcal{P}_2}\frac{\partial \mathcal{P}_2}{\partial \tau} + 2\Phi'(a_D, a_D^*)\frac{\partial a_D}{\partial \tau} \tag{C-3}$$

Ignoring the existence value in order to write a cleaner equation, we find:

$$\begin{aligned}
\frac{\partial V_k}{\partial \tau} &= \frac{-\mu_1}{\mathcal{P}_1}\frac{\partial \mathcal{P}_1}{\partial \tau} - \frac{\mu_2}{\mathcal{P}_2}\frac{\partial P_2}{\partial \tau} \\
&= -\frac{1}{\Upsilon}\left(\frac{a_X}{\rho}\right)^{1-\varepsilon}\frac{N_X\sigma}{(\sigma-\varepsilon+1)\tau^\varepsilon}\left[\frac{\mu_1}{\mathcal{P}_1^{1-\varepsilon}}(\Upsilon_3 - \alpha\Upsilon_2) + \frac{\mu_2}{\mathcal{P}_2^{1-\varepsilon}}(\alpha\Upsilon_1 - \Upsilon_4)\right] \\
&= -\frac{1}{\Upsilon}\left(\frac{a_X}{\rho}\right)^{1-\varepsilon}\frac{N_X\sigma}{(\sigma-\varepsilon+1)\tau^\varepsilon}\left[\frac{\mu_1}{\mathcal{P}_1^{1-\varepsilon}} + \frac{\alpha\mu_2}{\mathcal{P}_2^{1-\varepsilon}} + \left(\frac{\gamma\mathcal{P}_1^{1-\varepsilon} - \mathcal{P}_2^{1-\varepsilon}}{(\mathcal{P}_1\mathcal{P}_2)^{1-\varepsilon}}\right)\Psi\right] < 0
\end{aligned}$$

where

$$\Psi = \left(\frac{(\gamma-\alpha)a_D^{1-\varepsilon}}{f_D} + \frac{(\gamma-\beta)a_X^{1-\varepsilon}}{f_X}\right)\frac{\sigma a_D^{1-\varepsilon}N_D}{\varepsilon(\varepsilon-1)}\frac{\mu_1}{P_1}\frac{\mu_2}{P_2} > 0, \text{ and}$$

$$\left(\frac{\gamma P_1 - P_2}{P_1P_2}\right) = -\frac{N_E a_X^{\sigma-\varepsilon+1}}{P_1P_2\rho^{1-\varepsilon}}\left(\frac{\sigma[\beta + (\alpha-\gamma)\tau^{1-\varepsilon} - \gamma]}{(\sigma-\varepsilon+1)a_U^\sigma}\right) > 0$$

From here, to arrive at (30), simply reintroduce the change in the existence value.

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