The Economic Value of Country Image

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November 16, 2018

Acknowledgements: I am deeply grateful for Professor Luo Changyuan at Fudan University and Professor Thomas Chaney for useful pieces of advice and help. This paper is my contribution to the whole project based in Fudan University.

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Abstract

This paper provides a simple theoretical model to consider country image or more generally, consumer taste in the "New Trade Literature". I isolate the extensive margin effect of country image from the intensive margin based on the heterogeneous firm model by assuming that the demand is in the CES form and the pricing rule of the firm is not affected by the demand shifter. I estimate this structural model by using panel data on country image and unit value. The country image effect is found to be statistically significant for the Rauch-reference and heterogeneous goods but not important for the homogeneous goods. The country with lower country image benefits more from the improvement of that.

1 Introduction

In this paper, I show the effect of country image or country-of-origin on average exporting price. Resent empirical research using firm-product-destination panel data has identified the role of consumer taste in the firm exporting performance. Some of these literature have further shown that firms' export volume is highly related to country image: relatively more positive country image is more likely to enable firms in that country to export more. However, few literature investigate how the country image affects the average exporting price and the mechanism behind this effect.

Governments play the main role in constructing and improving the country image in reality. They advertise in the public area in other countries, make the document of natural landscapes and historic interests and publish them on the Internet. Why governments are willing to spend part of their budget on the promotion of their country image? To my best knowledge, the theoretical foundation for such government behaviour is limited. Particularly, we focus on the government interest to promote the average exporting price via improving the country image.

My paper is related to the emerging literature which have identified the important role that international relations, political events and public opinion play in the bilateral trade. Chavis and Leslie (2009) and Ashenfelter et al. (2007) both investigate the impact of the boycott of French wine in the US during the Iraq War on the sale of wine, but give completely different empirical results. Davis and Meunier (2011) also shows because of the large sunk cost incurred before trade, firms tend to avoid entangling the political relations and economic interests. Disdier and Mayer (2007) studies the relationship between bilateral trade and opinions. They find the bilateral opinions have a large effect on imports and explain this effect as reflecting a positive impact of "bilateral affinity". Based on these studies, one can naturally conclude that it is basically country image which is the shaped by the previous three elements that affects the bilateral trade.

There has been a long debate in the business literature concerned about whether country-of-origin has non-trivial impact on the bilateral trade. As shown in Zeithaml (1988, pp. 3), he described that *"perceived quality is different from objective or actual quality and a higher level abstraction rather than a specific attribute of a product."* Recent marketing studies show that consumers' cognitive, affective and normative opinions related to the country-of-origin can change their preferences. (Wilcox, 2005; Pharr, 2005; Jaffe and Nebenzahl, 2006; Phau and Chao, 2008; Koschate-Fischer et al., 2012). These findings, nevertheless, lack a strict theoretical foundation. The serious investigation on the role of country image began late. Chang and Fujii (2013) use the data from UN Comtrade and country image data from BBC and show that the one percent increase in positive country image will increase the export volume by over one percent. Roberts, Lee and Vandenbussche (2018) constructs the basic model which generates the pricing rule of one firm without any effect from consumer taste. So they can separate price and quantity in trade volume. Their result shows that about 50% variation in export revenue can be explained by consumer taste, which points out the importance of taste in international trade. However, they ignore the extensive margin of the country image impact on trade prices. Actually, the improvement of the country image can give the less productive firms more chance to export. Other papers show the theoretical mechanism. Dasgupta and Mondria (2013) assumes the rationally inattentive importers in the multi-country

Ricardian trade model, which means that the quality of continuing exporters is known by only a fraction of consumers. Chisik (2003) and Cage and Rouzet (2015) both treat the country image as reputation and then deal with the interplay of quality of goods and the reputation of the exporting country. These literature basically use the country reputation as the indicator of quality from exporting firms in the consumer choices.

In my paper, I use the trade data from the "trade unit value" data base which provides the cross-country exporting prices (CIF) over the period 2006-2013. The country image data is obtained from BBC annual survey based on Global Scan and Maryland University. In 2013, this survey has 26,299 respondents from 25 countries. My result shows that improvement in country image increases the average exporting price. In particular, the country image has a statistically significant effect on the price of heterogeneous goods but has a trivial effect on the price of the homogeneous goods.

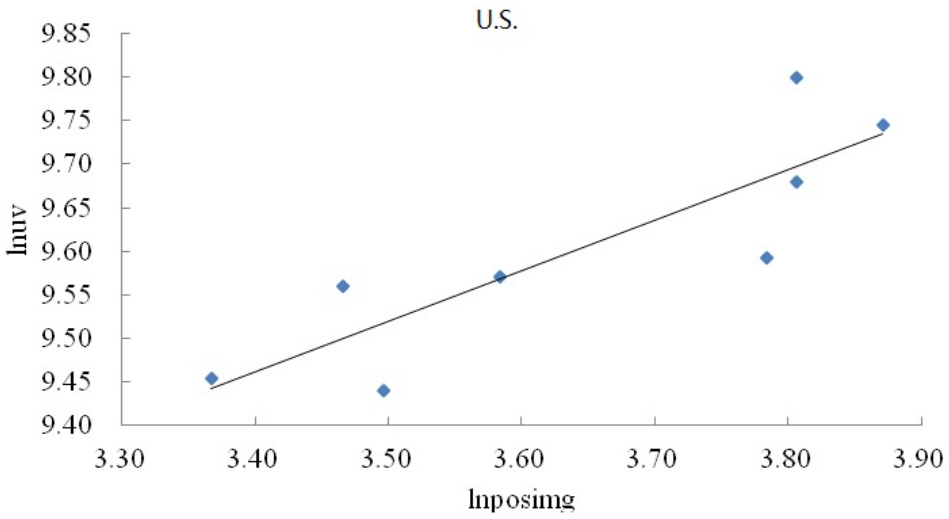
Based on the empirical findings, I propose a theory that points out the mechanism by which the more positive country image enables less productive firms stays in export and these free riders charge a constant markup times their higher marginal costs which leads to the higher average aggregate price. On the other hand, from the general equilibrium analysis, the positive shock in the country image of one country could crowd out the firms with low productivity in other countries and decrease the price level of other countries.

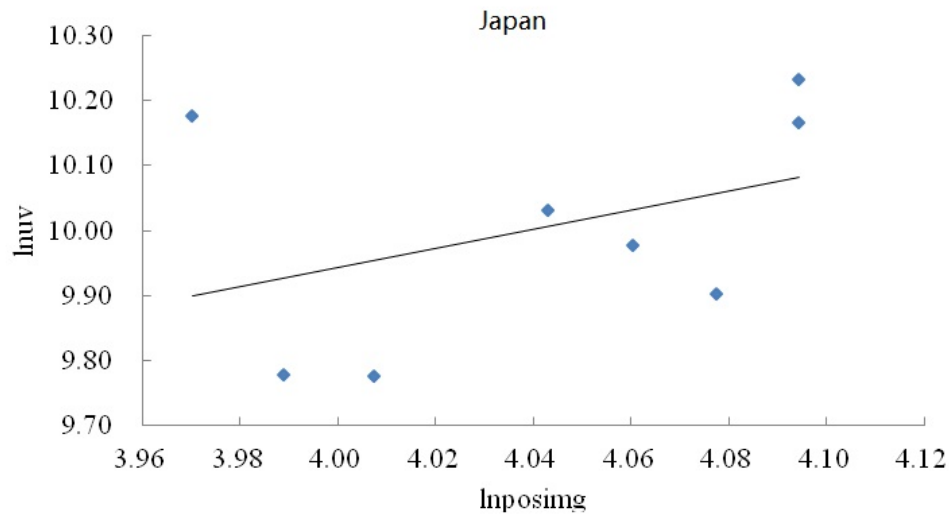
One last, but important, implication in my paper is that the effect of the positive consumer taste shock towards country-of-origin is more significant when the original country image is less positive. This gives the policy implication that the country with lower evaluation for the country image among consumers should make more effort to improve the country image.

2 Empirial Motivation

The country image has the positive relationship with the unit value of the export in the four countries I show here. Figure 1 illustrates the relationship between unit value and country image, which is positive no matter how developed the country is. In the fourth

section, I will introduce the data sources and how I calculate the country image from the survey. Also, I provide the more detailed specification based on the simple theory and panel data estimation.





3 Theoretical framework

3.1 Demand

we assume consumers in each country have Cobb-Douglas utility function with different preferences for country-of-origin over differentiated good sectors. Thus, they spend fixed share of their income on each good sector. By this simplification, we only need model

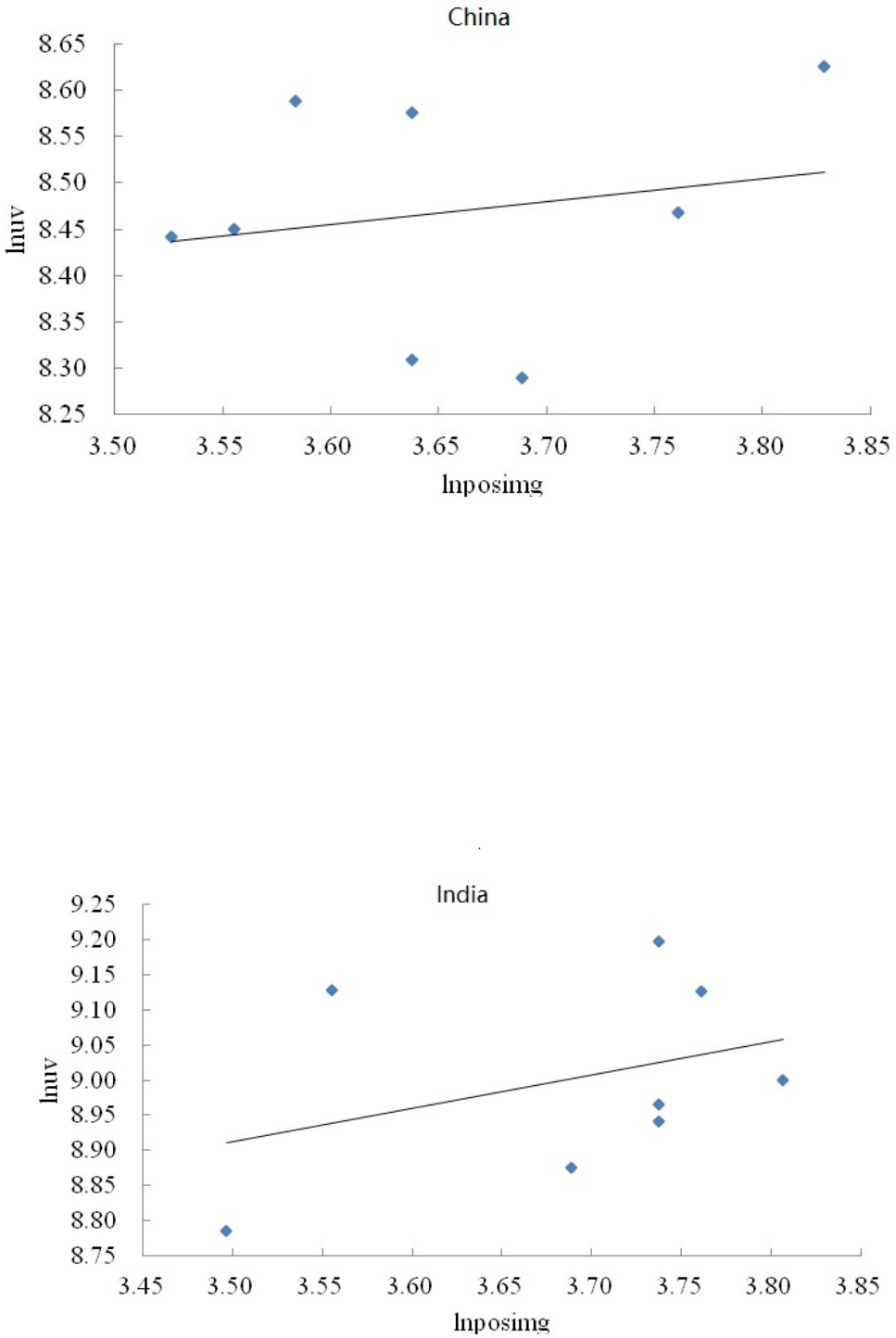


Figure 1: Country Image and Unit Value: US, Japan, China and India

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on one good sector. Demand in country k is generated by a representative consumer with an aggregate utility function. We assume constant elasticity of substitution over a continuum of differentiated varieties in one good sector, denoted byσ and $\sigma > 1$. Country k imports varieties in this good sector from other N countries. Then, we categorize this set of varieties according to the country-of-origin, denoted by $H^k \in \{H_i^k, i = 1, 2, \ldots, N\}$, to investigate the effect of country image on the equilibrium price.

Then, the consumer in country k has preferences over consumption given by teh utility function:

$$U^k = [\sum_{i=1}^{N} \int_{h \in H_i^k} (\tau^{ik} q_h^{ik})^\rho dh]^{1/\rho} \tag{1}$$

Where q_h^k is the consumption of variety h in country k. The country image of country i in country k is denoted by τ^{ik} and $\tau^{ik} \in R^{++}$. $\tau^{ik} < 1$ means a mainly negative country image of country i in country k, while $\tau^{ik} > 1$ means a mainly positive country image and $\tau^{ik} = 1$ means neutrality. And $\rho = ((\sigma - 1))/\sigma$.

The consumer in country k has the budget E spent on the varieties in this good sector. As was shown in Dixit and Stiglitz (1977), consumer behavior can be modeled by using aggregate price,

$$P^{ik} = (\int_{h \in H_i^k} {p_h^{ik}}^{1-\sigma})^{\frac{1}{1-\sigma}} \tag{2}$$

Where p_h^{ik} is the price of the variety h in country k and P^{ik} is the aggregation of the prices of the varieties imported from country i. Then, the expenditure spent on the variety h produced in country i is:

$$E_h^i = \frac{(\frac{p_h^{ik}}{\tau^{ik}})^{1-\sigma}}{\sum_{j=1}^{N} (\frac{P^{jk}}{\tau^{jk}})^{1-\sigma}} E^i \tag{3}$$

We denote $P^k = [\sum_{j=1}^{N} (\frac{P^{jk}}{\tau^{jk}})^{1-\sigma}]^{1/(1-\sigma)}$. We assume delivering per unit of variety h from country i to country k requires producing d_{ik} units of variety h. This "iceberg" cost well denotes the geographic barriers and tariff between both countries. p_h^i is the price set

by the firm and p_h^{ik} is the price the consumer faces in country k. Thus,

$$p_h^{ik} = p_h^i d_{ik} \tag{4}$$

3.2 Production

Firm uses only one factor of production, which is labor. Labor is immobile across countries. The labor market is competitive and w_i is the common wage rate in country i. We assume the production follows the increasing return to scale which is same as Krugman (1979):

$$L_h^i = f + \frac{q_h^{ik} d_{ik}}{\varphi} \tag{5}$$

Where L_h^i is the labor used for producing certain quantity, q_h^{ik}, of variety h in country i. f is the operation fixed cost of production and all firms have same fixed cost. The productivity of the firm is indexed by φ. The higher productivity means lower labor needed, and then lower marginal cost to produce the certain quantity of variety h.

The firm with productivity ϕ and operation fixed cost f solves the maximization problem,

$$\max_{q_h^{ik}} \pi_h^{ik} = p_h^i q_h^{ik} d_{ik} - w_i L_h^i \tag{6}$$

Following Melitz (2003), firms are identical before entry. After paying the sunk cost, firms draw the initial productivity parameter ϕ from a common distribution $g(\varphi)$. $g(\varphi)$ is continuous and defined on R^{++}. It has the continuous cumulative distribution $G(\varphi)$. We also assume that all the countries have the same productivity distribution $g(\varphi)$.

We find that firms with same productivity sell varieties at the same price, thus get same revenue and profit. We define the function $p^i(\varphi)$. In one country with the common wage rate, all the firms that share the same productivity set an identical price according to this function. Then, combining the demand curve represented by equation (3) and the

firm problem, this yields the pricing rule, the equilibrium revenue and profit:

$$p^i(\varphi) = \frac{w_i}{\rho\varphi} \tag{7}$$

$$\pi^{ik}(\varphi) = \frac{E}{\sigma}(P^k \frac{\rho\varphi\tau_{ik}}{w_i d_{ik}})^{\sigma-1} - w_i f \tag{8}$$

The firm with higher productivity can produce with a lower marginal cost. Thus, the price which is the constant mark-up times marginal cost is lower. However, since the elasticity of substitution is greater than one, the increase of the sale exceeds the fall of the price. This leads to a higher revenue and profit. However, the influence of the country image on profit is not that straight-forward. It depends on not only the direct effect of the country image, but also the indirect effect caused by the change of the aggregate price level in country k.

3.3 Entry and zero cutoff profit condition

Following Chaney (2008), I assume there is no free entry and there is no cost when the firm remains inactive in the market. All the existing firms that have already entered market are not permitted to participate in the market again once they exit. Therefore, those firms with the productivity that is lower than the threshold level determined by the operation fixed cost have the incentive to remain inactive in the market, but not exit. Because the shock on the consumer taste or the income could make these inactive firms gain positive profit. This is like the entry of less productive new entrants, so thereafter we call entry the change of being inactive to being active.

From equation (8), the profit is the increasing function of the productivity. Then, there must be a threshold that the profit will be positive above this value. However, if firm unluckily get the productivity lower than this threshold. It will not produce and remain inactive. Thus, we have the zero cutoff profit condition to get the threshold productivity for firms which export goods from country i to country k within one sector. We define the

country image vector: $\boldsymbol{\tau^k} = \{\tau^{ik}, i = 1, 2, \ldots, N\}$. Let equation (8) equals zero and define the function $\varphi^\star : R^{++} \to R^+$.

$$\varphi^\star_{ik} = \varphi^\star_i(\boldsymbol{\tau^k}) = \frac{w_i d_{ik}}{\rho}(\frac{w_i \sigma f}{E})^{1/(\sigma-1)}[P^{ik\,1-\sigma} + \tau^{ik\,1-\sigma} \sum_{j=1, j\neq i}^{N} (\frac{\tau^{jk}}{P^{jk}})^{\sigma-1}]^{\frac{1}{\sigma-1}} \tag{9}$$

Higher country image leads to higher demand for the varieties produced in country i, and then increases profit earned by firms. Therefore, firms with lower productivity that cannot afford the operation fixed cost before, then could survive. Less productive firms lead to higher average marginal cost and thus, the aggregate price level in country i increases. However, the aggregate price level in country j is also endogenous. According to equation (3), consumers in country k spend less on the varieties imported from other countries when the country image of country i in country k increases. Therefore, the aggregate price level in country j falls. Without further investigation, we cannot know either the direct effect of increase of country image plus the indirect effect caused by increase in the aggregate price level in country i or the indirect effect caused by decrease in aggregate price level in other countries is dominant.

3.4 Aggregation

Since firms which draw the productivity that below the minimum productivity threshold are not active, the equilibrium productivity distribution must be the initial distribution conditional on successful entry. We denote the equilibrium distribution as $\mu_i(\phi)$.

$$\mu_i(\varphi) = \begin{cases} \frac{g(\varphi)}{1-G(\varphi^\star_{ik})}, & \varphi \geq \varphi^\star_{ik}. \\ 0, & otherwise \end{cases} \tag{10}$$

For simplicity, I assume the mass of the firms is unity before they enter into the market in all countries. P^{ik} defined in (2) can be rewritten as the price index that is summed up

with respect to ϕ. I define $\tilde{P^{ik}} : R^+ \to R^+$.

$$\tilde{P^{ik}} = \tilde{P^i}(\varphi^\star_{ik}) = d_{ik}(\int_{\varphi ik^\star}^{\infty} P^i(\varphi)^{1-\sigma}\mu^i(\varphi)d\varphi)^{\frac{1}{1-\sigma}} \tag{11}$$

Combining the pricing rule derived in (8), we get the aggregate productivity, $\tilde{\varphi}(\phi^\star_{ik})$ as a function of $\phi^\star_{ik}$. I define $\tilde{\varphi} : R^+ \to R^+$.

$$\tilde{\varphi}(\varphi^\star_{ik}) = \frac{1}{M^i}(\frac{1}{1-G(\varphi^\star_{ik})}\int_{\varphi ik^\star}^{\infty} \varphi^{\sigma-1}g(\varphi)d\varphi)^{\frac{1}{\sigma-1}} \tag{12}$$

$$\tilde{P^{ik}} = \frac{w_i d_{ik}}{\rho\tilde{\varphi}(\varphi^\star_{ik})} \tag{13}$$

Following Helpman, Melitz and Yeaple (2004) and Chaney (2008), we assume the distribution of productivity of firms producing varieties in a certain good sector is given by Pareto distribution:

$$G(\varphi) = 1 - (\frac{\varphi^\star_{min}}{\varphi})^b \tag{14}$$

Combining previous equations of aggregation with the Pareto distribution,

$$\tilde{\varphi}(\varphi^\star_{ik}) = (\frac{b}{b-(\sigma-1)})^{\frac{1}{\sigma-1}}\varphi^\star_{ik} \tag{15}$$

The aggregate productivity is the linear in the threshold productivity. This could be understood intuitively. As the threshold productivity increases, only the more productive firms remains active, which increases the aggregate productivity. If $b \to \sigma - 1$, the aggregate productivity approaches infinity. This is because when b is smaller, the Pareto distribution tends to be flatter. Firms are more likely to draw a high productivity. Therefore, the aggregate productivity is higher with more firms with high productivity. When b is equal to the elasticity of substitution minus one, this aggregation goes to infinity.

I combine equations (9),(13) and (15) and get,

$$(\frac{\tilde{P^{ik}}}{\tau^{ik}})^{1-\sigma} = \frac{\lambda_i}{\lambda_i + 1} \sum_{j=1}^{N} (\frac{\tilde{P^{jk}}}{\tau^{jk}})^{1-\sigma} \tag{16}$$

Where $\lambda_i = [\frac{b-(\sigma-1)}{bf_i\sigma w_i} E^i - 1]^{-1}$, which is a country-specific coefficient.

DEFINITION OF THE EQUILIBRIUM: N countries export varieties in the same sector to country k. Given the set of exogenous variables: $\{\boldsymbol{\tau^k} = \{\tau^{ik}, i = 1, 2, \ldots, N\}$, $\{\boldsymbol{w_i, f_i}, i = 1, 2, \ldots, N\}$, $\boldsymbol{d_k} = \{d_{ik}, i = 1, 2, \ldots, N\}$,$g(\varphi)$, $E\}$. *the equilibrium is defined by a set of endogenous variables:* $\{p_h^i, q_h^{ik}, p^i(\varphi), \pi^i(\varphi), \mu_i(\varphi), \varphi^\star(\boldsymbol{\tau^k}), \tilde{\boldsymbol{P}}(\varphi^\star(\boldsymbol{\tau^k}))\}$, *such that: given the prices of the varieties,* p_h^i, *the quantities of the varieties,* q_h^{ik}, *solve the consumer problem and get the demand curve. Given the demand curve, the quantities of the variety solve the firm problem. Thus, we get pricing rule and profit, denoted by equation (7) and (8). Given the zero cutoff profit condition, we get threshold productivity,* $\varphi_{ik}^\star$, *and the productivity distribution in country i,* $\mu_i(\varphi)$. *Under the assumption that* $\mu_i(\varphi)$ *follows Pareto distribution, we solve the aggregate price level,* $\tilde{\boldsymbol{P}}(\varphi^\star(\boldsymbol{\tau^k})) = \{\tilde{P}^i(\varphi^\star(\boldsymbol{\tau^k})), i = 1, 2, \ldots, N\}$

PROPOSITION 1:*Suppose that the productivity distribution is Pareto distribution and* $b > \sigma - 1$, *the increase in the country image of country i in country k, leads to higher aggregate price level of the varieties imported from country i and lower aggregate price level of the varieties imported from other countries.*

From equation (16), we can have another similar equation,

$$(\frac{\tilde{P^{jk}}}{\tau^{jk}})^{1-\sigma} = \frac{\lambda_i}{\lambda_i + 1} \sum_{j=1}^{N} (\frac{\tilde{P^{jk}}}{\tau^{jk}})^{1-\sigma} \tag{17}$$

We divide (16) by (17), and then for any country i and j, we have,

$$(\frac{\tilde{P^{ik}}}{\tau^{ik}})^{1-\sigma} = \frac{\lambda_i}{\lambda_i + 1} \frac{\lambda_j + 1}{\lambda_j} (\frac{\tilde{P^{jk}}}{\tau^{jk}})^{1-\sigma} \tag{18}$$

This result means that the ratio of the price index of varieties imported from country i to the price index of varieties imported from country j is independent from all the other varieties imported from other countries, but just related to the country-specific constants and country image. The equilibrium defined by equation (18) can have infinite number of solutions. We define the function h: $R^{++^N} \rightarrow R^+$. Function h can be any function as long as it is continuous and differentiable. C_i is a country-specific constant. Then the general solutions are:

$$\tilde{P^{ik}} = C_i \tau^{ik} h(\boldsymbol{\tau^k}) \tag{19}$$

We also normalize $\sum_{i=1}^{N} C_i^{1-\sigma}$ to one. Then, $C_i = (\frac{\lambda_i}{\lambda_i+1})^{\frac{1}{1-\sigma}}$. Now, we need to investigate the exact form of $h(\boldsymbol{\tau^k})$ in equilibrium. The average revenue across firms in country i can be written as:

$$E^{ik}(\tilde{\varphi}(\varphi_{ik}^{\star})) = E^{ik}(\varphi_{ik}^{\star})(\frac{\tilde{\varphi}(\varphi_{ik}^{\star})}{\varphi_{ik}^{\star}}) \tag{20}$$

Recall that the mass of firms before entering the market is $M^{i^{1-\sigma}}$. Thus, the share of expenditure spent on varieties imported from country i is:

$$E^i = (1 - G(\varphi_{ik}^{\star}))E^{ik}(\tilde{\varphi}(\varphi_{ik}^{\star})) \tag{21}$$

Combining zero cutoff productivity condition and equations (15) and (20),

$$E^i = \delta E h^b(\boldsymbol{\tau^k}) \theta_{ik} \tau^{ik^b} \tag{22}$$

I define $\delta = \varphi_{min}^b \rho^b (\frac{E}{\sigma f})^{\frac{b-(\sigma-1)}{\sigma-1}} \frac{b-(\sigma-1)}{\sigma-1}$, which is a constant across countries, and $\theta_{ik} = w_i^{\frac{-\sigma b+\sigma-1}{\sigma-1}} d_{ik}^{-b}$, which is related to country iś fixed effect and bilateral trade barrier.

From the consumer problem, we know that the consumer's budget in this good sector is E. Then, the sum of the expenditures spent on different countries should be equal to

the budget.

$$E = \sum_{i=1}^{N} E^i = \delta E h^b(\boldsymbol{\tau^k}) \sum_{i=1}^{N} \theta_{ik} \tau^{ik^b} \tag{23}$$

Then, I get the expression of $h(\boldsymbol{\tau^k})$, the productivity threshold $\varphi^{\star}_{ik}$ and the aggregate price level $\tilde{P^{ik}}$ in equilibrium,

$$h(\boldsymbol{\tau^k}) = \frac{\delta^{-\frac{1}{b}}}{(\sum_{i=1}^{N} \theta_{ik} \tau^{ik^b})^{\frac{1}{b}}} \tag{24}$$

$$\varphi^{\star}_{ik} = \delta^{\frac{1}{b}} \frac{w_i d_{ik}}{\rho \tau^{ik}} [\frac{b-(\sigma-1)}{\frac{b-(\sigma-1)}{b f_i \sigma w_i} E^i - b}]^{\frac{1}{\sigma-1}} (\sum_{j=1}^{N} \theta_{jk} \tau^{jk^b})^{\frac{1}{b}} (\lambda^i + 1)^{\frac{1}{\sigma-1}} \tag{25}$$

$$\tilde{P^{ik}} = (\frac{\lambda^i}{\lambda^i + 1})^{\frac{1}{\sigma-1}} \delta^{-\frac{1}{b}} \frac{\tau^{ik}}{(\sum_{j=1}^{N} \theta_{jk} \tau^{jk^b})^{\frac{1}{b}}} \tag{26}$$

I find the similar expression in the price index as the supplier access or potential in the seminal paper, Redding and Venables (2004). This has the profound meaning that even in the heterogeneous firm model with demand shifter, the standard gravity equation is still valid, which corresponds to the core of the models in the "new trade models". Specifically,

$$S_k = \sum_{j=1}^{N} \theta_{jk} \tau^{jk^b} = \sum_{j=1}^{N} w_i^{\frac{-\sigma b + \sigma - 1}{\sigma - 1}} (\frac{d_{ik}}{\tau^{jk}})^{-b} \tag{27}$$

Compared to the benchmark model in their paper, the power on the tariff or trade barrier adjusted by the country image of country j is now change from one minus the elasticity of substitution to $-b$. I assume that the parameter which decides the shape of the Pareto distribution is greater than the elasticity of substitution minus one. So the supplier access is smaller in the heterogeneous firm models. This result is intuitive. As the demand function is in the standard CES form, some resources have to flow to the less productive firms even export fixed cost could select some firms with high productivity into the international market. These less productive firms makes the supplier potential smaller. Therefore, the shape of the distribution of the productivity matters in this case. If the distribution is flatter, it approaches the supplier access in the benchmark case and

the aggregate productivity goes to the infinity and cannot converge. Particularly,

$$\lim_{b\to\sigma-1} S_k = \sum_{j=1}^{N} w_i^{1-\sigma}(\frac{d_{ik}}{\tau^{jk}})^{1-\sigma} \tag{28}$$

We take the derivative on the both sides of equation (26) with respective to τ^{ik}:

$$\frac{\partial \tilde{P^{ik}}}{\partial \tau^{ik}} = (\frac{\lambda^i}{\lambda^i+1})^{\frac{1}{\sigma-1}}\delta^{-\frac{1}{b}}(\sum_{j=1}^{N}\theta_{jk}\tau^{jk^b})^{-\frac{1}{b}}[1-\frac{\theta_{ik}\tau^{ik^b}}{(\sum_{j=1}^{N}\theta_{jk}\tau^{jk^b})^{\frac{1}{b}}}] > 0 \tag{29}$$

$$\frac{\partial \tilde{P^{ik}}}{\partial \tau^{jk}} = -(\frac{\lambda^j}{\lambda^j+1})^{\frac{1}{\sigma-1}}\delta^{-\frac{1}{b}}\tau^{jk}\theta_{ik}\tau^{ik^{b-1}}(\sum_{z=1}^{N}\theta_{zk}\tau^{zk^b})^{-\frac{1}{b}-1} < 0 \tag{30}$$

The aggregate price index, $\tilde{P^{ik}}$, is the strictly increasing function of country image, τ^{ik}, and the aggregate prices of other countries are the strictly decreasing function of country image. Part of the effect caused by the increase of the country image is absorbed by the increase of the aggregate price level in country i due to the entry of more firms with lower productivity. At the same time, another part of this effect leads to the decrease of the aggregate price level in other countries because less profit of the firm causes less productive firms become inactive.

It is easy to verify that the effect of the positive consumer taste shock towards country-of-origin is more significant when the original country image is less positive, which means the marginal effect on aggregate price level by improving country image declines. Therefore, it is reasonable for countries with lower consumers' evaluation on their country image to take more actions than the countries with higher one. To our best knowledge, this policy implication is originally proposed in my paper.

4 Data Description and Empirical Estimation

I first estimate the supplier access. Equation (22) can be transformed into the following specification,

$$\ln E^i = \alpha + \beta_k + \beta_i + \beta_1 \ln \tau^{ik} + \beta_2 \ln distance + \beta_3 border + \beta_4 comlang + \beta_5 Agreement \tag{31}$$

Where distance, border effect and common languages and whether they have the trade agreement are control variables to capture the bilateral resistance of trade and β_i and β_k are the fixed effects. I estimate this equation for every country in every year. Then the supplier access can be constructed according to the following equation,

$$SA_k = \sum_i exp(\beta_i + \beta_1 \ln \tau^{ik} + \beta_2 \ln distance + \beta_3 border + \beta_4 comlang + \beta_5 WTO) \tag{32}$$

From equation (26), I get the empirical specification for aggregate price by using the supplier access we get before,

$$\ln \tilde{P^{ik}} = \alpha + \beta_i + \ln CapitaGDP_k + \ln SA_k + \ln \tau^{ik} \tag{33}$$

The aggregate price index can be achieved by simply dividing the trade value over the trade quantities, which is the unit value. Data on export unit value is from data set in CEPII about the "trade unit value", which provides the unit value data cross countries over the time 2006-2013. I use the CIF price based on the HS 2002 classification. Since 2006, the Global Scan Company and the program of international policy attitudes in Maryland University provide annual survey on the country image. In 2006, they survey 39435 residents from 33 countries; In 2013, they survey 26299 residents from 25 countries. In the survey, they are required to choose a category of their attitude towards countries images in other countries. These categories are mainly positive; mainly negative; depends, neither and neutral. In this part, I use the ratio of the residents who choose the mainly positive to the residents who choose the mainly negative adjusted by the share of both

types of the residents in that country in the survey. If we wrongly use the simply ratio as the measure of the country image, that would cause a big bias. For example, if the 95% of residents surveyed in this country reports neutral to the question, 3% reports positive and another 2% reports negative. The simple ratio gives 1.5 as the measure which is equivalent to the case where 60% reports positive and 40% reports negative. However, obviously, these two cases are very different. Particularly,

$$\tau = \frac{S_p}{S_n}(S_n + S_p) + (1 - S_n - S_p) \tag{34}$$

Where S_p, S_n are the share of the residents surveyed reporting mainly positive and mainly negative.

I merge both two data sets and get a panel data and categorize it into three sections based on Rauch classification of homogeneous, heterogeneous and reference goods. With the fixed-effect estimation, I consider the within-country estimation of the change of country image of one country on the change of export aggregate price. The fixed-effect estimation is more accurate than the cross-section estimation for two reasons. First, in the cross-section estimation, we need to add variables to take into account the fixed effect of a country. These variables may not fully include the fixed effect or there may be some missing variables which is correlated with the country image and then leads to the bias in the estimation. Secondly, fixed-effect estimation allows us to concentrate on such effect of country image within one country. This is more reasonable because comparison of the country image effect across the countries actually has little meaning. Also, the true effect of country image on different countries may vary which is not captured by the survey. We have to admit that the survey may not be a good proxy for the country image because the attitude itself may also be endogenous affected by cultural affinity and some history events which could also affect the trade value between countries. However, this survey is the most reliable proxy for country image I can find and the result of the survey is relatively exogenous.

Table 1 shows the fixed-effect estimation over the time period 2006-2013. Column 1 shows that for the homogeneous goods, the country image has no effect on the aggregate

Table 1: The effect of country image on export price index

	(1) Rauch-Homogeneous	(2) Rauch-Reference	(3) Rauch-Heterogeneous
$\ln \tau$	-0.001	0.714***	0.813***
	(0.011)	(0.004)	(0.003)
Time Frame	2006-2013	2006-2013	2006-2013
Observations	72935	493929	1469608
R^2	0.059	0.038	0.029

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

price. This is intuitive because these homogeneous goods are mainly raw materials which are always bought by the firms as the input to the production. For firms, they only take the goods with lowest price and the consumer taste has no impact. For the reference and heterogeneous goods, I have considered these cases in the models part and I get significantly positive coefficient in the estimation. The coefficient is close to 1 which corresponds to the theory I have built.

5 Conclusion

This paper provides an alternative perspective for the effect of the country image, or more generally, the consumer taste on the aggregate exporting performance of the country. We find that even though the individual firm's pricing rule is independent from the country image, it instead affects the extensive margin of the trade. In the end, the average export price is increasing with the country image with the non-linearity that the improvement in the relatively lower country image makes average export price increase more. However, whether it is worth to make a large sunk cost to improve the country image is still debatable. The possible extension of this paper is to consider a linear demand functions as shown in Melitz and Ottaviano (2008), where the demand elasticity increases with the price. In this case, the pricing rule of each firm can be related to the country image, which is the intensive margin of the effect of country image on the aggregate price.

6 Reference

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