BANCO CENTRAL DE COSTA RICA

Gains from trade: the Costa Rican case (Preliminary draft - do not cite)

Alonso Alfaro Ureña

Documento de Trabajo DT-XX-2015

Departamento de Investigación

División Económica

June, 2015

DEC-DIE-DT-XX-2015

Gains from trade: the Costa Rican case

Alonso Alfaro Ureña[‡]

Abstract

One fundamental goal of the economic literature is to quantify the gains from trade. Recently, Costinot & Rodríguez-Clare (2013) developed a methodology that uses the World Input Output Database (WIOD) to compute a statistic of the gains from trade. This paper applies their methodology for the Costa Rican case. The inclusion of Costa Rica in the WIOD database allows us to do counterfactual exercises in which we compare the current situation with hypothetical autarky. This can be done assuming different productive structures and competition schemes in the economy. The results can provide valuable information regarding how much a small open economy like Costa Rica's can benefit from international trade, and what are the differences in the results when compared to similar countries.

Key Words: Gains from trade, Costa Rica, input-output.

JEL Classification: F10, I30, D57

[‡]Departamento de Investigación Económica, División Económica, BCCR. Email : alfaroua@bccr.fi.cr

Gains from trade: the Costa Rican case

Contents

List of Figures

List of Tables

Gains from trade: the Costa Rican case[1]

1 Introduction

One of the most fundamental questions in economics is how much does a country gain from engaging in trade with other countries. Recent work by Costinot & Rodríguez-Clare (2013) described how the results of a wide array of different trade models developed in the last two decades can provide parsimonious measures of the gains from trade. Those include one sector models, multiple sector models, models with intermediate goods. All of these can be analyzed assuming different structures for the competition in the markets, such as perfect, Bertrand, and monopolistic.

The results presented in Costinot & Rodríguez-Clare (2013) are useful for evaluating the effects of globalization and the differences that arise for different countries depending on the level of integration to the rest of the world. The authors use the World Input Output Database (WIOD) constructed by Dietzenbacher, Los, Stehrer, Timmer & de Vries (2013) for computing the gains from trade. However, this database does not include Costa Rica as an individual country, where it is included as part of the "Rest of the World".

For a small, open economy such as Costa Rica it is of particular interest to quantify how much does the country gain from having its economy open to trade with the rest of the world. Recent work by Bullón, Mena, Meng, Sanchez, Vargas & Inomata (2015) allowed them to quantify the integration of the country to Gloval Value Chains (GVCs). This effort allowed for the publication of a version of the WIOD that includes Costa Rica as a single country (and not part of the Rest of the World) in this database. The goal of this paper is to use this version of the World Input Output database to compute gains from trade for the Costa Rican economy using the methodology of Costinot & Rodríguez-Clare (2013).

The results are consistent with the gains from trade from similar small open economies. The gains from being an open economy are above the average of the rest of the world, while incresing dramatically when the assumptions allow for multiple sectors in perfect competition.

[1]I want to thank Andrés Rodríguez-Clare for the discussions and clarifications required for this paper. I want to thanks also Henry Vargas for the encouragement for writing this paper. All errors are my own.

2 The new database

Costa Rica did not update its the Input Output Matrix (IOM) for many decades. The 2011 version which was recently published was constructed using the most recently available information in accordance with the best practices recommended by the United Nations Statistical Commision. In Bullón et al. (2015) the authors document how this IOM was embedded into the World Input Output Database. To achieve this, many elements had to be considered. For example, when subtracting the values for the Costa Rican economy from the "Rest of the World" (where they are assumed to be located in IOD), they had to deal with resulting negative values.

The Costa Rican IOT was built with 76 products, which were aggretated into 35 industries to match the international version. The results shown in this paper are not exactly the same as those presented in Costinot & Rodríguez-Clare (2013) because the version into which the Costa Rican IOM was embedded was the 2011, whereas the authors use the 2008 version. It is also the case that this database shows trade data after the 2008-2009 crisis that caused a collapsed the quantity of international trade in the following years, which affects the magnitude of the gains from trade.

One relevant difference from Costinot & Rodríguez-Clare (2013) is that I used 16 sectors for the aggregation levels, instead of the 31 sectors used originally. The reason for this is that the Costa Rican IOM lacks data on some of the sectors, and makes the inversion of the matrices for the computation impossible without some level of aggregation.

3 Computing gains from trade

3.1 Armington Model

The simplest model used in international trade that can match trade patterns across countries is an Armington model. This setup can serve as a benchmark for comparison for the rest of the models and assumptions presented in the rest of the paper. In each of the n countries there is an endowment of a domestic good. The preferences take the form

$$C_j = \left(\sum_{i=1}^{n} \psi_{ij}^{\frac{1-\sigma}{\sigma}} C_{ij}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}, \tag{3.1}$$

while there is a price index associated with the goods consumed in each country

$$P_j = \left(\sum_{i=1}^{n} \psi_{ij}^{1-\sigma} P_{ij}^{1-\sigma} \right)^{1-\sigma}. \tag{3.2}$$

The trade costs τ_{ij} are assumed to take an iceberg form:

$$P_{ij} = \frac{Y_i \tau_{ij}}{Q_i}$$

where Y_i is country's i income, and Q_i represents the endowment of the good i.

This simple economic environment results in a gravity equation for the trade flows. This takes the form

$$X_{ij} = \frac{(Y_i \tau_{ij})^{-\varepsilon} \chi_{ij}}{\sum_{l=1}^{n} (Y_l \tau_{lj})^{-\varepsilon} \chi_{lj}} E_j$$

where ε, is the trade elasticity,

$$\partial \ln(X_{ij}/X_{jj}) / \partial \ln \tau_{ij} = \varepsilon = \sigma - 1.$$

Arkolakis, Costinot & Rodriguez-Clare (2012) show that for a wide variety of trade models it is possible to compute the gains from trade from two sufficient statistics, namely the elasticity of imports with respect to the variable trade costs, ε, and the share of expenditure in domestic goods, λ. In the case of the Armington model, the change in real consumption can be computed as

$$\widehat{C_j} = \widehat{\lambda_{jj}}^{-\frac{1}{\varepsilon}}$$

where, for any variable X, $\widehat{X} = \frac{X'}{X}$ denotes a proportional change in any variable between an initial equilibria and a counterfactual one.

Here λ_{jj} is the share of expenditure on goods from the same country.

$$\lambda_{jj} = \frac{X_{jj}}{E_j} = 1 - \sum_{i \neq j} X_{ij} / \sum_{i=1}^{n} X_{ij}.$$

3.2 Generalization of the model

Costinot & Rodríguez-Clare (2013) discuss how a single gravity equation can tie together many different types of models that are related to different assumptions regarding the market structure: perfect competition, Bertrand competition, and monopolistic competition with either homogeneous firms or firm-level heterogeneity. Those models include, for example, Eaton & Kortum (2002), Bernard, Eaton, Jenson & Kortum (2000), Krugman (1980), Chaney (2008), Arkolakis (2010), Arkolakis, Demidova, Klenow & Rodríguez-Clare (2008) and Eaton, Kortum & Kramarz (2011) are models for which it is possible to obtain a gravity equation

In all of those models the preference side assumes a representative agent with Constant Elasticity

of Substitution (CES) preferences

$$C_j = \left(\int_{\omega \in \Omega} c_j(\omega)^{\sigma - 1/\sigma} d\omega \right)^{\sigma/(\sigma-1)}.$$

The models also assume balanced trade. In equilibrium a type of good is only imported from one possible origin, so the consumption of goods produced in i in a destination j can be summarized as

$$C_{ij} = \left(\int_{\omega \in \Omega_{ij}} c_j(\omega)^{\sigma - 1/\sigma} d\omega \right)^{\sigma/(\sigma-1)}$$

where $\Omega_{ij} \in \Omega$ is the set of goods that country j buys from country i. The corresponding price index takes the same form as Equation (3.2), assuming $\psi_{ij} = 1$ for symmetry. The price in country j of the goods imported from country i takes the form

$$P_{ij} = \left(\int_{\omega \in \Omega_{iJ}} p_j(\omega)^{1-\sigma} d\omega \right)^{1-\sigma}.$$

In these models the set Ω_{ij} is an endogenous variable. Depending on the assumptions of each model it is possible that some firms want to quit producing at all or exporting to some destinations. The changes in the price index of the goods that are traded between a pair of countries reflect three different elements: change at the intensive margin (change in the price of the goods) or change at the extensive margin, either by the selection of a different set of firms that export from i to j or because of a different set of firms producing at the origin i.

$$P_{ij} = \underbrace{\tau_{ij} c_i^p}_{\text{Intensive margin}} \times \underbrace{\left(\left(\frac{E_j}{c_{ij}^x} \right)^{\frac{\delta}{1-\sigma}} \frac{\tau_{ij} c_i^p}{P_j} \right)^{\eta}}_{\text{Extensive margin: selection}} \times \underbrace{\left(\frac{R_i}{c_i^e} \right)^{\frac{\delta}{1-\sigma}}}_{\text{Extensive margin: entry}} \times \xi_{ij}$$

In this environment c_i^p, c_i^e, c_{ij}^x are variables that relate to variables costs of production, fixed entry costs and fixed exporting costs, respectively. $E_j = \sum_{i=1}^n X_{ij}$ is the total expenditure of country j, while $R_i = \sum_{j=1}^n X_{ij}$ is the total sales or revenues for producers. Also, $\xi_{ij} > 0$ is a function of structural parameters.

The most important parameters for this generalization are δ and η. The first one is a dummy variable that takes a value of one with monopolistic competition with free entry. It takes a value of zero with perfect or Bertrand competition. The parameter $\eta \geq 0$ is related to the extent of heterogeneity across varieties. It is related to the distribution from where the productivities of firms are assumed to take their values. For example, in a monopolistic competition setup with fixed exporting costs like Krugman (1980), it takes a value of $\eta = 0$, but it is $\eta > 0$ for other models like Eaton & Kortum (2002), Chaney

(2008), Melitz (2003) and others. For a detaled discussion see Costinot & Rodríguez-Clare (2013).

3.3 One sector

In a one sector model the authors show that it is possible to obtain a price equation

$$P_{ij} = \tau_{ij} Y_i \left(\left(\frac{E_j}{c_{ij}^x} \right)^{\frac{\delta}{1-\sigma}} \frac{\tau_{ij} Y_i}{P_j} \right)^{\eta} \xi_{ij}.$$

In this case, the gravity equation is

$$X_{ij} = \frac{(Y_i \tau_{ij})^{-\varepsilon} (c_{ij}^x)^{-\delta\eta} \chi_{ij}}{\sum_{l=1}^{n} (Y_l \tau_{lj})^{-\varepsilon} (c_{lj}^x)^{-\delta\eta} \chi_{lj}} E_j.$$

In this case, $\varepsilon = (1+\eta)(\sigma - 1)$, so the interpretation of the trade elasticity is not the same as in the Armington model. Also, and $\chi_{ij}^{1-\sigma} \equiv \xi_{ij}^{1-\sigma}$. In this case, the increase of trade costs affects both the price of the existing varieties (intensive margin) and the set of variables sold from country i to country j (extensive margin). Even though there are differences in the model, Arkolakis et al. (2012) showed that the trade elasticity ε and the share of expenditure on domestic goods λ_{ii} remain the sufficient statistics for welfare analysis. In this case, the potential gains from trade are the same as in the Armington model.

3.4 Multiple sectors

Multiple sectors can be incorporated into this setup by assuming that the preferences are two-tiered. The upper level of the preferences is Cobb-Douglas in the form

$$C_j = \Pi_{s=1}^{S} C_{j,s}^{\beta_{j,s}},$$

with $\beta_{j,s}$ exogenous parameters and $\sum_{s=1} S\beta_{j,s} = 1$. The second tier is CES preferences

$$C_{j,s} = \left(\int_{\omega \in \Omega} c_{j,s}(\omega)^{\sigma_s - 1/\sigma_s} d\omega \right)^{\sigma_s/(\sigma_s - 1)},$$

and $\sigma_s > 1$ is the elasticity of substitution between different varieties, and can be different across sectors. In that case, the price equation can be expressed in the following form

$$P_{ij,s} = \tau_{ij,s} Y_i \left[\left(e_{j,s} \frac{E_j}{c_{ij,s}^x} \right)^{\frac{\delta_s}{1-\sigma_s}} \frac{\tau_{ij,s} Y_i}{P_{j,s}} \right]^{\eta_s} r_{i,s}^{\frac{\delta_s}{1-\sigma_s}} \xi_{ij,s},$$

where $e_{j,s} \equiv E_{j,s}/E_j$ is the share of total expenditure in country j allocated to the sector s, and $r_{i,s} \equiv R_{j,s}/R_j$ is the share of total revenues in country i generated from sector s. Here the gravity

equation takes the form

$$X_{ij,s} = \frac{(Y_i \tau_{ij,s})^{-\varepsilon_s} (c^x_{ij,s})^{-\delta_s \eta_s} r^{\delta_s}_{i,s} \chi_{ij,s}}{\sum_{l=1}^{n} (Y_l \tau_{lj,s})^{-\varepsilon_s} (c^x_{lj,s})^{-\delta_s \eta_s} \chi_{lj,s}} e_{j,s} E_j.$$

3.5 Tradable intermediate goods

Finally, tradable intermediate sectors can also be incorporated by assuming that in each sector the production takes the form

$$I_{j,s} = \left(\int_{\omega \in \Omega} i_{j,s}(\omega)^{\frac{\sigma_s - 1}{\sigma_s}} d\omega \right)^{\frac{\sigma_s}{\sigma_s - 1}}$$

In this case the price and gravity equations take the form

$$P_{ij,s} = \tau_{ij,s} c_{i,s} \left[\left(\frac{e_{j,s}}{v_j} \frac{Y_j}{c^x_{ij,s}} \right)^{\frac{\delta_s}{1-\sigma_s}} \frac{\tau_{ij,s} c_{i,s}}{P_{j,s}} \right]^{\eta_s} \left(\frac{r_{i,s}}{v_j} \frac{Y_i}{c_{i,s}} \right)^{\frac{\delta_s}{1-\sigma_s}} \xi_{ij,s},$$

and

$$X_{ij,s} = \frac{(\tau_{ij,s} c_{i,s})^{-\varepsilon_s} (c^x_{ij,s})^{-\delta_s \eta_s} \left(\frac{r_{i,s}}{v_j} \frac{Y_i}{c_{i,s}} \right)^{\delta_s} \chi_{ij,s}}{\sum_{l=1}^{n} (c_{l,s} \tau_{lj,s})^{-\varepsilon_s} (c^x_{lj,s})^{-\delta_s \eta_s} \left(\frac{r_{l,s}}{v_l} \frac{Y_l}{c_{l,s}} \right)^{\delta_s} \chi_{lj,s}} e_{j,s} E_j$$

where $c_{i,s} = c^p_{i,s}$, $v_i \equiv Y_i, R_i$ is the ratio of total income to total revenues in country i.

4 Counterfactual exercises

For the Armington model we had a measure that quantifies the changes in real income with respect to a change in the trade variables that in turn affect the share of expenditure in domestic goods:

$$\widehat{C_j} = \widehat{\lambda_{jj}}^{-\frac{1}{\varepsilon}}.$$

The simplest counterfactual exercise that can be performed is to compute the changes in real income with respecto to autarky. This measurement gives an insight of how much a country could lose if did not engage in international trade. In this case, the measure G_j quantifies the absolute value of the percentage change in real income that would be associated with moving to autarky. For the cases with only one sector,

$$G_j = 1 - \lambda_{jj}^{\frac{1}{\varepsilon}}.$$

When multiple sectors are added into the model, it is possible to obtain a similar measure of the gains from trade with respect to autarky, which takes the form

$$G_j = 1 - \Pi_{s=1}^{S} \left(\lambda_{jj,s} \left(\frac{e_{j,s}}{r_{j,s}} \right)^{\delta_s} \right)^{\beta_{j,s}/\varepsilon_s}.$$

Finally, when intermediate sectors are included in the model, the gains from trade can be computed using the formula

$$G_j = 1 - \Pi_{s,k=1}^{S} \left(\lambda_{jj,k} \left(\left(\frac{e_{j,k}}{b_{j,k}} \right)^{\eta_s} \frac{r_{j,k}}{b_{j,k}} \right)^{-\delta_k} \right)^{\beta_{j,s}\tilde{a}_{j,sk}/\varepsilon_k},$$

where $b_{j,k} \equiv v_j(\sum_{l=1}^{S} \beta_{j,l} a_{j,kl})$ and $\tilde{a}_{j,sk}$ is the elasticity of the price index in sector s with respect to changes in the price index in sector $k4$[2].

To estimate the gains from trade, the data from WIOD is used to compute the measures $\lambda_{jj,s}$, $e_{j,s}$, $\beta_{j,s}$ and $r_{j,s}$. The trade elasticities used are those from Caliendo & Parro (2012). Table 1 shows the results for the different assumptions of the models including the Costa Rican case which is shown first. For the one sector model (Column 1) it is clear that small open economies are the ones that gain most from trade. The gains for the Costa Rican economy are not as large as those of a country like Ireland (8,3%) but are larger than those of the average country.

When multiple sectors are included in the model (Columns 2 and 3) the gains from trade increase dramatically. For the Costa Rican case, they do so five times with respect to the benchmark case. The increase is significant in part due to the Cobb-Douglas preferences assumed for the sectors. However, the increase is greater in countries for which the market structure means that closing the possibility to trade may increase the prices for some goods significantly, which is particularly sensitive with the Cobb-Douglas assumption. Columns 4-5 show the potential gains from trade allowing for intermediates using two possible competition assumptions, perfect competition and monopolistic competition. Costa Rica is one of the countries in which the gains from trade are smaller with the monopolistic competition assumption. This is the case for countries with comparative disadvantage in the sectors with strong scale effects which show in this setup.

It is possible to perform additional counterfactual exercises in the setup described. For example, Table 2 shows the effects of a simultaneous increase to a 40% tariff from the current situation. In those cases, the magnitude of the potential losses is similar (in the opposite direction) with the gains from trade when compared to autarky. This exercise must serve as a warning since another counterfactual exercise is to evaluate potential policy measures by one country. Graph 1 shows the potential gains from a country from increasing unilaterally the tariffs it charges for products entering the country. There are

[2]See Costinot & Rodríguez-Clare (2013) for details.

Table 1: Gains from trade as percentages of income

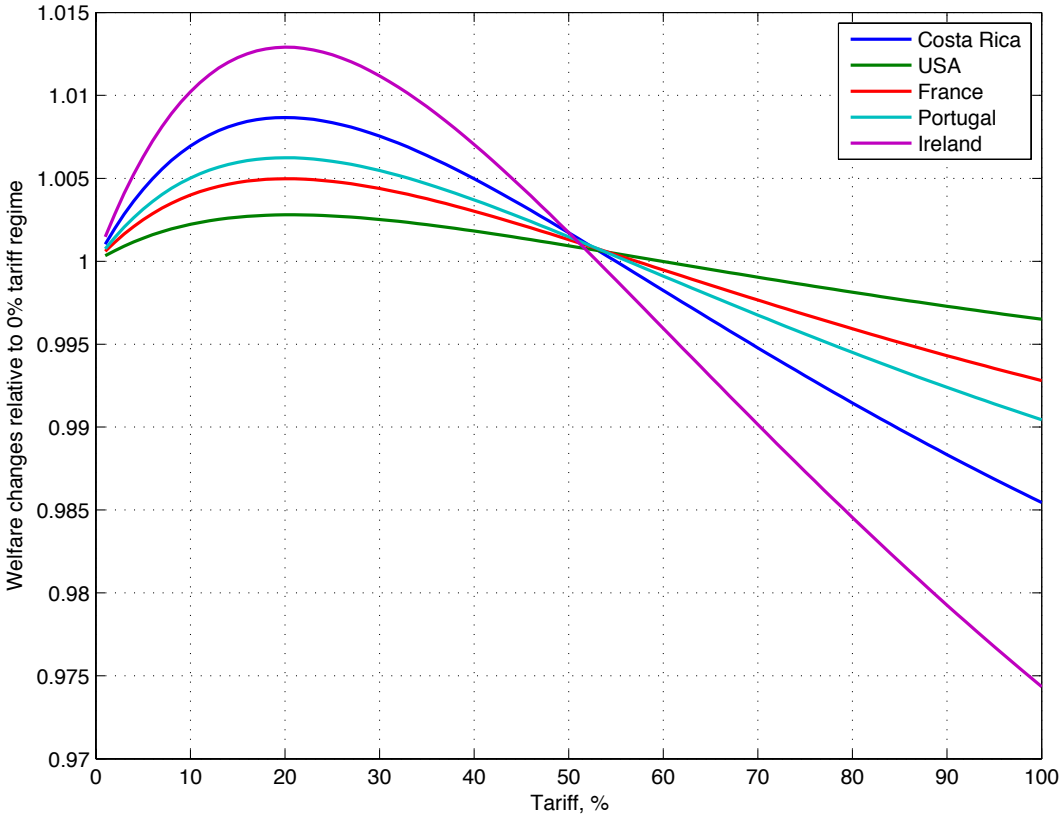
Country	One Sector	Multiple sectors Perf. Comp.	Multiple sectors Mon. Comp.	Multiple Sector Interm Intermediates Perf. Comp.	Multiple sectors Intermediates Mon. Comp. (Melitz)
CRC	5.0%	23.6%	11.3%	36.1%	22.1%
AUS	2.0%	6.3%	2.6%	11.7%	3.6%
AUT	4.8%	23.1%	23.3%	38.9%	49.4%
BEL	6.6%	34.0%	33.2%	55.3%	67.8%
BRA	1.3%	3.2%	3.0%	5.4%	8.8%
CAN	3.4%	12.9%	11.7%	22.4%	32.1%
CHN	1.5%	2.4%	2.4%	6.5%	66.6%
CZE	5.5%	14.6%	18.9%	31.9%	74.3%
DEU	3.8%	11.8%	15.5%	20.4%	42.0%
DNK	4.8%	35.8%	30.7%	52.4%	51.1%
ESP	2.5%	6.9%	7.8%	13.6%	23.1%
FIN	3.7%	12.0%	11.6%	20.8%	27.2%
FRA	2.6%	8.1%	9.3%	14.6%	27.6%
GBR	3.1%	11.6%	10.6%	20.2%	21.5%
GRC	3.6%	16.4%	4.5%	24.0%	4.2%
HUN	7.2%	19.3%	21.3%	38.4%	67.8%
IDN	2.2%	4.2%	3.2%	8.9%	11.9%
IND	2.1%	3.4%	3.6%	6.7%	10.5%
IRL	8.3%	20.3%	13.5%	33.5%	26.5%
ITA	2.5%	7.2%	7.6%	13.2%	18.7%
JPN	1.3%	1.3%	2.7%	2.7%	21.9%
KOR	3.7%	3.8%	8.1%	10.2%	74.3%
MEX	3.2%	10.5%	11.9%	17.5%	27.3%
NLD	5.6%	25.5%	23.6%	41.5%	46.3%
POL	4.0%	15.1%	17.1%	28.4%	46.4%
PRT	3.7%	17.6%	13.7%	29.0%	26.5%
ROM	3.8%	11.0%	10.9%	19.3%	17.9%
RUS	2.1%	9.7%	0.7%	16.9%	-3.5%
SVK	6.5%	18.1%	19.1%	41.2%	79.8%
SVN	5.8%	31.3%	32.8%	50.8%	66.7%
SWE	4.6%	10.9%	12.0%	20.2%	33.5%
TUR	2.5%	10.6%	10.6%	18.5%	24.1%
TWN	5.5%	7.5%	8.2%	14.7%	28.2%
USA	1.5%	3.3%	3.1%	5.8%	9.0%
RoW	3.7%	11.6%	5.3%	21.5%	15.0%
Ave	3.8%	13.3%	12.1%	23.2%	33.4%

potential gains, but the results from Table 2 show that an uncoordinated increase could cause a welfare loss for every single country.

Table 2: Losses from a simultaneous 40% tariff increase.
Multiple sectors, intermediate goods

Country	G_j	Country	G_j	Country	G_j
CRC	-5.01%	FRA	-1.59%	POL	-3.05%
AUS	-2.71%	GBR	-3.16%	PRT	-3.54%
AUT	-4.28%	GRC	-3.65%	ROM	-3.58%
BEL	-6.64%	HUN	-6.50%	RUS	-4.26%
BRA	-0.90%	IDN	-1.83%	SVK	-5.74%
CAN	-3.57%	IND	-1.69%	SVN	-4.79%
CHN	-1.23%	IRL	-8.61%	SWE	-3.97%
CZE	-4.82%	ITA	-1.35%	TUR	-1.78%
DEU	-2.34%	JPN	-0.25%	TWN	-4.13%
DNK	-4.54%	KOR	-1.35%	USA	-0.91%
ESP	-1.68%	MEX	-2.22%	RdM	-4.27%
FIN	-3.12%	NLD	-4.62%	Prom	-3.4%

Figure 1: Gains from a unilateral increase in the tariff



5 Conclusions

This paper documents the gains from trade for the Costa Rican economy using the methodology proposed by Costinot & Rodríguez-Clare (2013). The results show that Costa Rica is one of the countries that gain most from trade, and could have significant potential losses when compared to autarky or a simultaneous increase of tariffs around the world. The gains from trade are larger whenever the model includes more sectors, but are smaller in a monopolistic competition setup when compared to a perfectly competitive markets. This result hints that the Costa Rican economy has less advantage in the sectors with the highest scale effects. However, this characteristic is not unique to lower income economies, as other advanced economies show this characteristic too.

Costa Rica is a small open economy that benefits significantly from being open to trade. The magnitude of these gains and alternative trade policies can have a significant impact in the discussion of what alternative paths can a country take from the current situation.

Finally, it should be mentioned that the authors of Bullón et al. (2015) and the Ministry of Foreign Trade (COMEX) and the Central Bank (BCCR) deserve praise for putting together a group that prepared this database for external use. There is a significant amount of work that can be done thanks to the effort put into this database, and the trade and industrial organization literature of Costa Rica can expand much more thanks to this accomplishment.

References

Arkolakis, C. (2010). Market Penetration Costs and the New Consumers Margin in International Trade. *Journal of Political Economy*, *118*(6), 1151 – 1199.

Arkolakis, C., Costinot, A., & Rodriguez-Clare, A. (2012). New Trade Models, Same Old Gains? *American Economic Review*, *102*(1), 94–130.

Arkolakis, C., Demidova, S., Klenow, P. J., & Rodríguez-Clare, A. (2008). Endogenous Variety and the Gains from Trade. NBER Working Papers 13933, National Bureau of Economic Research, Inc.

Bernard, A. B., Eaton, J., Jenson, J. B., & Kortum, S. (2000). Plants and Productivity in International Trade. NBER Working Papers 7688, National Bureau of Economic Research, Inc.

Bullón, D., Mena, T., Meng, B., Sanchez, N., Vargas, H., & Inomata, S. (2015). Using the input-output approach to measure participation in GVCs: The case of Costa Rica. IDE Discussion paper 529, Institute of Developing Economies.

Caliendo, L. & Parro, F. (2012). Estimates of the Trade and Welfare Effects of NAFTA. NBER Working Papers 18508, National Bureau of Economic Research, Inc.

Chaney, T. (2008). Distorted Gravity: The Intensive and Extensive Margins of International Trade. *American Economic Review*, *98*(4), 1707–21.

Costinot, A. & Rodríguez-Clare, A. (2013). Trade Theory with Numbers: Quantifying the Consequences of Globalization. NBER Working Papers 18896, National Bureau of Economic Research, Inc.

Dietzenbacher, E., Los, B., Stehrer, R., Timmer, M., & de Vries, G. (2013). The Construction Of World Input-Output Tables In The Wiod Project. *Economic Systems Research*, *25*(1), 71–98.

Eaton, J. & Kortum, S. (2002). Technology, Geography, and Trade. *Econometrica*, *70*(5), 1741–1779.

Eaton, J., Kortum, S., & Kramarz, F. (2011). An Anatomy of International Trade: Evidence From French Firms. *Econometrica*, *79*(5), 1453–1498.

Krugman, P. (1980). Scale Economies, Product Differentiation, and the Pattern of Trade. *American Economic Review*, *70*(5), 950–59.

Melitz, M. J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. *Econometrica*, *71*(6), 1695–1725.