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Footloose capital and forced agglomeration: Do “build them here” policies work?

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Abstract

Concerned with persistent U.S. trade deficits, President Trump has taken concrete steps to restrict imports, while leaving the country open for foreign inward investment. His recent tweet “build them here!” suggests he aims to block imports while encouraging foreign inward investment and demanding domestic businesses to stay, so that more industrial goods are produced in the U.S. By using the footloose capital model and introducing the concept of forced agglomeration, this paper offers a theoretical exploration of “build them here” policies. In a two-country setting, it is shown that a country can implement such a policy by banning imports, which raises the returns to capital in that country, to lure in foreign firms and capital. Conditional on non-retaliation by the foreign country and non-opposition by home citizens who suffer (short-term) losses from the import ban, the country can successfully force agglomeration, and it will unambiguously gain (compared to the initial symmetric equilibrium), while the foreign country loses from higher costs-of-living. A stability condition for the forced agglomeration equilibrium is derived; forced agglomeration is more likely to sustain between countries with lower trade costs and in industries with lower elasticities of substitution.

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1. Introduction

United States President Donald Trump, like his predecessors, is concerned with the nation's trade deficit and has paid attention to the country's trade balances with its major trading partners, including China, Japan, and Europe. Beyond this, he has moved on to taking concrete steps to restrict imports from China. The Japanese authorities are keen to handle this situation carefully and reach an amicable settlement.

Regarding Europe, Trump tweeted on June 23, 2018 that "Based on the Tariffs and Trade Barriers long placed on the U.S. & its great companies and workers by the European Union, if these Tariffs and Barriers are not soon broken down and removed, we will be placing a 20% Tariff on all of their cars coming into the U.S. Build them here!"[1]

The President appreciates foreign businesses that come to the U.S. Five days after the "build them here" tweet, he applauded Foxconn, a Taiwanese electronics firm, that invested in Wisconsin and opened a new plant employing 13,000 workers.[2]

At the same time, the President keeps watch over domestic businesses to discourage them from defecting. He tweeted on September 8, 2018 that Apple Inc. should make products in the United States if it wants to avoid tariffs on Chinese imports. In another tweet, he expressed his dissatisfaction with the U.S. motorcycle manufacturer Harley-Davidson's plan to move some of its operations abroad.

What the President's "build them here" policy is aiming at appears clear: blocking imports (and immigration) while encouraging foreign inward investment and demanding domestic businesses to stay, so that more industrial goods are produced in the U.S. But it is unclear whether it is possible to make this happen. How can a country implement a "build them here" policy? What are the implications if such a policy is implemented? Would this policy choice make any sense?

I suggest that the footloose capital model is a useful framework to formally study the applicability and implications of "build them here" policies. The footloose capital model was originally proposed by Martin and Rogers (1995) to analyze the role of public infrastructure on the international location of industries. It is recognized by Baldwin et al. (2003) as one of the core new economic geography models that focus on the agglomeration of economic activities. It is particularly suitable for analyzing the policy under consideration here because it focuses on international capital movements instead of human migration.

Applying the footloose capital model, this paper shows that blocking imports by one (home) country increases the returns to capital in that country, but reduces it in the other (foreign) country. Higher returns to capital lure foreign firms and capital into the home country, thus industrial activities agglomerate there, and this can be termed forced agglomeration. Because international trade costs exist, agglomeration at home reduces the cost-of-living, thereby raising domestic welfare, at the cost of reducing foreign welfare. The "build them here" policy is, in this sense, a beggar-thy-neighbor policy.

The "build them here" policy, therefore, does make sense if one is only interested in domestic welfare. However, it is also shown that multiple conditions need to be met to realize the abovementioned gains by way of forced agglomeration. The first condition is that the foreign country does not retaliate to the import ban on industrial goods by the home country. Second, home country citizens are patient, ignorant, or unaware of the short-term losses from this import ban.

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[1] The President appears to be particularly interested in the auto industry. On January 6, 2017, he tweeted "NO WAY! Build plant in U.S. or pay big border tax," on Toyota's plans for a new plant in Mexico.

[2] "Remarks by President Trump at Foxconn Facility," Economy & Jobs, issued on June 28, 2018, https://www.whitehouse.gov/briefings-statements/remarks-president-trump-foxconn-facility/

Third, foreign firms and capital owners are only interested in economic gains so that they decide to relocate to the home country on the basis of expectations of higher profits and returns (and thus, they do not have, for example, nationalistic interests). Fourth, forced agglomeration must be sustainable. That is, there should be no incentive for any firms to relocate abroad once they are agglomerated in the home country.

Implementing a "build them here" policy appears unrealistic given these multiple hurdles that need to be cleared. It is not wholly unrealistic, however, recalling the experience of the voluntary export restraints (VERs) imposed on Japanese automobiles during the 1980s.

The remainder of the paper is structured as follows. In Section 2, the basic configuration of the footloose capital model is reviewed and the initial equilibrium of this study is presented. Section 3 explores the impact of blocking imports on returns to capital and economic welfare. Section 4 derives and analyzes the long-run equilibrium in which world capital agglomerates in one country. Finally, Section 5 concludes by summarizing the analysis and discussing its relevance.

2. International trade with footloose capital

2.1 Assumptions

I follow the setup of the model of international trade with capital flows, originally developed by Martin and Rogers (1995), now known as the footloose capital model. It essentially combines Helpman and Krugman's (1985) trade model with Krugman's (1991) core-periphery geography model. The difference between Krugman's model and the footloose capital model is that the former focuses on human migration but the latter focuses on capital as mobile factors that generate agglomeration.

There are two countries with the same economic structure, home and foreign. The population of each country are worker-consumers, each of whom supplies a unit of labor inelastically and consumes goods based on the utility function

$$U = \frac{1}{\alpha^{\alpha}(1-\alpha)^{1-\alpha}} D^{\alpha} Y^{1-\alpha} \quad (1 < \alpha < 1). \tag{1}$$

There are two types of goods. Y is the numeraire good and D is a composite good made up of a variety of differentiated products:

$$D = \left[\sum_{i=1}^{N} D_i^{1-1/\sigma} \right]^{\frac{1}{1-1/\sigma}}, \tag{2}$$

where $\sigma > 1$ and N is the total number of differentiated goods produced in the home and foreign countries. n varieties are produced at home, and the remainder, that is, $N - n = n^*$ varities are produced in the foreign country (hereafter, asterisks are used to denote foreign variables). A typical consumer at home chooses D_i and Y to maximize (1) subject to the budget constraint,

$$\sum_{i=1}^{n} p_i D_i + \sum_{j=n+1}^{N} \tau p_j D_j + Y = I, \tag{3}$$

where p is the price of the differentiated good and I is individual income. I is composed of wages (w) and returns to capital which are shared equally among the population. Hence, denoting per unit returns to capital as r, home labor and capital endowment as L and K,respectively, $I = w + rK/L$. Following Baldwin et al. (2003), the trade cost part is simplified compared to Martin and Rogers (1995): there are no domestic trade costs. We focus only on the international trade cost, $\tau > 1$. (3) implies that for home country citizens to consume D_j, which is produced in the foreign country, they must purchase τD_j units.

On the production side, the industrial sector produces the differentiated good. In this sector, a unit of capital is needed to set up a firm. This implies paying a fixed rent, r, to employ capital. β units of labor are also required to produce a unit of the industrial good. Then, denoting the output of an industrial firm as x_i, the cost function is $C(x_i) = r + \beta w x_i$. Production technology thus exhibits increasing returns to scale. Firms in the industrial sector are monopolistically competitive.

The numeraire good, Y, is produced under constant returns to scale technology. Specifically, a unit of labor is needed to produce a unit of Y. The firms producing the numeraire good are perfectly competitive. Y is internationally traded without incurring trade costs.

2.2 Behavior of firms and consumers

I briefly review the behaviors of firms and consumers derived from the abovementioned assumptions, which are now standard in the literature. In the numeraire good sector, perfect competition leads to marginal cost pricing. If the price of the numeraire good is equal to one, the wage also becomes one. Further, the zero trade cost associated with the numeraire good pins down the wages, that is, $w = 1$ holds internationally.

In the industrial sector, profit maximizing firms set the prices of their products so that marginal revenue equals marginal costs. Since $w = 1$ and technology is the same in both countries, the marginal cost of producing an industrial good is equal to β in the two countries. Therefore, the following mark-up behavior is derived:

$$p_i = p_j = \frac{\sigma\beta}{\sigma - 1} \equiv p. \tag{4}$$

Turning to consumers, solving their first order conditions, a representative home consumer's demand for home-produced industrial goods and foreign-produced industrial goods is

$$D_i = \alpha p^{-\sigma} G^{\sigma-1} I, \tag{5a}$$

and

$$D_j = \alpha (p\tau)^{-\sigma} G^{\sigma-1} \tau I, \tag{5b}$$

respectively. Similarly, in the foreign country,

$$D_j^* = \alpha p^{-\sigma} (G^*)^{\sigma-1} I^* \tag{6a}$$

and

$$D_i^* = \alpha (p\tau)^{-\sigma} (G^*)^{\sigma-1} \tau I^*. \tag{6b}$$

The *G*s in (5a) through (6b) are price indices, expressed as

$$G^{\sigma-1} = \left[n_i p^{1-\sigma} + n_j (p\tau)^{1-\sigma} \right]^{-1}, \tag{7a}$$

and

$$(G^*)^{\sigma-1} = \left[n_j p^{1-\sigma} + n_i (p\tau)^{1-\sigma} \right]^{-1}. \tag{7b}$$

Economic welfare is evaluated by indirect utility, denoted as ω:

$$\omega = I/G^{\alpha} \text{ and } \omega^* = I^*/(G^*)^{\alpha}. \tag{8}$$

2.3 Benchmark: symmetric equilibrium

Following the tradition of the new economic geography literature, and as per Baldwin et al. (2003), I assume symmetry with respect to the two countries. That is, the two countries are of equal size, and therefore each contains half of the world's labor force ($\bar{L}$) who own half of world capital ($\bar{K}$). Further, I assume for the benchmark case that the capital owned by each country operates within that country. That is, capital owned by the home (foreign) country operates in the home (foreign)

country. The symmetric equilibrium derived below will be the benchmark of the subsequent analysis.

Given $w = 1$, denoting the output of a typical firm as x_i, the profit of a typical industrial firm at home (π_i) is the value of sales minus fixed and variable costs, that is, using (4),

$$\pi_i = px_i - r - \beta x_i = \frac{\beta x_i}{\sigma - 1} - r \,. \tag{9}$$

Free entry drives π_i down to zero, by bidding up r. Therefore, using (9), equilibrium returns to capital are

$$r = \frac{\beta x_i}{\sigma - 1} \,. \tag{10}$$

Also, market equilibrium of the industrial good requires

$$x_i = (D_i + D_i^*)(\bar{L}/2). \tag{11}$$

Because of symmetry, $n = n^* = \bar{K}/2$ and $G = G^*$. Therefore, $I = I^* = 1 + r\bar{K}/\bar{L}$. Then using (5a), (6a), (7a), and (7b), (11) becomes

$$x_i = \frac{\alpha(\sigma - 1)(\bar{L} + r\bar{K})}{\sigma\beta\bar{K}} \,. \tag{12}$$

Substituting (12) into (10), the returns to capital in the symmetric equilibrium are

$$r = r^* = \frac{\alpha}{\sigma - \alpha}\left(\frac{\bar{L}}{\bar{K}}\right) \equiv r_0 \,. \tag{13}$$

r_0 is the benchmark level of the returns to capital. Economic welfare is equal in each country and can expressed as

$$\omega = \omega^* = \frac{[1 + [\sigma/(\sigma - \alpha)](\bar{K}/\bar{L})]}{\left\{[\sigma\beta/(\sigma - 1)][(\bar{K}/2)(1 + \tau^{1-\sigma})]^{\frac{1}{1-\sigma}}\right\}^{\alpha}} \equiv \omega_0 \,. \tag{14}$$

3. Short run impact of the home country's import blocking

Hereafter, I depart from Martin and Rogers (1995), and study the impact of trade restriction by the home country. The home country initiates its "build them here" policy by first blocking imports. If the foreign country does not retaliate, home firms face no such trade restrictions and can continue business in both countries, while enjoying the protected domestic market. The short-run impact equates to the effect of the home country's import blocking on the welfare of the two countries, before any international movement of capital takes place.

Here, the foreign industrial sector can no longer export to the home country; they can only do business within their country. This means, for a typical foreign industrial firm, losing demand from home D_j given by (5b). Hence, $x_j = D_j^*(\bar{L}/2)$. Substituting for p, G^*, and I^* using (4), (7b), and $I^* = 1 + r^*\bar{K}/\bar{L}$, respectively,

$$x_j = \frac{\alpha(\sigma - 1)(\bar{L} + r^*\bar{K})}{\sigma\beta(1 + \tau^{1-\sigma})\bar{K}} \,. \tag{15}$$

Using the zero profit condition, i.e., $r^* = \beta x_j/(\sigma - 1)$, we obtain the returns to capital owned by (and also operating in) the foreign country as

$$r^* = \frac{\alpha}{\sigma(1+\tau^{1-\sigma}) - \alpha}\left(\frac{\bar{L}}{\bar{K}}\right), \tag{16}$$

which is lower than r_0 derived in (13). Therefore, the home country's import blocking reduces the returns to capital in the foreign country. The lower the trade cost (that is, the closer τ is to 1), the larger the reduction in r^*. This is because, for the foreign firms, the lower the initial τ, the larger demand from the home country prior to the import ban.

On the other hand, in the home country, the price index G becomes higher because there are no competing imported varieties. That is, the second term inside the brackets in (7a) becomes zero, which gives

$$G^{\sigma-1} = (n_i p^{1-\sigma})^{-1} = \left[\left(\frac{\bar{K}}{2}\right)p^{1-\sigma}\right]^{-1}. \tag{17}$$

Substituting for G into (5a) using (17),

$$x_i = (D_i + D_i^*)\left(\frac{\bar{L}}{2}\right) = \left[\frac{\alpha(\sigma-1)}{\sigma\beta\bar{K}}\right]\left[\bar{L} + r\bar{K} + \left(\frac{\tau^{1-\sigma}}{1+\tau^{1-\sigma}}\right)(\bar{L} + r^*\bar{K})\right]. \tag{18}$$

Further, substituting (16) into (18),

$$x_i = (D_i + D_i^*)\left(\frac{\bar{L}}{2}\right) = \left[\frac{\alpha(\sigma-1)}{\sigma\beta}\right]\left\{r + \left(\frac{\bar{L}}{\bar{K}}\right)\left[1 + \frac{\sigma\tau^{1-\sigma}}{\sigma(1+\tau^{1-\sigma}) - \alpha}\right]\right\}. \tag{19}$$

Solving for r using (19) and the zero profit condition given by (10), we have

$$r = \left[1 + \frac{\sigma\tau^{1-\sigma}}{\sigma(1+\tau^{1-\sigma}) - \alpha}\right]\frac{\alpha}{\sigma-\alpha}\left(\frac{\bar{L}}{\bar{K}}\right) = \left[1 + \frac{\sigma\tau^{1-\sigma}}{\sigma\tau^{1-\sigma} + \sigma - \alpha}\right]r_0 > r_0\,. \tag{20}$$

Therefore, returns to capital increase in the home country after it blocks imports. In contrast to r^*, the lower the trade cost, the higher r becomes.

To summarize the impact of the home country´s import blocking,

$$r^* < r_0 < r\,. \tag{21}$$

Result (21) implies that the foreign country loses out because of reduced income due to the fall in their returns to capital. Foreign economic welfare clearly deteriorates after the home country closes its market to that country.

At home, although citizens now earn higher incomes due to increased returns to their capital, in real terms, it appears ambiguous whether they actually gain or lose from blocking imports. This is because, as home consumers no longer have access to imports from the foreign country, they have fewer varieties of industrial goods available compared to the benchmark situation. Home welfare after the import ban (ω_1) relative to its benchmark level can be expressed as

$$\frac{\omega_1}{\omega_0} = AB, \tag{22}$$

where

$$A \equiv \left[\frac{1 + Zr_0(\bar{K}/\bar{L})}{1 + r_0(\bar{K}/\bar{L})}\right],\ \ B \equiv \left[(1+\tau^{1-\sigma})^{\frac{\alpha}{1-\sigma}}\right],\ \ Z \equiv 1 + \frac{\sigma\tau^{1-\sigma}}{\sigma\tau^{1-\sigma} + \sigma - \alpha}\,.$$

A and B reflect the increase in nominal income and loss of industrial varieties, respectively. Inspecting (22), recalling $\sigma > 1$, $0 < \alpha < 1$, and $\tau > 1$, we have $Z > 1$, $1 < A < 2$ and $0 < B < 1/2$. Therefore, $AB < 1$, thus the home country does not gain either from blocking imports.

4. "Build them here" and footloose capital

4.1 Forced agglomeration

Now suppose that the foreign country does not retaliate and home country citizens are patient, ignorant or unaware about the losses from their ban on industrial imports, and therefore, the home country maintains its ban on imports, but welcomes foreign investment. The short-run result $r^* < r$ implies that, in response to the "build them here" call, foreign industrial firms can profitably relocate to the home country and still pay capital higher rents. Thus, in the long run, allowing for international movement of capital, all of the world's capital operates in the home country, as planned by that country; all industrial activities take place in the home country, which can be denoted as forced agglomeration.

The forced agglomeration equilibrium is solved as follows. Now that all industrial firms operate in the home country,

$$n = \overline{K} \quad \text{and} \quad n^* = 0\,. \tag{23}$$

These imply

$$G^{\sigma-1} = (np^{1-\sigma})^{-1}, \tag{24}$$

and

$$(G^*)^{\sigma-1} = [n(p\tau)^{1-\sigma}]^{-1}\,. \tag{25}$$

Because the relocation of capital from the foreign to the home country does not change the ownership of capital, the citizens of the foreign country still earn their returns to capital, regardless of the fact that operations are taking place in the home country. Therefore, individual incomes in both countries are the same. That is,

$$I = I^* = 1 + r\left(\frac{\overline{K}}{\overline{L}}\right). \tag{26}$$

Substituting (24) through (26) into (5a) and (6b), we have the equilibrium per unit of firm output:

$$x_i = (D_i + D_i^*)\left(\frac{\overline{L}}{2}\right) = \frac{\alpha(\sigma-1)}{\sigma\beta}\left(r + \frac{\overline{L}}{\overline{K}}\right). \tag{27}$$

Using the zero profit condition given by (10), the returns to capital in the forced agglomeration equilibrium are

$$r = \frac{\alpha}{\sigma - \alpha}\left(\frac{\overline{L}}{\overline{K}}\right), \tag{28}$$

which is equal to r_0.

4.2 Stability of the forced agglomeration equilibrium

Is this forced agglomeration in the home country sustainable? This can be analyzed by investigating whether incentives exist for industrial firms to "defect" from home and move to the foreign country. For any firm, the hypothetical output, $\widetilde{x_j}$, if it undertook this move can be calculated,

$$\widetilde{x_J} = \widetilde{D_J}\frac{\bar{L}}{2} = \alpha p^{-\sigma}(G^*)^{\sigma-1}I^*\left(\frac{\bar{L}}{2}\right)\tau^{\sigma-1}\,. \tag{29}$$

Note here that, because of the home country's import ban, relocating to the foreign country means that the firms which undertook this move can only sell in the foreign country, they cannot export back to home; thus, undertaking this move, means relinquishing the home market. Substituting for p, G^*, and I^* in (29), using (4), (25), and (26), respectively, we have

$$\widetilde{x_J} = \frac{\alpha(\sigma-1)}{2\sigma\beta}\left(\frac{\bar{L}}{\bar{K}} + r\right)\tau^{\sigma-1}\,. \tag{30}$$

Using (30) and the returns to capital in the forced agglomeration equilibrium given by (28), the corresponding hypothetical profit ($\widetilde{\pi_J}$) is

$$\widetilde{\pi_J} = p\widetilde{x_J} - r - \widetilde{x_J} = \frac{\bar{L}}{\bar{K}}\left[\frac{\alpha(1-2\tau^{1-\sigma})}{2\tau^{1-\sigma}(\sigma-\alpha)}\right].$$

Recalling that $\sigma > 1$, $0 < \alpha < 1$ and $\tau > 1$, $\widetilde{\pi_J} > 0$ if

$$\tau^{\sigma-1} > 2\,. \tag{31}$$

That is, if condition (31) is satisfied, a typical industrial firm finds that it can profitably relocate to the foreign country while paying higher rents to capital.

To summarize, if $\tau^{\sigma-1} \leq 2$ then there is no incentive for industrial firms to relocate to the foreign country and the forced agglomeration equilibrium is stable; firms and world capital remain at home. Otherwise if $\tau^{\sigma-1} > 2$, the forced agglomeration equilibrium is unstable; there is an incentive for firms and capital to move to the foreign country. These differential outcomes are illustrated in Figure 1.

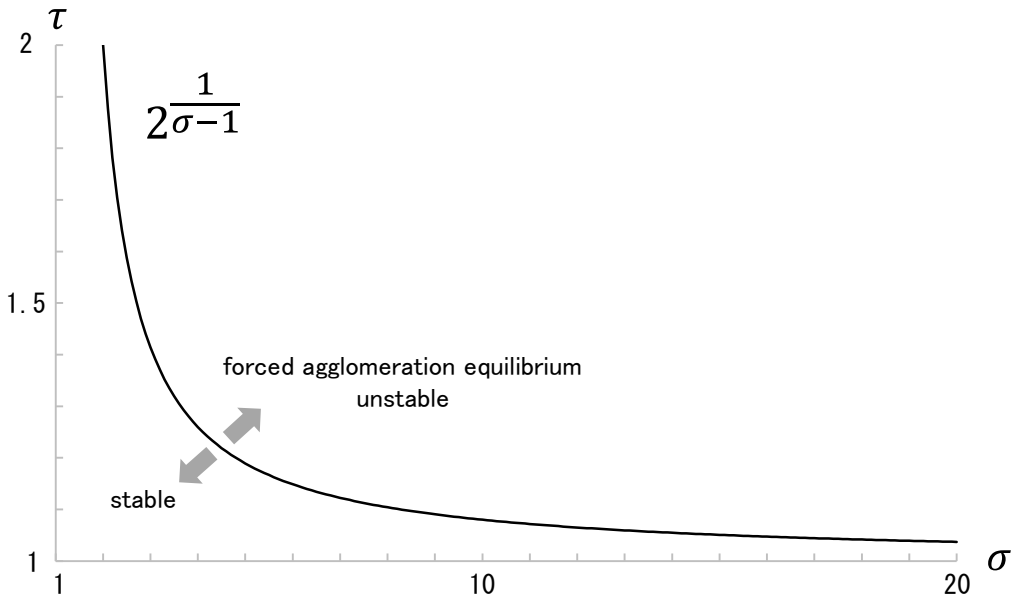

Figure 1: Stability/instability of the forced agglomeration equilibrium

As condition (31) and Figure 1 indicate, the lower (higher) τ and/or the lower (higher) σ, the higher (lower) the likelihood of the forced agglomeration being sustainable. The economic intuition is as follows. Ceteris paribus, the lower τ, the lower price level of the industrial good in the foreign country. A lower price level implies less profit opportunities in the foreign country, which leads to weaker incentives to relocate to that country. Lower σ implies that consumers are less sensitive to prices, which further weakens the incentive to relocate to the foreign country.

A numerical exercise may help to assess the real-world feasibility of the stable forced agglomeration. I use estimates of σ and τ from Broda and Weinstein (2006) and Novy (2006), respectively. Broda and Weinstein (2006) offer estimates of σ for two periods, from 1972 to 1988, and from 1990 to 2001. The levels of σ differ by industry. In the former period, σ at the SITC-5digit level ranges from 2.02 to 9.66, with a median of 3.00. In the latter period, σ ranges from 1.71 to 9.85 with a median of 3.84. Novy (2006) puts forward tariff equivalent average trade costs of U.S. bilateral trade with various trading partners for 1960 and 2002. It is duly noted that these years do not exactly match those in Broda and Weinstein (2006). The estimated trade costs range from 40.8% to 103.3% in 1960, and from 24.8% to 171.0% in 2002. Then, τ ranges from 1.41 to 2.03 in 1960, and from 1.25 to 2.71 in 2002.

Using these data, it can be confirmed that there are some industry-country combinations of σ and τ that satisfy $\tau^{\sigma-1} \leq 2$, meaning that stable forced agglomerations can be realized within the theoretical framework developed in this paper. For example, in the case of cars (SITC78100), using the 1972-1988 estimated σ of 2.29, four countries, that is, Canada, Japan, Germany, and France, satisfy $\tau^{\sigma-1} \leq 2$ when the 1960 estimate of τ is applied. Because of overall reductions in trade costs, more countries satisfy this condition when the 2002 estimate of τ is applied. Forced agglomeration equilibrium becomes less likely, however, with the 1990-2001 estimate of σ for cars, because it is higher. Plotting these data on Figure 1 yields graphical representations which are included as supplementary material.

Suppose $\tau^{\sigma-1} \leq 2$ is met and the forced agglomeration sustains. How does this impact on the welfare of citizens in the two countries? Those in the foreign country unambiguously lose even though they earn the same income as they did in the benchmark equilibrium. This is because in the forced agglomeration equilibrium, they must buy all industrial goods from home paying the trade costs; their cost-of-living has increased.

In contrast, citizens of the home country unambiguously gain (compared to the benchmark) because, for them, the forced agglomeration implies that all varieties of industrial good are produced domestically, and, unlike those in the foreign country, they pay no trade costs, while earning the same income as they did in the benchmark equilibrium. Formally, denoting home welfare under forced agglomeration as ω_2, and comparing it with that of the benchmark, using (14), (24), and (26),

$$\frac{\omega_2}{\omega_0} = \left(\frac{1+\tau^{1-\sigma}}{2}\right)^{\alpha/(1-\sigma)} > 1 .$$

5. Summary and discussion

5.1 Summary

Applying Martin and Rogers' (1995) framework of international trade and capital mobility, this paper theoretically explored the potential of a country's "build them here" policy, by way of forced agglomeration. It showed that a country gains at the expense of others if it realizes sustainable forced agglomeration.

There are, however, multiple conditions that need to be met for this to be accomplished. That is, in addition to the assumptions of the model itself, the following must be satisfied: 1) the foreign country does not retaliate to its exports being blocked, 2) citizens of the home country are patient (otherwise ignorant or unaware) vis-à-vis short-run losses due to import restriction, 3) foreign firms respond to the "build them here" call and world capital agglomerates in the home country, and 4) taste and trade cost parameters satisfy $\tau^{\sigma-1} \leq 2$ so that the forced agglomeration is sustainable.

5.2 Discussion

Given the multiple conditions that need to be satisfied, it may appear unrealistic that "build them here" policies would ever work in practice. For example, at present, there is no sign of Chinese firms leaving China to agglomerate in the U.S. in response to the additional tariffs and trade-restrictive measures imposed by the Trump administration. However, although it does not serve as evidence of forced agglomeration, there is at least one real-world case relevant to the present analysis. That is, the voluntary export restraints (VERs) imposed on Japanese automobiles from 1981 to 1994, and the corresponding relocation of the Japanese automobile industry to the U.S. Although the U.S. did not completely ban car imports from Japan, quotas were set on the amount of cars permitted to be exported to the U.S. Japan did not retaliate to the trade restriction by the U.S. because, politically, Japan's relationship with the U.S. is unique for historical reasons. Correspondingly, during the 1980s, all Japanese car manufacturers built transplants in the U.S. to carry on business in the U.S. Most of them, including big players (Toyota, Honda, and NISSAN) are still in the U.S.

VERs have been explored extensively by a number of researchers including Berry et al. (1999), Dinopoulos and Kreinin (1988), Feenstra (1992), and Goldberg (1994). These studies analyzed impacts of VERs from static perspectives and did not account for the fact that Japanese auto manufacturers later started production in the U.S. Therefore, unsurprisingly, they found net welfare losses to the U.S. For example, Berry et al. (1999) estimated that the VER raised car prices and increased the profits of U.S. manufacturers by about 10 billion dollars, but the net welfare loss to the U.S. was close to 3 billion dollars, because U.S. consumers were hurt.

The approach herein, based on the footloose capital model, suggests a need for re-examination of the VER in the longer term, from the perspective of international capital mobility and agglomeration. Although the U.S. incurred short-run losses, it could be the case that the relocation of Japanese automobile factories to the U.S. increased the varieties of locally produced automobiles available to U.S. consumers, the gains from which could have outweighed the initial losses, and thus Japan would have lost from the VER.

References

Baldwin, Richard E., Rikard Forslid, Philippe Martin, Gianmarco I. P. Ottaviano, and Frederic Robert-Nicoud (2003) *Economic Geography and Public Policy*, Princeton, MA: Princeton University Press.

Berry, Steven, James Levinson, and Ariel Pakes (1999) "Voluntary export restraints on automobiles: evaluating a trade policy" *American Economic Review* **89**, 400-430.

Broda, Christian, and David E. Weinstein (2006) "Globalization and the Gains From Variety" *Quarterly Journal of Economics* **121**, 541-585.

Dixit, Avinash K., and Joseph E. Stiglitz (1977) "Monopolistic competition and optimum product diversity" *American Economic Review* **67**, 297-308.

Helpman, Elhanan, and Paul Krugman (1985) *Market structure and foreign trade*, Cambridge, MA: MIT Press.

Krugman, Paul (1991) "Increasing returns and economic geography" *Journal of Political Economy* **99**, 483-499.

Martin, Philippe, and Carol Ann Rogers (1995) "Industrial location and public infrastructure" *Journal of International Economics* **39**, 335-351.

Novy, Dennis (2006) "Is the Iceberg Melting Less Quickly? International Trade Costs after World War II" *Warwick Economic Research Papers* number 764.

Dinopoulos, Elias, and Mordechai Kreinin (1988) "Effects of the U.S.-Japan auto VER on European Prices and U.S. welfare" *Review of Economics and Statistics* **70**, 484-491.

Feenstra, Robert C. 1992. "How costly is protectionism?" *Journal of Economic Perspectives* **6**, 159-178.

Goldberg, Pinelopi. 1994 "Trade policies in the U.S. automobile industry" *Japan and the World Economy* **6**, 891-952.