TRADE OFF - INCOME GAINS AND INEQUALITY COSTS

Hochschule Bochum

Academic Paper

submitted by

Frederik Hölter
born on 10th May 1995

on 31 January 2023

Betreuer:	Dr. Stephan Sommer
Matrikelnummer:	18103952
Studienfach:	International Economic Policy

This paper will talk about the impact of trade liberalization on income gains and their equal distribution. By reviewing an article of Artuc et al. from 2019, several models regarding the implication of trade liberalization impacts are explained and combined to determine the socially adjusted welfare gains for Third World countries to check if those are beneficial and there proving the assumption, that trade liberalization is welfare enhancing and beneficial for low income households.

Contents

1 Introduction

In today's world with ongoing worldwide economic crises like the COVID-19-pandemic or the current Russia-Ukraine-conflict, trade policies are seen and used as possible, important instruments to either help or punish specific countries' economies. However, the majority of countries currently suffers a decline in social welfare caused by those ongoing crises. Through new developed and improved trade models and the current worldwide economic situation, the interest in the impact of trade policies, especially the trade liberalization, and the distribution of the gains from trade increased. While trade liberalization is commonly seen as economy and welfare enhancing, the majority of developing countries with low social welfare still tend to restrict their trade in favor of protectionism. To estimate the impact of trade liberalization and the trade-off between the income gains and inequality costs, Artuc, Rijkers and Porto reviewed recent and past trade models to measure income gains and inequality costs for 54 developing countries in their article from 2019. Using household survey data from 54 developing countries in combination with trade data and tariff data, they developed a new model to determine the income gains, inequality costs and therefore the inequality adjusted income gains of trade. With the model, they were able to answer the question, whether there are trade-offs between income gains and inequality costs in case of trade liberalization and whether the trade liberalization is beneficial for the studied countries' welfare.

This paper reviews the study by Artuc, Rijkers and Porto from 2019 and takes several critical aspects of the paper itself into consideration. The first section describes the data used in the study and describes the three parts, the household survey data, the tariff data and the trade data. The second section summarizes the methods of the study by Artuc et. al. and explains their results. After that, the next section will showcase several critical aspects in regard of the data used, the methods used to form their model and the results, to underline possible weaknesses and strengths of this study. Finally, a conclusion is given about the quality of the model and possible improvements for further use cases.

2 Data

The study by Artuc, Rijkers and Porto used several data sets to enable the heterogenous view of households in regard of their expenditures, auto-consumption and incomes. One of the main datasets used are household surveys of 54 developing countries which were taken between the years 1998 and 2015. The dataset covers all low income countries, where appropriate household survey data was available, and additionally contains the majority of lower middle income countries.

Table A1
Household Surveys

Country	Year	Obs	Survey
Benin	2003	5296	Questionnaire Unifié sur les Indicateurs de Base du Bien-Être
Burkina Faso	2003	8413	Enquête sur les Conditions de Vie des Ménages
Burundi	1998	6585	Enquête Prioritaire, Etude Nationale sur les Conditions de Vie des Populations
Cameroon	2001-2002	10881	Deuxième Enquête Camerounaise Auprès des Ménages
Central African Republic	2008	6828	Enquête Centrafricaine pour le Suivi-Evaluation du Bien-être
Comoros	2004	2929	Enquête Intégrale auprès des Ménages
Côte d'Ivoire	2008	12471	Enquête sur le Niveau de Vie des Ménages
Egypt, Arab Rep.	2008-2009	23193	Household Income, Expenditure and Consumption Survey
Ethiopia	1999-2000	16505	Household Income, Consumption and Expenditure Survey
The Gambia	1998	1952	Household Poverty Survey
Ghana	2005-2006	8599	Living Standards Survey V
Guinea	2012	7423	Enquête Légère pour l'Evaluation de la Pauvreté
Guinea-Bissau	2010	3141	Inquerito Ligeiro para a Avalicão da Pobreza
Kenya	2005	13026	Integrated Household Budget Survey
Liberia	2014-2015	4063	Household Income and Expenditure Survey
Madagascar	2005	11661	Permanent Survey of Households
Malawi	2004-2005	11167	Second Integrated Household Survey
Mali	2006	4449	Enquête Légère Intégrée auprès des Ménages
Mauritania	2004	9272	Enquête Permanente sur les Conditions de Vie des Ménages
Mozambique	2008-2009	10696	Inquérito sobre Orçamento Familiar
Niger	2005	6621	Enquête Nationale sur les Conditions de Vie des Ménages
Nigeria	2003-2004	18603	Living Standards Survey
Rwanda	1998	6355	Integrated Household Living Conditions Survey
Sierra Leone	2011	6692	Integrated Household Survey
South Africa	2000	25491	General Household Survey
Tanzania	2008	3232	Household Budget Survey
Togo	2011	5464	Questionnaire des Indicateurs de Base du Bien-être
Uganda	2005-2006	7350	National Household Survey
Zambia	2004	7563	Living Conditions Monitoring Survey IV

Table A1 (Continued)
Household Surveys (Continued)

Country	Year	Obs	Survey
Armenia	2014	5124	Integrated Living Conditions Survey
Bangladesh	2010	12117	Household Income and Expenditure Survey
Bhutan	2012	8879	Living Standards Survey
Cambodia	2013	3801	Socio-Economic Survey
Indonesia	2007	12876	Indonesian Family Life Survey
Iraq	2012	24895	Household Socio-Economic Survey
Jordan	2010	11110	Household Expenditure and Income Survey
Krygyz Republic	2012	4962	Intergrated Sample Household Budget and Labor Survey
Mongolia	2011	11089	Household Socio-Economic Survey
Nepal	2010-2011	5929	Living Standards Survey
Pakistan	2010-2011	16178	Social and Living Standards Measurement Survey
Papua New Guinea	2009	3776	Household Income and Expenditure Survey
Sri Lanka	2012-2013	20335	Household Income and Expenditure Survey
Tajikistan	2009	1488	Tajikistan Panel Survey
Uzbekistan	2003	9419	Household Budget Survey
Vietnam	2012	9306	Household Living Standard Survey
Yemen, Rep.	2005-2006	12998	Household Budget Survey
Azerbaijan	2005	4797	Household Budget Survey
Georgia	2014	10959	Household Integrated Survey
Moldova	2014	4836	Household Budget Survey
Ukraine	2012	10394	Sampling Survey of the Conditions of Life of Ukraine's Households
Bolivia	2008	3900	Encuesta de Hogares
Ecuador	2013-2014	28680	Encuesta de Condiciones de Vida
Guatemala	2014	11420	Encuesta Nacional de Condiciones de Vida
Nicaragua	2009	6450	Nicaragua - Encuesta Nacional de Hogares sobre Medición de Niveles de Vida

Figure 2.1: Household Survey Data by Artuc, Rijkers and Porto 2019

The household survey data was harmonized by adopting and improving templates based on Nicita, Olarreaga and Porto from 2014. There are three templates used covering the expenditure of households, their auto-consumption and their income. Those templates contain several categories, which hold a unique two or four-digit ID.
The first template used is the expenditure template, which contains the categories agriculture/food, manufacturing/household items, services and other expenditures. The group

agriculture/food is split into staple and non-staple food. The second group, manufacturing/household items contains energy, textiles/apparel, electric/electronics, household items/furniture and other physical goods. The service group contains transportation, health, education, communication and other services. Other expenditures shows remittances/transfers given, investment of any sort, festivities and other disbursement.

Figure 2.2: Expenditure template based on Deaton modified by Artuc, Rijkers and Porto 2019

The next template regarding the auto-consumption of each household is split into agriculture/food and other goods. Agriculture/food contains staple and non-staple food and other goods contains energy, gathering, other goods collected for free and other goods produced and consumed within the household.

The final template showcasing the income of each householkd is split into agriculture/food, wages, sales of goods/services and transfers. The group agriculture/food contains the same data as mentioned above. Wages contain agriculture/forestry/fishing, mining/oil/gas extraction, manufacturing, construction, transportation/communication/electric/gas/sanitary, wholesale/retail, finance/insurance/real estate, entertainment services, professional services and public administration. The group sales of goods/services contains the same categories as the wages group. The last group transfers includes remittances/transfers received, profits of investment, government transfers, non-governmental transfers and others.

Besides the survey data, the authors of the paper also used datasets regarding the quantity and value of traded goods as well as import tariffs on goods for each country. The data regarding the quantity and value of traded goods for each country is sourced from the COMTRADE-Database by the Trade Statistics Section of United Nations Statistics Division. The tariff data is sourced from the TRAINS-Database by Trade Information Section of United

Nations Conference on Trade and Development. Both datasets use the HS 6-digit code to uniquely identify every possible traded good. This HS 6-digit code was used to merge with the unique two and four-digit codes from the adopted survey templates. This harmonization leads to the advantage over the most other studies regarding the impact of trade liberalization as household heterogeneity is granted in the data for the model to use.

3 Study

To use the data explained above, Artuc, Rijkers and Porto need a model to study the welfare effects of tariff changes. In the first instance, they adopt an extended agricultural household model to define the household welfare based on the work of Singh, Squire and Strauss from 1986 and Benjamin from 1993. The authors then derive the welfare effects using first order approximations based on the work of Deaton from 1989, Porto, 2006; Nicita, Olarreaga and Porto, 2014.

To determine the impacts of price changes and furthermore on the welfare effects for households, the authors first defined a maximized nominal income function for the household

$$y^h(\mathbf{p}, v^h) = w^h + \sum_i \pi_i^h(\mathbf{p}) - T^h + \Omega^h, \tag{3.1}$$

where the household income y^h depends on the vector of prices p_i and fixed amount of resources v^h. The labor income of household h as w^h is only from the labor market and π_i^h are farm enterprise profits obtained from selling good i. Governmental taxes paid are represented as T^h. Other transfers and other income are showcased in Ω^h.

To also take the expenditures into consideration, the household expenditure function is defined as

$$e(\mathbf{p}, u^h) = \sum_i p_i c_i^h(\mathbf{p}). \tag{3.2}$$

In this equation, p_i is the price for good i and u^h is the required utility for the optimal consumption c_i^h.

While the income and expenditures of the household are already defined, the expenditures caused by trade can now be summarized in one equation. Therefore, the authors reference to Dixit and Norman (1980) and Anderson and Neary (1996) and use their trade expenditure function as

$$V^h(\mathbf{p}, v^h, u^h) = y^h(\mathbf{p}, v^h) - e(\mathbf{p}, u^h). \tag{3.3}$$

The authors refer to Porto (2006) while explaining, that the traditional expenditure function is defined as $e^h - y^h$, but by swapping the terms, they can see the results as changes in real household income.

To obtain estimates of welfare effects which are applicable with the above explained data, the authors propose two aspects to reach those goals. The first proposition assumes, that the household is the price taker in consumer, producer and labor markets. Therefore, the impact of a price change on the household welfare could be defined as

$$\frac{dV_i^h}{e^h} = ((\phi_i^h - s_i^h) + \phi_w^h \frac{\partial w^h}{\partial p_i} \frac{p_i}{w^h}) d\ln p_i - \frac{dT^h}{e^h}. \tag{3.4}$$

The monetary transfer needed by household h to enable the same utility u^h as before the price change is showcased as dV_i^h. The share of the traded good i is s_i^h, while share from the

sales of good i is ϕ_i^h. The labor income share is defined as ϕ_w^h.

The second proposition contains multiple assumptions. First it assumes that the goods are homogenous and that the targeted countries are rather small and are therefore facing exogenously the international prices of p_i^*. There is also the assumption of the perfect price transmission from tariffs to domestic prices. Finally, they assume, that the loss of public revenue caused by the tariff cuts is compensated with the help of income tax increases. Based on this proposition, the estimable welfare effects are given as

$$\frac{dV_i^h}{e^h} = ((\phi_i^h - s_i^h) + \phi_{wi}^h)\frac{\tau_i}{1 + \tau_i} + \Psi_i^h. \tag{3.5}$$

The share of labor income ϕ_{wi}^h is now specified for the sector i and Ψ_i^h is the tax increase for the household h. The level of tariff protection in sector i is assumed to be τ_i. This equation only works under the assumption, that the country reduced its own tariffs individually, therefore assuming a full unilateral tariff liberalization. While the possibility for a full import tariff liberalization could be showcased in the equation, the data does not contain information regarding the pass-through elasticities and therefore needs to be simplified as shown above. Finally, to measure the welfare effects of the entire tariff protection and not only for single sectors, the equation can be summed up as

$$\hat{V}^h = \frac{dV^h}{e^h} = \sum_i \frac{dV_i^h}{e^h}. \tag{3.6}$$

The proportional change of real household income can be displayed as $\hat{V}^h$. This equation can also be used to estimate the counterfactual real income under the assumption that x_0^h is the observed ex-ante level of real household income to define the equation as

$$\hat{x}_1^h = x_0^h(1 + \hat{V}^h). \tag{3.7}$$

In this equation, $\hat{x}_1^h$ is the counterfactual real income. As the authors use an agricultural household model, there are some differences to standard trade models since the data in form of household surveys does not contain returns to capital or corporate profits. The authors name the Stolper-Samuelsen effects as an example of effects, which show the differential impacts on returns to capital vs labor or to skilled vs unskilled labor, which can not be captured in this study. However, they argue that topics like poverty, inequality and household welfare are usually based on household surveys, therefore it is beneficial to use a model, which is able to use this dataset. Another benefit is named in the household heterogeneity regarding the income and the consumption, which leads to results regarding the total gains as well as for inequality costs since the model can differentiate between rich and poor households.

As seen in the data, there is still a need of weighted average tariff rates for every single category of the harmonized dataset. Those tariff rates can be defined as

$$\tau_i = \sum_{c,n \in i} \tau_{c,n} \frac{m_{c,n}}{\sum_{c,n \in i} m_{c,n}}. \tag{3.8}$$

Every category of the HS 6-digit classification is represented as n for the 2- and 4-digit category i from the survey. The imports of good n are for the country c are given as $m_{c,n}$.

The resulting average tariffs are 14.4 percent for non-staple agricultural goods and 10.8 percent for staple agricultural goods. The category manufactures yields an average tariff of 10.9 percent. To determine the impact of the elimination of those tariffs on the prices, the authors refer back to the assumption of the full price transmission in equation 6 to set the equation as

$$\Delta lnp_i = \frac{p_i^* - p_i^*(1 + \tau_i)}{p_i^*(1 + \tau_i)} = -\frac{\tau_i}{1 + \tau_i}. \tag{3.9}$$

The authors review the equation **??** with weighted household survey data. Excluding the top and bottom 0.5 percentile to reduce the measurement error, they show averages for six biggest household expenditures, which are Staple Agriculture, Non-Staple Agriculture, Manufactured Goods, Non-Traded Goods, Other Goods and Home Consumption. The biggest expenditure is seen in the category food with an average of 45 percent of all household spendings. The authors argue that this was expected as the survey data holds an average poverty rate of 35 percent and an average GDP per capita of US$ 1879.

Regarding the compensation of the tariff revenue loss, the authors assumed before that the government would impose a proportional income tax, which is displayed as

$$\psi_i^h = -\frac{\tau_i}{1 + \tau_i} \frac{M_i}{\sum_h y^h}. \tag{3.10}$$

The revenue loss is shown as ψ_i^h and the value of imports is shown as $M_i = p_i^*(1 + \tau_i)m_i$.

To define the income gains from trade, which are portrayed as the proportional change in aggregate household real expenditures after the import tariff liberalization as in Arkolakis, Costinot and Rodriguez-Clare from 2012, the equation is

$$G = \frac{\sum_h (x_1^h - x_0^h)}{\sum_h x_0^h} = \frac{x_0^h}{\sum_h x_0^h} \hat{V}^h. \tag{3.11}$$

As $\hat{V}^h$ was explained above as the proportional change in real expenditures of household h, G can bee seen as the weighted average of the welfare effects. Using this equation on the harmonized survey data, tariff liberalization induces a gain of 2.5 percentage points in real expenditures for 45 countries, where the gains are positive. Ten countries face a loss of an average of 0.9 percent of real expenditures. In total, the average for all countries is 1.9 percent, which implicates that the developing countries seem to gain from trade.

To inspect the distributional effects of trade, the authors first estimate kernel averages of the gains from trade dependent on the initial well-being of the household per capita expenditure. Then they estimate bivariate kernel densities of the distribution of gains from trade and household per capita expenditure. Using the pro-poor Index of Nicita, Olarreaga and Porto from 2014, they divide the countries in to two groups, pro-poor and pro-rich. The pro-poor Index is the proportional change of low 20 percent income household minus the high 20 percent income households. If the index is positive, the tariff liberalization can be seen as pro-poor as the poor household gain proportionally more than the rich households. The opposite would indicate a countries' tariff liberalization as pro-rich. As a result, 17 countries are classified as pro-poor and the remaining 37 countries would have a pro-rich gain distribution.
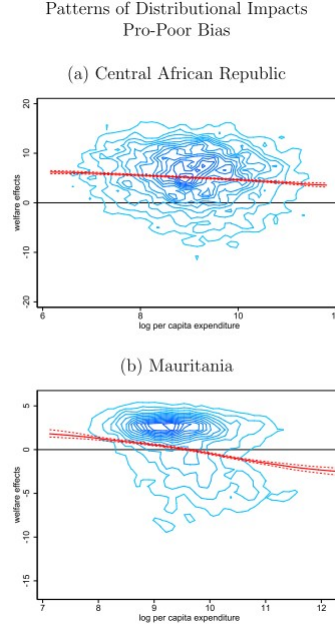
Figure 3.1: Example countries for Pro-Poor Bias by Artuc, Rijkers and Porto from 2019
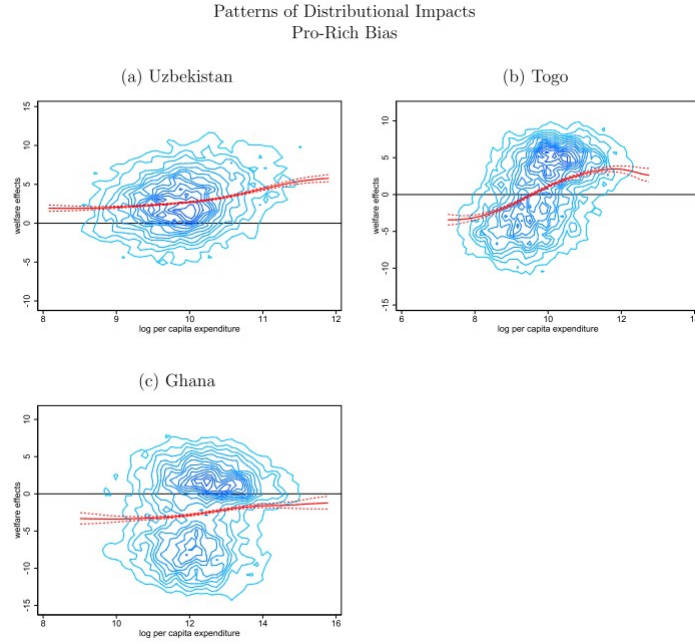

Figure 3.2: Example countries for Pro-Rich Bias by Artuc, Riijkers and Porto from 2019

To tackle the possible trade-off between income inequality and average incomes, the authors refer to the Atkinson social welfare function from 1970:

$$W = \frac{1}{H} \sum_h \frac{(x^h)^{1-\varepsilon}}{1 - \varepsilon}. \tag{3.12}$$

The social welfare is W and $\varepsilon \neq 1$ is the inequality aversion parameter, which can be seen as a weighting for the well-being of low income households. One benefit of this equation is that

it can be also defined as
$$W = \mu * (1 - I), \tag{3.13}$$
in which μ is mean income and I is the atkinson inequality index, which is defined as

$$I = 1 - (\frac{1}{H} \sum_{h=1}^{H} (x^h/\mu)^{1-\varepsilon})^{1/(1-\varepsilon)}. \tag{3.14}$$

The authors use the two equations above to define a equation for the inequality adjusted income gains as
$$G(\varepsilon) = \frac{W_1(\varepsilon) - W_0(\varepsilon)}{W_0(\varepsilon)}. \tag{3.15}$$

The ex-ante social welfare is W_0 and $W_1(\varepsilon)$ is the counterfactual social welfare under the tariff liberalization. As above-mentioned in equation 14, this equation can be decomposed into
$$G(\varepsilon) = G(0) + \frac{\mu_1}{\mu_0} \frac{I_0(\varepsilon) - I_1(\varepsilon)}{1 - I_0(\varepsilon)}. \tag{3.16}$$

To determine the possibility of a trade-off between the income gains $G(0)$ and the equality gains which are represented as $\frac{\mu_1}{\mu_0} \frac{I_0(\varepsilon) - I_1(\varepsilon)}{1 - I_0(\varepsilon)}$, those terms have to have opposite signs. This would be the case if the trade would decrease the equality gains, which would mean the inequality would increase, while the income gains would increase. The other possible case for a trade-off would be an increase in equality gains and a decrease in income gains. Those trade-offs appear for the majority of the countries, in case of this study for 45 countries. The remaining 9 countries do not face a trade-off. However, 27 of the trade-off countries can face, depending on the inequality aversion parameter ε, severe reversals in the preference of trade policy.

As mentioned above, the authors differentiate the results into three categories. The first category is seen as trade-off countries without trade policy preference reversals. As mentioned before, only 18 countries face a trade-off soft enough to indicate for only one trade policy for all inequality aversion parameter ε. From those countries, only 2 countries showcase a favor for protectionism while the remaining countries tend a strong domination in regard of a trade liberalization.

The second group of countries are countries which face severe trade policy preference reversals caused by the trade-off. Those countries preferences change in regard of the weighting of the well-being of low income households, which is defined as ε. Those 27 countries showcase that for a low ε, most countries favor the protectionism and with an ongoing increase of ε the countries tend to favor the liberalization.

The authors view the results as follows, even with an $\varepsilon = 1.5$, which is close to the Gini coefficient, there are 30 countries with a trade-off in favor of liberalization. 28 of the studies' countries would experience inequality adjusted gains from liberalization and only 7 countries with trade-offs would prefer the protectionism because in their case, tariffs would lead to higher inequality-adjusted welfare. However, in total, the trade liberalization is expected to increase the welfare in 39 countries and reduce it in only 9 countries for plausible levels of the inequality aversion parameter ε, which can be seen in Figure ?? as well. Therefore, the authors ask themselves why the majority of countries still prioritize protectionism over liberalization, they can not answer this question directly and see a possible answer in the political, economic considerations of the single countries. In total those results show, that

protectionism seems to be loaded with high costs in regard of the social welfare.
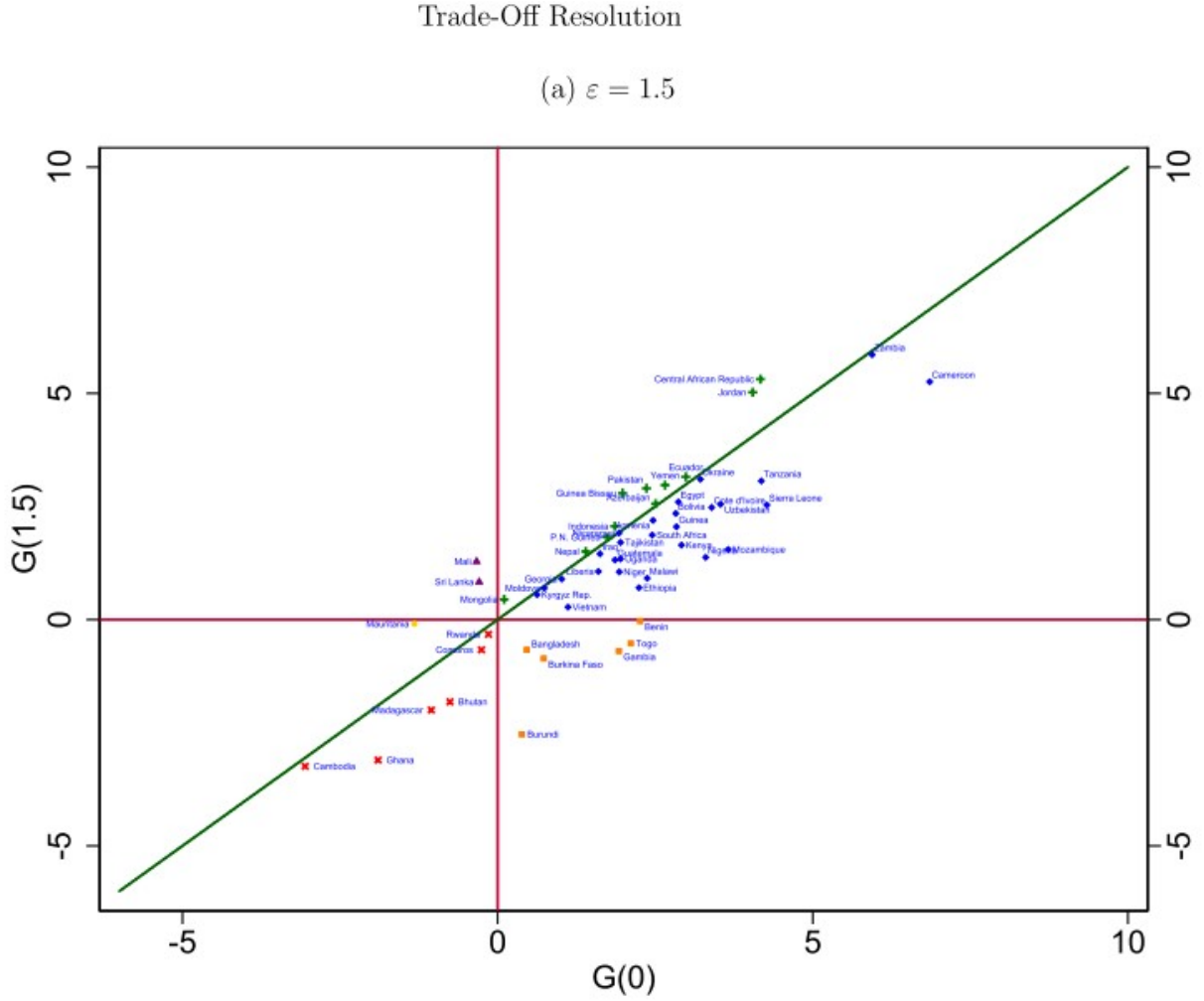
Trade-Off Resolution

(a) $\varepsilon = 1.5$

Figure 3.3: Scatter plot to display the countries favorable trade policy by Artuc, Rijkers and Porto from 2019

To underline their results, the authors use two different permutations of their model to check the model's robustness, which they confirm by the very similar pattern of the inequality-adjusted gains. Another point of their robustness check is in the form of reevaluation of two alternative assumptions about the tariff redistribution. The first assumption of changes is the exclusion of tariff revenue from the model, however the correlation of equality gains and income gains is still negative. The second reevaluation is a change in the compensation of the tariff losses by governmental progressive taxes instead of proportional taxes, however the pattern does not show any impact and the trade-off countries are still dominated in favor of liberalization. Another form of robustness test is done by using the model to evaluate three different protectionist scenarios instead, the first one increases the tariffs by 10 percent uniformly, the second is a relative increase of 10 percent and the third one is an increase to 62.4 percent for all tariffs. However, all three scenarios confirm the results, that in this case 43 to 48 countries inequality-adjusted income gains would decrease with increased protection. This underlines the assumption, that the majority of countries is actually financially hurt by

their ongoing protectionism.

Protectionist Scenarios

	Baseline (Liberalization)	10% relative increase	10% absolute increase	Increase to 62.4%
N winners	45	6	11	11
N losers	9	48	43	43
Average (Inequality Adjusted) Gains from trade reform				
G(0)	1.9 %	-0.2 %	-1.3 %	-5.7 %
G(1)	1.5 %	-0.2 %	-1.3 %	-7.2 %
G(1.5)	1.3 %	-0.2 %	-1.3 %	-7.8 %
G(2)	1.1 %	-0.2 %	-1.3 %	-8.3 %
G(10)	-0.4 %	-0.2 %	-1.7 %	-17.9 %
Countries without tradeoffs	11	8	9	10
of which prefer freer trade	5	6	7	9
Countries with tradeoffs	43	46	45	44
of which prefer freer trade				
$\epsilon = 1$	39	42	39	37
$\epsilon = 1.5$	36	43	38	37
$\epsilon = 2$	35	41	36	37
$\epsilon = 10$	27	33	36	42
Total number of countries that prefer freer trade				
$\epsilon = 0$	45	48	43	43
$\epsilon = 1$	44	48	46	46
$\epsilon = 1.5$	41	49	45	46
$\epsilon = 2$	40	47	43	46
$\epsilon = 10$	32	39	43	51

Table 3.1: Results of three Protectionist Scenarios by Artuc, Rijkers and Porto from 2019

Finally, to summarize their study's results, the authors come to the conclusion, that their model confirmed the negative correlation between income gains and equality gains, which leads to a trade-off in the case of liberalization. While liberalization lead to income gains in 45 countries in their study, 9 countries would face losses instead. To finish, they give their thought that based on their study, the majority of developing countries would profit of liberalization and that the ongoing trend of protectionism is causing significant welfare losses in developing countries.

4 Critical aspects

To determine the significance of the study by Artuc, Rijkers and Porto, a closer review regarding possible weaknesses of the study has to be done. To start the critical review of the study, first, the data must be inspected. One of the main issues or possible weaknesses of the data is the range of years, in which the household surveys were taken. As the earliest household survey was taken in 1998 for Rwanda, the most recent one was taken in 2015 in Liberia. The outdated part of the data might dilute the results and assumptions regarding the impact of liberalization for those "outdated" countries as the time between the usage of those single household surveys and the time they are used in the model ranges up to twenty-one years. In those decades, worldwide economic shifts, economic crises and other factors could appear and could change the household surveys' outcome a lot. It is also unknown if the authors of this study adapted the survey data by including the inflation of the single countries. While the data definitely shows possible directions for trade-offs between income gains and equality gains, the authors could have tried to add commonly known economic developments into the data as the inflation rate for example, to increase the significance of their results.

Another possible weakness in the usage of survey data is the accuracy of the household's answer and therefore the significance of the data itself. Several authors and politicians mentioned the lack of some features and relatively high error rates and even higher non-answer rates for conducted household surveys. Therefore, the literature and policy tries to overcome those disadvantages by linking survey data with administrative data. However, especially in developing countries, which were the main focus of this study, administrative data is lacking. Therefore, the authors could not use a better possible dataset for especially the heterogeneous analysis of households' incomes and expenditures. This can be also confirmed by the authors themselves as they updated this study in 2022 with the same dataset of household surveys. The lack in the recurrence of household surveys in developing countries leads to the conclusion, that household survey data is still the most detailed data possible, especially in the case of developing countries as other possible data like administrative data is still an exception.

As the authors themselves mentioned, their model relies on the extended agricultural household model by Singh etc. This leads to an inability of the model to capture the differential impacts on the impacts of capital vs labor or skilled vs unskilled labor. However, not only the model can not capture those details as the data itself lacks information about capital and corporate profits, so that just by choosing this dataset, the authors decided against the differential analysis of these points.

Another thing which could be misleading is the assumption about the results of this study, that trade liberalization is an easy solution for enhancing the social welfare of countries. This study tried to predict the impact of trade liberalization based on the assumption, that those welfare enhancing effects especially for the low income household are instantly receivable. However, there is the thought in literature, that the impact of trade liberalization on low income households depends on the environment and policies of the country itself. Therefore,

a need for additional policies can be needed to enhance or even enable the positive impact for the poor households of a country. This important role of complementary politics is also underlined by the evidence, that shows that especially low income households have lower chances per se to protect themselves socially and to enhance the possibility to exploit the anticipated benefits by the liberalization. Even under the circumstances above, the author of this literature concludes, that while trade liberalization might not be the most powerful or direct tool to address welfare of a country, it is one of the easiest tools to use with a positive outcome. So in the end, even while the isolated view of trade liberalization can lead to not reaching the anticipated benefits, it is still a useful and easy to execute tool to increase the welfare of low income households and battle poverty of a country.

5 Conclusion

By summarizing and reviewing the study by Artuc, Rijkers and Porto from 2019, the following conclusion can be given regarding their model, the chosen data set and the results of the study.

While the data set is based on household surveys from 54 developing countries, which range back to 1998 in the most extreme cases, the data still seems to be the best possible dataset for this use case as especially the chosen developing countries suffer a lot under the lack of data in other form like administrative data. Therefore, the used dataset meets all the requirements and can be assumed as the most recent and fitting data for their own developed model. This just showcases, that especially countries, which would probably benefit by a trade policy change towards freer trade, lack the monitoring and collection of data or the technology itself, which needs to be improved to increase the quality of possible estimations regarding the countries' economy, especially on the scope of households to battle poverty.

Another specific weakness and also strength of their developed model lies in their use of the extended agricultural household view as base view, which denies possible analyses regarding standard trade theory like Stolper-Samuelson effects for example. However, Artuc et al. mentioned that they chose this household model to enable the new view of scope of households to get results addressing the heterogeneity of households. This problem also appears in the selected data of the household surveys itself, as this data lacks information about returns to capital and corporate benefits, which would be needed for several models regarding the standard trade theory. The authors also compare their results in robustness tests with other studies, where standard trade models were used and showed the same pattern in the results and confirmed the negative correlation between income gains and equality gains.

While the authors of the main study conclude that trade liberalization would be welfare enhancing itself based on the results, other literature refers to the potential need of complementary policies to achieve the anticipated welfare changes, especially for the low income households, there might be a need to enable some form of protection and enhance the chance to receive and exploit the income gains through additional policies. But even though as the Artuc, Rijkers and Porto tend to view trade liberalization in isolation in their model, their results underline the potential of trade liberalization and showcases its beneficial side. Even critics of the isolated view of trade liberalization underline the statement, that it is one of the easiest to commit to tools to possibly tackle poverty and enhance social welfare, but with the possibility in the dependence of complementary policies to enhance the equal and anticipated distribution of the income gains.

So in total, the study by Artuc, Rijkers and Porto from 2019 showcases a new concept of model to investigate the impact of trade policies on the income gains and equality gains of countries, which enables the scope of households and their heterogeneity. Using this model on

the best possible data from household surveys, they found out that first, that liberalization causes trade-offs between income gains and equality gains. Those trade-offs were explained as negative correlation, which was proven as well. Their second and final conclusion of the results, that trade liberalization is welfare enhancing in most cases, seems to be confirmed as well as other literature with standard models tend to show the same conclusion. However, the limitation of the household surveys needs to be updated to come to more recent conclusions regarding the question, whether or whether not developing countries should move towards trade liberalization instead of protectionism.