



Prosperity Notes Series

ASSESSING THE WELFARE IMPACT OF TARIFF LIBERALIZATION FOR WOMEN:

Data and Analytical Framework

Guido Porto with Deborah Winkler

March, 2026



TRADE, COMPETITION, AND BUSINESS

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ABS

ABSTRACT

Assessing the Welfare Impacts of Tariff Liberalization for Women: Data and Analytical Framework¹

Guido Porto² with Deborah Winkler³. March, 2026.

This paper presents a dataset and an analytical framework to study the welfare effects of tariff changes on women. The data is an extension of the Household Impacts of Tariffs (HIT) dataset, which contains harmonized household survey data for 54 low and lower middle-income countries. It includes highly disaggregated information on household budget and income shares for 53 agricultural products, wage labor income, non-farm enterprise sales and transfers as well as spending on manufacturing and services for each percentile of the real income distribution. The Household Impact of Trade for Women (HIT_W) data presented here differentiates expenditure and income shares for households with male heads, households with female heads, and households with different female demographic compositions. The analytical framework delivers formulas that can be used to measure the impacts of changes in tariffs on household real income.

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INTRODUCTION

This paper presents a dataset and an analytical framework to study the welfare effects of tariff changes on women. The measure of welfare is real income. Thus, the tools developed here take into account the effects of trade liberalization on the prices paid by consumers, on the prices of products sold by producers and on wages. The data provides aggregate metrics to quantify those welfare effects separately for women and for men. These metrics include household headship (i.e., a comparison of households with males as head relative to households with females as head) as well as household composition (i.e., a comparison of households with different female composition).

The data is an extension of the Household Impacts of Tariffs (HIT) dataset of Artuç, Porto and Rijkers (2021). The HIT data contain harmonized household survey data for 54 low and lower middle income countries. It includes highly disaggregated information on household budget and income shares for 53 agricultural products, wage labor income, non-farm enterprise sales and transfers as well as spending on manufacturing and services for each percentile of the real income distribution. The Household Impact of Trade for Women (HIT_W) data presented here extends Artuç, Porto and Rijkers (2021) to differentiate expenditure and income shares for households with male heads, households with female heads, and households

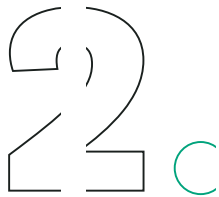


with different female demographic composition. The focus of this data, and thus this paper, is on agricultural tariffs.

The analytical framework builds on Artuç, Porto and Rijkers (2019) and Artuç, Depetris, Porto and Rijkers (2023). We describe household consumption choices following a utility maximization setting and describe various dimensions of the income generation process, in terms of land and labor allocations. This leads to measures of household welfare based on real income information and to formulas that can be used to measure the welfare impacts of trade liberalization based on expenditure and income shares. Since these shares

are the core of the HIT_W data, the analytical framework provides guidelines for the assessment and quantification of the welfare effects of trade on women.

The paper is organized as follows. In Section 2, we develop the analytical framework building on agricultural household models and we derive the theoretical impacts of trade shocks on household welfare. Section 3 introduces the Household Impacts of Trade for Women (HIT_W) dataset. Section 4 illustrates applications of the data in analyzing welfare impacts of tariff shocks as well as productivity shocks. Section 5 concludes.



ANALYTICAL FRAMEWORK

The analytical framework builds on an extended agricultural household model. In this note, we present a simplified version of the model described in Artuç, Porto and Rijkers (2019). The canonical agricultural household models are described in Barnum and Squire (1979) and Singh, Squire and Strauss (1986). The use of these models to study

the welfare consequences of pricing policies was pioneered by Deaton (1989). Recent extensions include Porto (2006) and Nicita, Olarreaga and Porto (2014), among others. In all these models, households have a dual role, as consumers and as income earners.



2.1. Expenditures

Each household, denoted by h , maximizes utility given income y^h and a vector of exogenous prices \mathbf{p} . As a result of the maximization process, we obtain a demand vector $\mathbf{c} = c^h(\mathbf{p}, y^h; a)$, where a is a set of household characteristics including household headship (male versus female) and the female demographic composition. It is useful to write

down the associated expenditure function

$$e(\mathbf{p}, u^h; a) = \sum_i p_i c_i^h(\mathbf{p}; a)$$

which is the minimum level of expenditure e needed to reach the required utility u^h .

2.2. Farm Production and Labor Income

Assume for a moment that the household specializes in one farming activity, such as rice, maize, coffee, or tobacco. The family is endowed with fixed amounts of land and capital, denoted by K . There is also family labor, supplied inelastically at the level $T^h(a)$, which may depend on sex-disaggregated characteristics. The price of the good, p , and the wage w_L are exogenous. The farm maximizes profits. Given the maximized profits $\pi^*(a)$, household income is

which includes labor income and profits (earned in agriculture). To extend this analysis to many activities j , we assume that the household faces exogenous prices for all goods and factors of production and that these factors can be freely allocated across activities. We get

$$y^{h*}(a) = w_L T^h(a) + \pi^*(a)$$

$$y^{h*}(a) = w_L T^h(a) + \sum_j \pi_j^*(a)$$

2.3. Trade and Household Welfare

To study household welfare effects, we can look at the real income of the household and how trade affects nominal incomes and expenditures separately. To simplify, we assume that household expenditures are fully covered by current income (ruling out savings, debt and dynamic considerations)

We follow Deaton (1989a; 1989b; 1997) and estimate first order approximations to get a sense of the welfare effects of different trade shocks. As is well understood, these approximations account for short-term effects and do not account for adjustments, dynamics or general equilibrium impacts. In all the experiments, we use the notion of the compensating variation CV^h by adjusting exogenous income by dx_0^h to keep households at constant utility. The welfare effects are expressed in terms of household expenditure e^h to get a sense

$$\sum_i p_i c_i^h(a) = w_L T^h(a) + \sum_j \pi_j^*(p_j, w_L; a) + x_0^h$$

of the monetary value of the impacts.

Consider good i , and assume there is a change in the tariff τ_i imposed on good i . The monetary effect of such a price change on the household is

$$CV^h(\tau_i) = -\frac{dx_0^h}{e^h} = (\phi_i^h(a) - s_i^h(a)) \frac{d \ln p_i}{d \tau_i}$$

where $s_i^h(a)$ is the budget share of household h on good i and $\phi_i^h(a)$ is the income share of household h from sales of good i . For one good and small price changes, the approximation works well. With many

goods and large tariff changes, the error can be more sizeable. The use of budget and income shares is useful because they are available in the surveys and we exploit this in the HIT_W. This expression operationalizes the net-consumer, net-producer results. If price p_i increases (with tariff protection), net producers are better off while net consumers are worse off. In contrast, if the household is a net consumer of the good, then a higher price creates a welfare loss. These welfare effects can be sex-specific.



HOUSEHOLD IMPACTS OF TRADE FOR WOMEN DATA

The Household Impacts of Trade for Women (HIT_W) dataset is an extension of the Household Impact of Tariff (HIT) data. HIT contains harmonized household survey data for 54 low and lower middle-income countries. The surveys are listed in Table 1. HIT includes highly disaggregated information on household budget and income shares for 53 agricultural products, wage labor income, non-farm enterprise sales and transfers as well as spending on manufacturing and services for each percentile of the real income distribution. Artuç, Porto and Rijkers (2019) and Artuç, Porto and Rijkers (2021) provide a detailed discussion

on the household survey availability, product and sector coverage, and the harmonization of income and expenditure survey data. The HIT and HIT_W databases are not the World Bank Group's official poverty data, which can be found in Bank's Poverty and Inequality Platform (PIP). HIT consumption aggregates may differ from those in PIP because the methodology used to calculate aggregate consumption differs from that of PIP (see Artuç, Porto and Rijkers, 2021).



Table 1: List of Household Surveys

Country	Year	Sample	Survey Name
Armenia	2014	5124	Integrated Living Conditions Survey
Azerbaijan	2005	4797	Household Budget Survey
Bangladesh	2010	12117	Household Income and Expenditure Survey
Benin	2003	5296	Questionnaire Unifié sur les Indicateurs de Base du Bien-être
Bhutan	2012	8879	Living Standards Survey
Bolivia	2008	3900	Encuesta de Hogares
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
Cambodia	2013	3801	Socio-Economic Survey
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
Ecuador	2013-2014	28680	Encuesta de Condiciones de Vida
Egypt, Arab Rep.	2008-2009	23193	Household Income, Expenditure and Consumption Survey
Ethiopia	1999-2000	16505	Household Income, Consumption and Expenditure Survey
Georgia	2014	10959	Household Integrated Survey
Ghana	2005-2006	8599	Living Standards Survey V
Guatemala	2014	11420	Encuesta Nacional de Condiciones de Vida
Guinea	2012	7423	Enquête Légère pour l'Evaluation de la Pauvreté
Guinea-Bissau	2010	3141	Inquerito Ligeiro para a Avaliação da Pobreza
Indonesia	2007	12876	Indonesian Family Life Survey
Iraq	2012	24895	Household Socio-Economic Survey
Jordan	2010	11110	Household Expenditure and Income Survey
Kenya	2005	13026	Integrated Household Budget Survey

Table 1 (cont.): List of Household Surveys

Country	Year	Sample	Survey Name
Mali	2006	4449	Enquête Légère Intégrée auprès des Ménages
Mauritania	2004	9272	Enquête Permanente sur les Conditions de Vie des Ménages
Moldova	2014	4836	Household Budget Survey
Mongolia	2011	11089	Household Socio-Economic Survey
Mozambique	2008-2009	10696	Inquérito sobre Orçamento Familiar
Nepal	2010-2011	5929	Living Standards Survey
Nicaragua	2009	6450	Encuesta Nacional de Hogares sobre Medición de Niveles de Vida
Niger	2005	6621	Enquête Nationale sur les Conditions de Vie des Ménages
Nigeria	2003-2004	18603	Living Standards Survey
Pakistan	2010-2011	16178	Social and Living Standards Measurement Survey
Papua New Guinea	2009	3776	Household Income and Expenditure Survey
Rwanda	1998	6355	Integrated Household Living Conditions Survey
Sierra Leone	2011	6692	Integrated Household Survey
South Africa	2000	25491	General Household Survey
Sri Lanka	2012-2013	20335	Household Income and Expenditure Survey
Tajikistan	2009	1488	Tajikistan Panel Survey
Tanzania	2008	3232	Household Budget Survey
The Gambia	1998	1952	Household Poverty Survey
Togo	2011	5464	Questionnaire des Indicateurs de Base du Bien-être
Uganda	2005-2006	7350	National Household Survey
Ukraine	2012	10394	Sampling Survey of the Conditions of Life of Ukraine's Households
Uzbekistan	2003	9419	Household Budget Survey
Viet Nam	2012	9306	Household Living Standard Survey
Yemen, Rep.	2005-2006	12998	Household Budget Survey
Zambia	2004	7563	Living Conditions Monitoring Survey IV

HIT aggregates goods in the household surveys to 2-digit and 4-digit categories using separate expenditure and income templates (Nicita, Olarreaga and Porto, 2014). It covers spending on, and income derived from, 53 4-digit agricultural and food items. These include Staple Agriculture, such as corn and rice, and Non-Staple Agriculture, such as oils, cotton and tobacco. It also categorizes spending on five manufacturing items, on five (non-tradeable) services and on four other expenditures. The fact that we have much more granular data on agricultural products than on manufacturing services reflects the structure of the household

surveys we are standardizing, which typically lack detailed disaggregated information on what industries workers are employed in, yet do typically contain detailed information on what crops are consumed and grown. On the income side, HIT keeps track of income derived from the sales of the same 53 food items we cover on the expenditure side. In addition, whenever the survey design allows it, we also split wage income by sector, defined roughly at the 1 digit level, and keep track of non-farm household enterprise sales across 10 sectors, as well as various types of transfers.

3.1. Women's Characteristics in the Household Data

HIT_W exploits this information to differentiate the budget and income shares for households with different sex-disaggregated characteristics. HIT_W includes average expenditure and income shares for male-headed households, for female-headed households, for households with more than 50% of females relative to households with less than 50% of females, for households with more than 70% of females relative to households with less than 70% of females, and for households with more than 30% of females relative to households with less than 30% of females. Since many of the surveys are subject to confidentiality agreements, we aggregate the households for each percentile of the household per capita real income distribution. The database comprises 54 country-specific datasets with 100 observations (one per percentile) each. The entire data is based on an underlying dataset of 521,639 households which are in turn representative of approximately 1.8 billion people. This allows for a direct comparison of the welfare impacts of trade shock across different sex-disaggregated dimensions and along the entire income distribution of each country.

For each budget and income share in HIT, HIT_W reports nine variables. Consider for example the

variable `share_inc_20` from HIT. This is the share of income derived from wages earned in 2-digit sector 20 which is agriculture, forestry and fishing. HIT_W includes the following variables:

1. `share_inc_20`: average income share, at different percentiles, across all households
2. `share_inc_20_m`: average income share, at different percentiles, across male-headed households
3. `share_inc_20_f`: average income share, at different percentiles, across female-headed households
4. `share_inc_20_shF_50_H`: average income share, at different percentiles, across households with more than 50% of females
5. `share_inc_20_shF_50_L`: average income share, at different percentiles, across households with less than 50% of females
6. `share_inc_20_shF_70_H`: average income share, at different percentiles, across households with more than 70% of females
7. `share_inc_20_shF_70_L`: average income

share, at different percentiles, across households with less than 70% of females

8. share_inc_20_shF_30_H: average income share, at different percentiles, across households with more than 30% of females
9. share_inc_20_shF_30_L: average income share, at different percentiles, across households with less than 30% of females

Two final remarks follow. In one case, Kenya, no household has more than 70% of its member being

females and no household with less than 30% of members being females. In this case, the pertinent variables are not available in the dataset (for instance, “share_inc_20_shF_70_H” and “share_inc_20_shF_30_L.”) In addition, in three countries, namely Iraq, Zambia and Papua New Guinea, the demographic composition data was not available and thus the HIT_W dataset only allows for a comparison between male-headed and female-headed households.

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APPLICATIONS

In this section, we illustrate uses of the data and model. To do this, we work with the main example proposed by Artuç, Porto and Rijkers (2021) in their presentation of the HIT data. This example considers a full liberalization of tariffs on all agricultural products. The reasons behind this choice are the following. First, it seems appropriate to run the scenario of the original paper so as to consider differences across sex-disaggregated characteristics that can enrich the analysis. Second, the HIT_W dataset is mainly focused on agriculture, rather than manufacturing. As explained, this is because of the nature of the household surveys and because of the characteristics of the countries

that are included, which are mostly low income countries with a large participation in agriculture.

We explore the case where the tariffs imposed by the countries in our sample on all agricultural products are eliminated. Note that we work with unilateral tariff cuts and thus we run independent simulations for each of the 54 countries separately.⁴ This implies a cut from the current tariff to a 0 tariff. Under full pass-through rate, the price change would be $d \ln p_i = - \left(\frac{\tau_i}{1 + \tau_i} \right) d \tau_i$

The full pass-through assumption is clearly a simplification. However, in the absence of heterogeneous tariff pass-through rates across

4. It is possible to study scenarios of multilateral trade liberalization, but this requires a general equilibrium trade model to determine equilibrium prices.

products and households, the final results will not change much. For example, if for a particular product the pass-through rate is less than one but common to all households, then the welfare

consequences will be reduced in the same proportion as the difference in the pass-through implies. The differences can be sizeable, but the distributional impacts will remain unaltered.

4.1. Gains from Agricultural Tariff Liberalization

With the tariff data from HIT and the income and budget shares from HIT_W, we compute the welfare effects using the formulas from Section 2. We calculate the welfare effect of the tariff cut in each product and then aggregate all those product-level effects to get a measure at the household level. The results are reported in Table 2.

We begin with the gains from trade without sex-disaggregated differentiation. The gains from eliminating tariffs amount to 2.84% of real household income on average across countries (column 1). This means that, from a global standpoint, developing countries would win from a unilateral agricultural tariff liberalization. There are sizeable differences in these averages (columns 2 and 3). For female-headed households, the average gains are 3.24%, while for male-headed households, they are 2.78%. In terms of Artuç, Depetris, Porto and Rijkers (2023), the bias of current trade policy against women is -0.46. Since trade liberalization in agriculture generates larger gains for female-headed households than for male-headed households, it follows that agricultural tariff protection in developing countries tend to hurt women more than males.

An interesting picture emerges when we compare households with different sex-disaggregated composition. In columns 4 and 5, we find only small differences in the gains for households with more than 50% of females (2.80% gain) than for households with less than 50% of females (2.78% gain). Using this metric, the bias against women almost disappears. Instead, the bias becomes stronger when we compare households with more

and less than 70% of females (columns 6 and 7). In this case, the gains for households with more women than men is 3.05% while for households with more men than women is 2.74%. Another possible comparison is between households with more than 30% of females with household with less than 30% of females. In this case, the gains are larger for households with less than 30% of females. This is an intriguing pattern: the bias is negative for households with more than 70% of females (in the sense that these households would gain more than the complement group of households with less than 70% of females), but it is also negative for households with less than 30% of females. Instead, for households with more (or less) than 50% of females, the bias tends to disappear. The reason is larger gains for households with uneven composition of women and men, be that a large fraction of females or a small fraction of them, and smaller gains for households with a more even demographics.

In order to put the analysis into context, it is convenient to work with an example. Suppose there are four households in the survey, with id 1, 2, 3 and 4. The share of females in each household is 0.8, 0.6, 0.4 and 0.2. The gains for household 1 is 3%, for households 2 and 3, 1%, and for household 4, 3% again. In this example, when we compare households with more or less than 50% of females, we find equal average gains of 2%. When we compare households with more than 70% of females versus households with less than 70% of females, we are comparing a gain of 3% versus an average gain of 1.67%, and the bias is 1.33 (or -1.33 depending on how the bias is defined). When

we compare households with more than 30% of females versus households with less than 30% of women, the latter group gains 1.33% more than the former group. In the first case, we are comparing households 1 and 2 with households 3 and 4; in the second case, we are comparing household 1 with the average of households 2, 3 and 4; in the last case, we are comparing the average of households 1, 2 and 3 with household 4.

Of course, this is not the only possible comparison (even within this example). We can think about this issue as follows. Consider for example the group of households with more than 70% of females. Which is the most relevant comparison for this group? In

this analysis, we are comparing it with the group of households with less than 70% of females. In principle, it would be possible to compare households with more than 70% of females with households with more than 70% of men (which is the same as the households with less than 30% of females). This comparison is also possible. In the example, both groups gain the same (3%). In terms of the results in Table 1, we should compare columns 6 and 9 (with gains of 3.05% and 3.03%). On average, these two groups gain the same, but, as Table 1 shows, this is obviously not the case in all countries.

Table 2: The Gains from Agricultural Tariff Liberalization Gender Bias

Country	Aggregate Gains								
	all	female heads	male heads	share of females					
				>=50%	<50%	>=70%	<70%	>=30%	<30%
World	2.84	3.24	2.78	2.8	2.78	3.05	2.74	2.75	3.03
Armenia	3.00	3.11	2.95	3.05	2.88	3.26	2.94	2.99	3.04
Azerbaijan	2.01	2.30	1.93	2.10	1.81	2.29	1.95	2.05	1.71
Bangladesh	0.82	0.66	0.84	0.84	0.79	0.48	0.87	0.82	0.87
Benin	1.46	1.13	3.26	1.30	1.73	1.74	1.39	1.30	2.38
Bhutan	7.87	6.24	8.46	7.73	8.11	8.18	7.82	7.58	9.40
Bolivia	3.17	3.80	2.97	3.19	3.14	3.49	3.09	3.16	3.24
Burkina Faso	1.52	3.36	1.35	1.47	1.58	1.89	1.46	1.39	2.13
Burundi	-1.07	0.20	-1.50	-0.99	-1.21	-0.82	-1.10	-1.04	-1.26
Cambodia	0.89	1.93	0.61	0.91	0.85	1.41	0.79	0.84	1.31
Cameroon	7.65	8.63	7.34	7.84	7.39	8.26	7.52	7.78	7.25
Central Africa Republic	3.29	3.31	3.28	3.12	3.56	3.16	3.32	3.16	3.81
Comoros	0.52	0.76	0.46	0.52	0.52	0.57	0.51	0.52	0.52
Cote d'Ivoire	2.30	2.35	2.20	2.60	1.96	3.64	2.04	2.32	2.32

Table 2 (cont.): The Gains from Agricultural Tariff Liberalization Gender Bias

Country	Aggregate Gains								
	all	female heads	male heads	share of females					
				>=50%	<50%	>=70%	<70%	>=30%	<30%
Ecuador	4.36	4.70	4.25	4.22	4.60	4.38	4.35	4.26	4.77
Egypt	3.24	3.42	3.22	3.14	3.41	3.17	3.25	3.14	3.84
Ethiopia	1.50	2.74	0.94	1.77	0.97	2.53	1.24	1.55	1.03
Gambia	4.67	5.85	4.47	4.61	4.80	4.88	4.64	4.60	5.13
Georgia	1.34	1.56	1.23	1.31	1.41	1.58	1.27	1.29	1.75
Ghana	-0.42	0.31	-0.68	-0.38	-0.46	0.10	-0.54	-0.51	-0.05
Guatemala	2.77	3.18	2.67	2.78	2.77	2.89	2.75	2.73	3.01
Guinea	3.04	3.37	2.98	3.04	3.04	2.97	3.05	3.03	3.15
Guinea Bissau	4.59	4.86	4.52	4.60	4.59	4.76	4.56	4.52	5.10
Indonesia	3.03	2.48	3.15	2.82	3.40	2.46	3.15	2.90	3.70
Iraq	1.16	1.37	1.14						
Jordan	6.64	6.42	6.67	6.33	7.12	5.73	6.78	6.56	7.24
Kenya	3.24	3.20	3.26	3.25	3.13		3.24	3.24	
Kyrgyz Republic	1.12	1.37	0.95	1.21	0.89	1.46	1.02	1.13	0.99
Liberia	1.92	2.26	1.79	2.00	1.81	2.12	1.87	2.01	1.63
Madagascar	0.73	1.80	0.44	0.90	0.42	1.48	0.57	0.74	0.62
Malawi	0.59	0.55	0.59	0.48	0.74	0.56	0.59	0.52	0.84
Mali	2.36	3.92	2.25	2.35	2.35	2.93	2.30	2.27	3.14
Mauritania	4.44	4.93	4.32	4.44	4.43	4.51	4.42	4.44	4.43
Moldova	0.63	1.00	0.37	0.66	0.51	1.07	0.47	0.62	0.67
Mongolia	2.14	2.71	1.98	2.22	1.99	2.39	2.08	2.16	2.03
Mozambique	3.75	4.26	3.51	3.74	3.76	3.67	3.77	3.76	3.63
Nepal	2.76	3.01	2.66	2.75	2.77	2.89	2.73	2.72	3.05
Nicaragua	4.77	5.34	4.43	4.86	4.60	5.07	4.71	4.80	4.57
Niger	1.44	3.05	1.31	1.39	1.53	1.78	1.40	1.37	1.98

Table 2 (cont.): The Gains from Agricultural Tariff Liberalization Gender Bias

Country	Aggregate Gains								
	all	female heads	male heads	share of females					
				>=50%	<50%	>=70%	<70%	>=30%	<30%
Nigeria	3.49	4.01	3.44	3.42	3.56	3.85	3.43	3.34	3.94
Pakistan	2.57	3.17	2.53	2.58	2.57	2.76	2.56	2.52	2.94
Papua New Guinea	2.75	3.08	2.70						
Rwanda	2.28	2.49	2.19	2.27	2.31	2.69	2.18	2.21	2.69
Sierra Leone	3.01	3.50	2.83	3.10	2.84	3.53	2.91	2.99	3.14
South Africa	1.72	1.58	1.82	1.65	1.85	1.54	1.77	1.66	1.93
Sri Lanka	3.57	3.80	3.50	3.52	3.69	3.62	3.56	3.54	3.84
Tajikistan	3.13	3.41	3.07	3.15	3.08	3.28	3.11	3.13	3.09
Tanzania	4.63	4.62	4.60	4.89	4.15	5.63	4.39	4.66	4.32
Togo	3.79	4.49	3.60	3.72	3.84	4.10	3.72	3.67	4.12
Uganda	3.28	3.04	4.04	3.34	3.12	4.10	3.11	3.05	4.19
Ukraine	3.44	3.43	3.50	3.46	3.38	3.62	3.36	3.43	3.60
Uzbekistan	3.91	4.65	3.69	4.02	3.70	4.38	3.84	3.90	4.01
Viet Nam	1.85	3.03	1.48	1.78	2.00	2.28	1.76	1.76	2.52
Yemen	3.90	4.33	3.86	3.92	3.87	3.99	3.89	3.87	4.09
Zambia	6.91	7.10	6.85						

Note: gains from tariff liberalization from HIT_W dataset.

Another interesting pattern is that the aggregate gains are highly heterogeneous across countries. In almost all countries, there are positive gains from trade, but there can be losses as in Burundi and Ghana. In contrast, female-headed households show average gains in all countries. Thus, the losses in Burundi and Ghana are attributed to male-headed households. At the same time, when we consider the sex-disaggregated composition (beyond headship), households with different female structure in both Burundi and Ghana lose on average.

Finally, there are wide differences in the gains from trade across countries. For example, the largest gains are found in Cameroon, where female-headed households gain 8.63%, households with more than 50% of females, 7.84%, households with more than 70% of females, 8.26%, and households with more than 30% of females, 7.78%. The smallest gains (among winner countries) can be found in Malawi. Female-headed households gain only 0.5%, households with more than 50% of females, 0.48%, households with more than 70%

of females, 0.56%, and households with more than 30% of females, 0.52%.

Obviously, this heterogeneity is present also in the pattern of the bias against women. We showed that, on average, households with more than 70% of females gain more, as do households with less

than 30% of females. This pattern is present in similar magnitudes in countries like Georgia, Ukraine or Togo. In Viet Nam, it is magnified, while in Mozambique, it is reduced. There are cases in which the opposite happens, as in the Central African Republic or Indonesia.

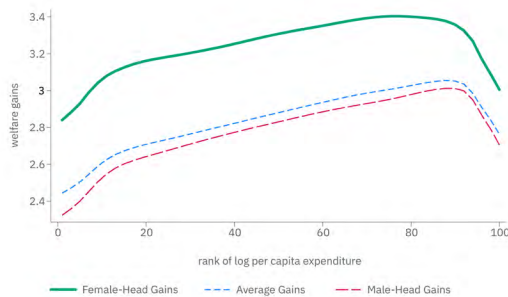
4.2. The Distribution of the Gains from Trade

Since the HIT_W dataset allows us to compute welfare gains across 100 points in the income spectrum of each country, it is possible to study the within country distribution of the gains from trade. We pool all countries and run a non-parametric regression of the gains from tariff liberalization against the household rank in the income distribution. Figure 1, panel a), plots this for all households and for male-headed and female-headed households. The non-parametric averages are increasing in the expenditure rank, except at the very top ranks (about the top decile). This

means that, on average, households at the left of the income distribution gain less than households at the top. This pattern is similar for male-headed as for female-headed households. Moreover, the results show that female-headed households tend to gain more, at each bin, than male-headed households. This is of course consistent with the calculation of the average bias in Table 1. For instance, the average female-headed household at bin 1 gains over 2.8% from tariff cuts, while male-headed households gain below 2.4%.

Figure 1: The Distribution of the Gains from Trade All Countries

a. male-head & female-head



b. more & less than 50% females

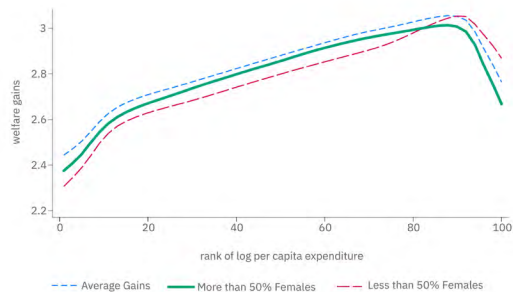
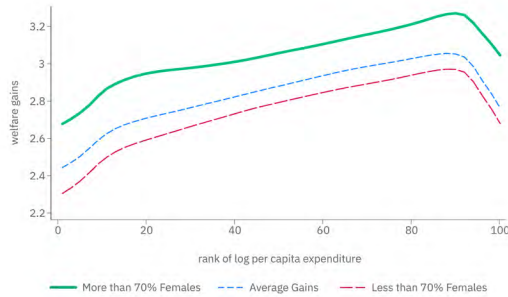
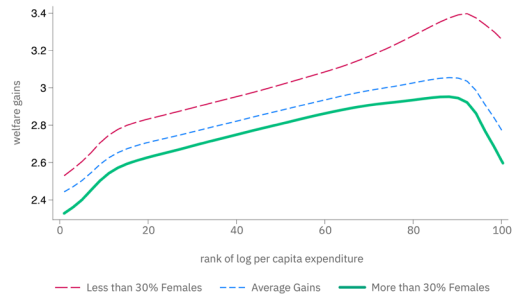


Figure 1 (cont.): The Distribution of the Gains from Trade All Countries

c. more & less than 70% females



d. more & less than 30% females



When we analyze the differences in the gains conditional on sex-disaggregated structure, the results show various patterns. In panel b) of Figure 1, for instance, we compare households with more and less than 50% of women. In this case, the gains are comparable across all the income spectrum (and not only then at the average as in Table 1), with slightly higher gains for households with more

than 50% of women. In panel c), it can be seen that the gains for households with more than 70% of females are larger than the gains for households with less than 70% of females across all the income ranks. Panel d) shows instead that households with less than 30% of females gains more than households with more than 30% of women and this holds at all income strata.⁵

5. Note that there is an enormous amount of heterogeneity in the data. A country-by-country exploration may uncover different patterns. To illustrate, the folder “Results” contains graphs for each country separately.



CONCLUSION

This paper introduced a dataset and an analytical framework to study the effects of trade shocks on the real incomes of women. The Household Impact of Trade for Women (HIT_W) data presented here extends Artuç, Porto and Rijkers (2021) to differentiate expenditure and income shares for households with male heads, households with female heads, and households with different female demographic composition. The analytical framework builds on Artuç, Porto and Rijkers (2019) and delivers first order changes in welfare based on the expenditure and income shares provided by the HIT_W data.

The paper illustrated how to use the data and the model by exploring the impacts of a full liberalization

of tariffs on all agricultural products. We found that trade liberalization in agriculture would generate larger gains for female-headed households than for male-headed households, implying that agricultural tariff protection in developing countries is hurting women more than men. This bias is larger for households with both more and less than 70% of females, that is, for households with more uneven demographics. There is significant heterogeneity in the welfare impacts of trade on women, but across countries and, within countries, across the income distribution. The paper showed a few examples of this heterogeneity and provided guidance to exploit this heterogeneity using the accompanying dashboard.



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