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Do Trade Agreements Increase Food Trade?

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Introduction

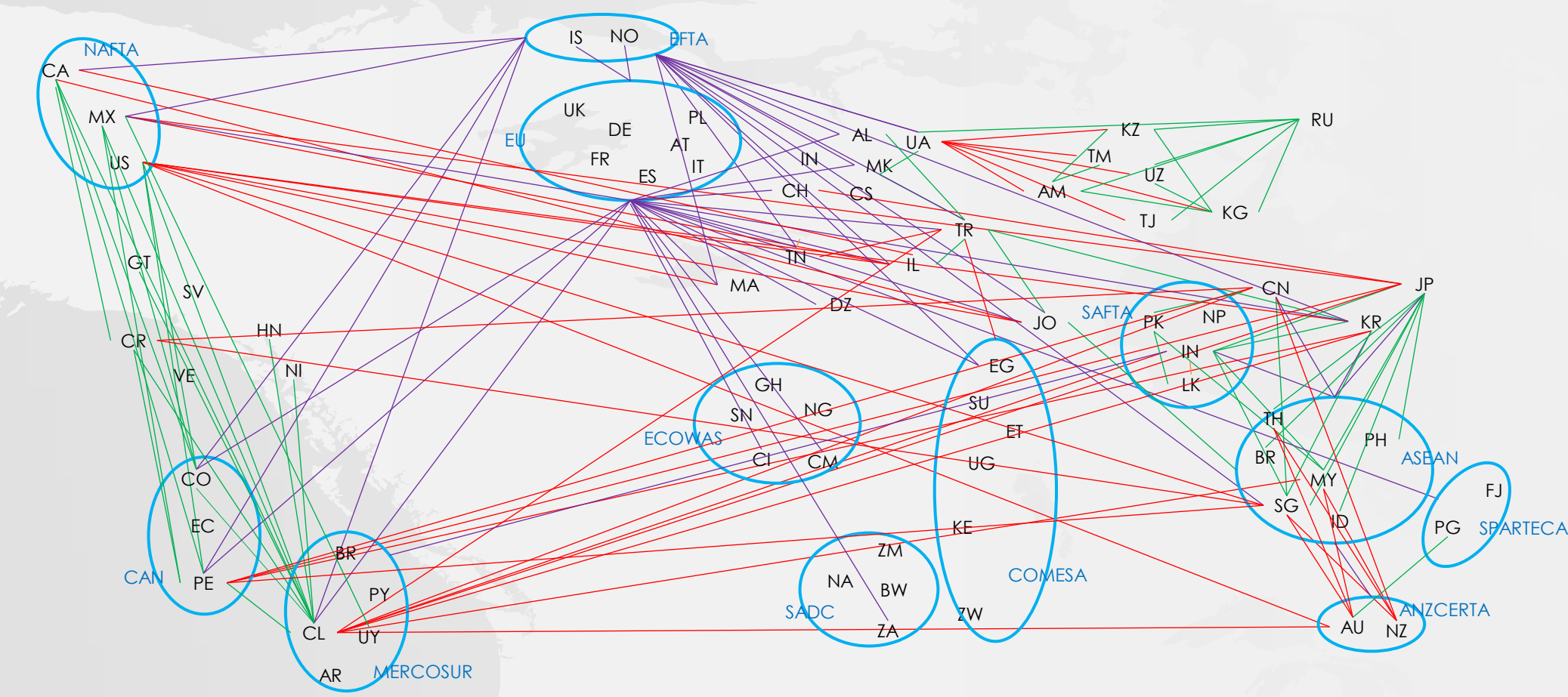


Figure: Global map of trade agreements
Source: Own illustration based on WTO database

In addition to multilateral trade agreements under the WTO, the world has an enormous number of regional trade agreements. This study attempts to investigate the contribution of these multilateral and regional trade institutions in strengthening food security at the worldwide level.

An important key factor of food security is physical availability of food at all times in all places. Economic means to access food is meaningless if food is not available.

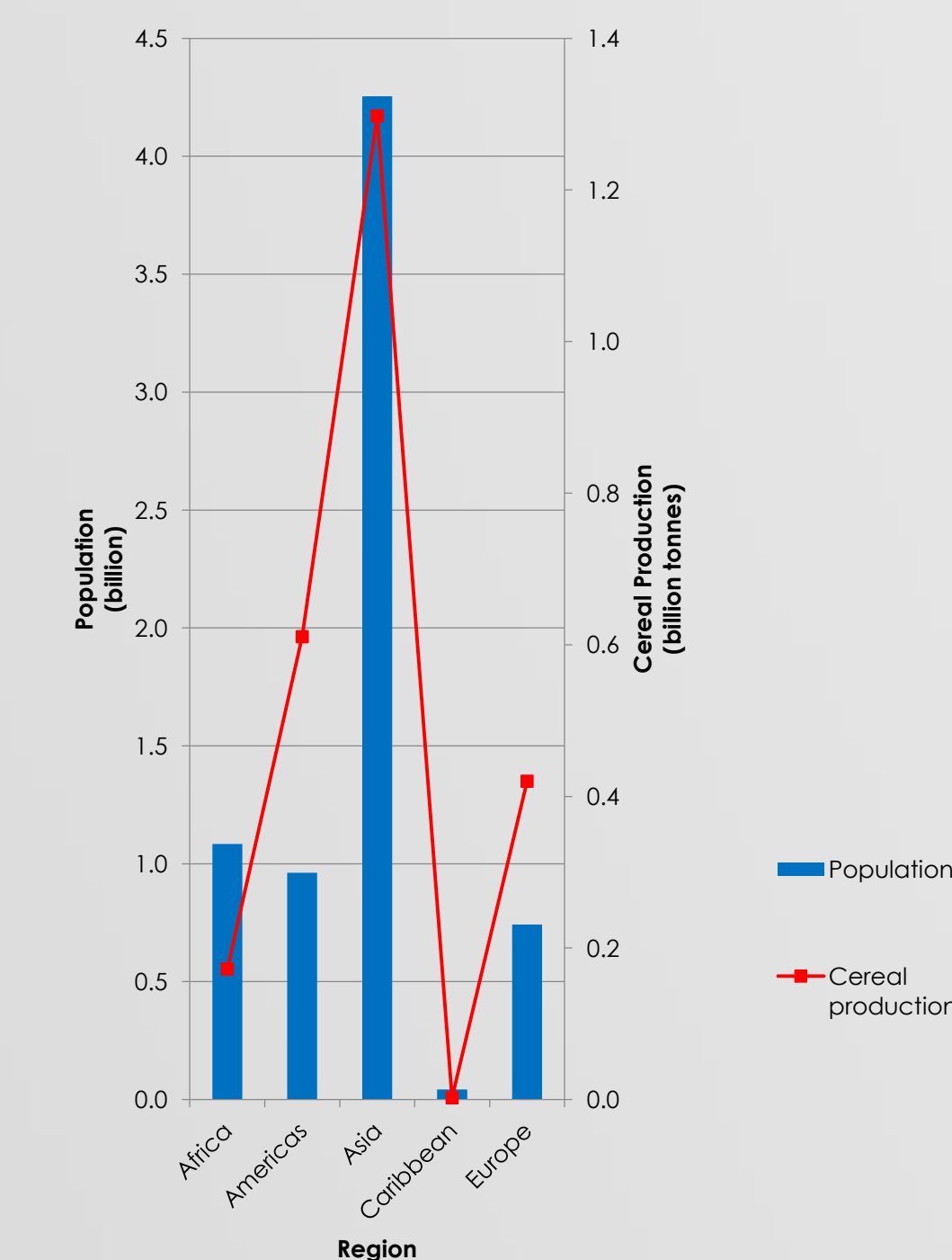


Figure: Population and Cereal Production in 2012
Source: FAOSTAT

However, Global imbalances occur since high population is not associated with high food production.

Food security at the global level is only possible when food can move freely from areas of surplus to areas of deficit.

In the context of food price volatility, in which international trade distortions have been found to be among the main key drivers (Martin and Anderson, 2012; von Braun and Tadesse, 2012; World bank, 2010), it is highly important to analyze whether trade agreements may contribute to reduce trade distortions and could bring the world to a freer flow of food.

Background Information

Trade Agreements

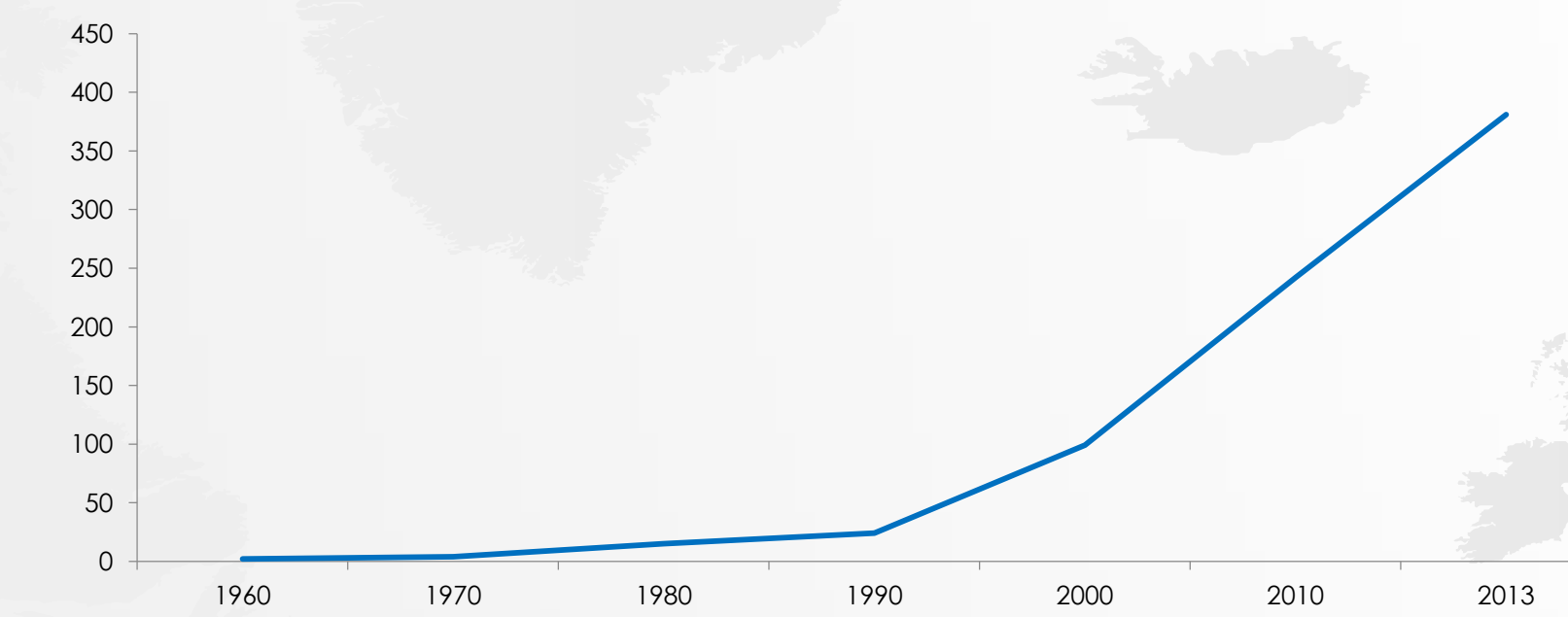


Figure: Numbers of RTAs 1960 - 2013
Source: Own illustration based on WTO database

Market Access

Sector	Tariff Rates	
	1992	2012
All Sectors	13.06	6.74
Manufactures	13.21	6.49
Agriculture	13.28	10.24
Textiles	17.21	10.06
Food	14.55	11.55

Table: Average tariff rates of different sectors
Source: TRAINS database accessed via WITS

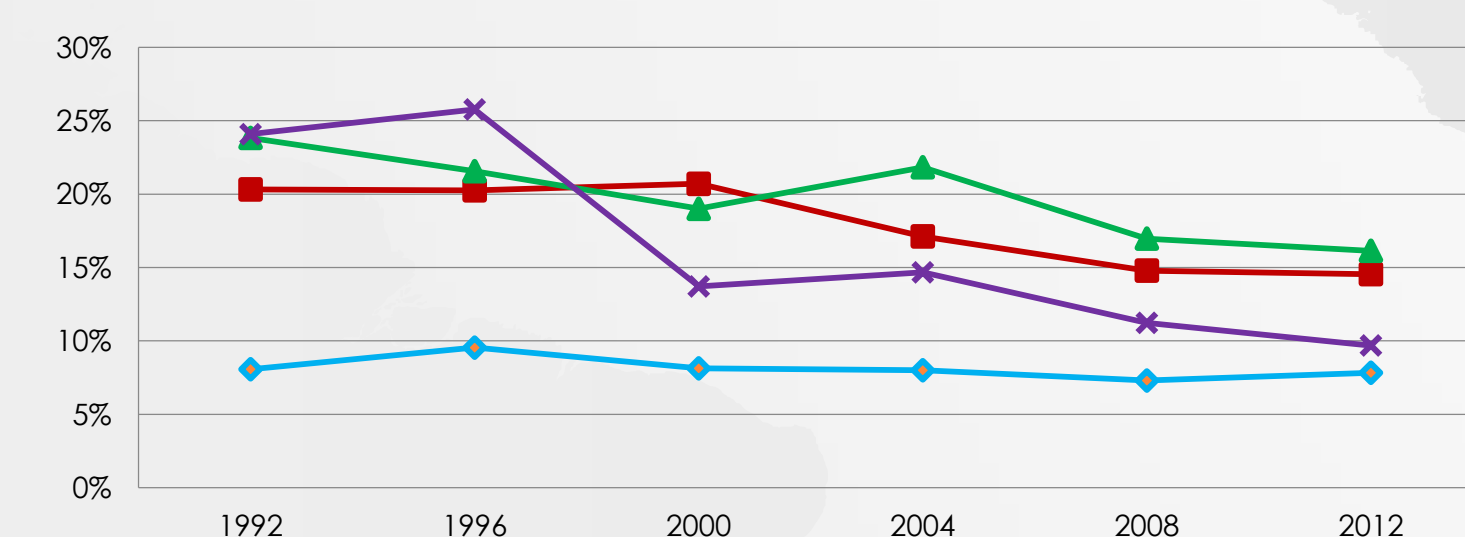


Figure: Food tariff rates evolution 1992 - 2012
Source: TRAINS database accessed via WITS

Food Trade

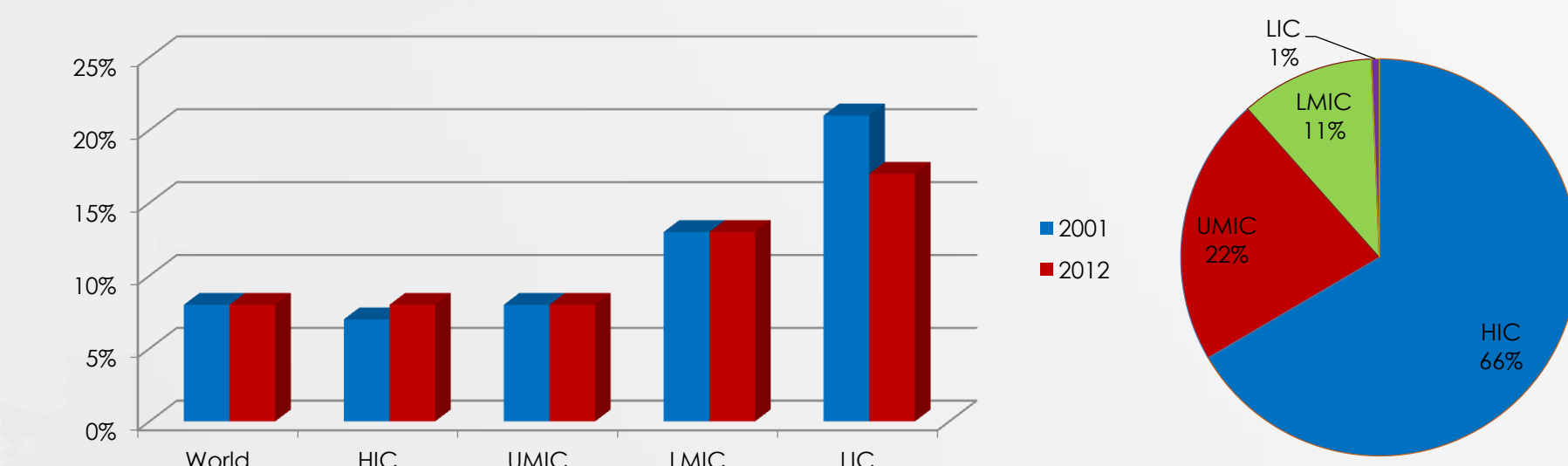


Figure: Shares of food in total trade
Source: Own calculation based on UN COMTRADE database

Figure: Shares of countries in world food trade
Source: Own calculation based on UN COMTRADE database

Empirical Strategy

Gravity model of international trade is used in the analysis. The model is developed in the large panel data setting and attempted to address some potential problems in the estimation including multilateral trade resistances, zero trade values and endogeneity. The database consists of 162 countries and 188 RTAs around the globe.

Basic formulation

$$X_{ijt}^k = \alpha_1 Y_{it} + \alpha_2 Y_{jt} + \sum_{m=1}^M \beta_m Z_{ij(t)}^m + \gamma_a WTO_{ijt} + \delta_n RTA_{ijt} + \varepsilon_{ijt}$$

Where Y_{it} and Y_{jt} are economic sizes represented by GDP of country i and country j respectively, Z is a vector of observable trade costs or promotions. WTO and RTA are dummy variables, 1 if the country pair are members of the WTO and whether the two countries are in the same RTA respectively, 0 otherwise.

The regressions include Ordinary Least Squares (OLS) with time invariant and time variant country fixed effects, OLS with bilateral country pair fixed effects, Poisson Pseudo Maximum Likelihood (PPML) and Instrumental Variable estimated using Two Stages Least Squares (TSLS).

Results

	OLS Time Invariant FE		OLS Time Variant FE		OLS Bilateral Country Pair FE		PPML		Instrumental Variable	
	Total Trade	Food Trade	Total Trade	Food Trade	Total Trade	Food Trade	Total Trade	Food Trade	Total Trade	Food Trade
GDP Importer	0.877*** (-0.03)	0.549*** (-0.0498)	1.068*** (-0.045)	0.854*** (-0.0949)	0.671*** (-0.0432)	0.785*** (-0.0962)	0.910*** (-0.0323)	0.695*** (-0.0621)		
GDP Exporter	0.445*** (-0.0296)	-0.0203 (-0.0464)	0.449*** (-0.0483)	0.0284 (-0.0878)	0.667*** (-0.0514)	-0.196 (-0.106)	0.893*** (-0.033)	0.0415 (-0.052)		
Tariff	-0.0465*** (-0.00968)	0.0408*** (-0.012)	-0.162*** (-0.0128)	0.0370** (-0.0146)	-0.218*** (-0.0108)	-0.0458*** (-0.0163)	0.0675** (-0.0342)	-0.0254*** (-0.00912)	0.9222*** (-0.0169)	
Distance	-1.559*** (-0.0103)	-0.340*** (-0.0179)	-1.562*** (-0.0102)	-0.340*** (-0.0178)	-1.362*** (-0.0141)	-1.362*** (-0.0352)	-1.362*** (-0.0887)	0.163 (-0.106)		
Landlocked	1.167** (-0.488)	1.243 (-0.876)	2.143 (-0.876)	6.611 (-0.876)	-0.566 (-0.264)	-0.566 (-0.421)	-0.303 (-0.203)	-2.499*** (-0.377)		
Shared Border	0.248*** (-0.0467)	0.440*** (-0.0846)	0.235*** (-0.0472)	0.418*** (-0.0846)	0.424*** (-0.0373)	0.424*** (-0.116)	0.0965 (-0.0847)	-0.151 (-0.156)		
Common Language	0.679*** (-0.0221)	-0.0109 (-0.0371)	0.677*** (-0.0218)	-0.016 (-0.0368)	0.148*** (-0.0372)	0.09925 (-0.0826)	0.642*** (-0.0249)	-0.158*** (-0.0512)		
Colonial Link	1.066*** (-0.0409)	0.015 (-0.0845)	1.058*** (-0.0407)	-0.0252 (-0.0842)	0.166*** (-0.042)	0.295*** (-0.104)	1.122*** (-0.0449)	0.179* (-0.105)		
Common Colony	0.953*** (-0.03)	0.015 (-0.0485)	0.941*** (-0.0296)	0.0137 (-0.0483)	0.285*** (-0.0945)	-0.0136 (-0.109)	0.933*** (-0.0311)	0.0126 (-0.0529)		
WTO	0.291*** (-0.0298)	-0.111** (-0.0503)	0.430*** (-0.0641)	-0.219* (-0.118)	0.307*** (-0.0436)	0.0729 (-0.086)	0.135*** (-0.0505)	0.0515 (-0.0998)	0.265*** (-0.0312)	-0.196*** (-0.0566)
RTA	0.253*** (-0.0186)	0.164*** (-0.0347)	0.213*** (-0.0191)	0.182*** (-0.0356)	0.0629 (-0.0431)	0.268*** (-0.139)	0.626*** (-0.0274)	1.770*** (-0.445)	4.220*** (-0.839)	
Importer, Exporter and Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	117,789	64,416	117,789	64,416	43,616	13,427	207,368	203,528	117,789	64,416
R-squared	0.749	0.506	0.762	0.532	0.220	0.108	0.849	0.438	0.737	0.400

Note: All variables are in logarithm, except the dummies and the dependent variables in ppml estimations. Total tariff is used for total trade, food tariff is used for food trade. Variable "Democracy" is used as instrument for RTA in IV regression and estimated using two-stages least squares (2sls). Robust standard errors (clustered by country-pairs) are in parentheses. * p<0.05, ** p<0.01, *** p<0.001

Using different specifications, the results show that on average the WTO and RTAs increase trade among the participant countries. However, while RTAs are found to increase food trade, the WTO is found to have negative impacts on food trade.

Developed versus developing countries

	Total Trade	Food Trade
WTO both developed	-0.194*** (-0.0451)	-0.190* (-0.107)
WTO both developing	0.330*** (-0.0758)	0.232* (-0.124)
WTO developed and developing	0.220*** (-0.0564)	0.0886 (-0.102)
RTA both developed	-0.0322 (-0.0552)	0.511*** (-0.119)
RTA both developing	0.0686 (-0.066)	0.269** (-0.105)
RTA developed and developing	0.346*** (-0.0453)	0.452*** (-0.0909)
Importer, Exporter and Year dummies	Yes	Yes
Observations	207,368	203,528
R-squared	0.855	0.452

Note: Estimated using ppml. Variables included but not reported: gdp importer, gdp exporter, distance, landlocked, shared border, common language, common colony, colonial link. Robust standard errors (clustered by country-pairs) are in parentheses. * p<0.05, ** p<0.01, *** p<0.001

Selected RTAs

	Total Trade	Food Trade
AFTA	-0.138 (-0.0884)	0.549*** (-0.165)
COMESA	0.934*** (-0.195)	0.748*** (-0.202)
ECOWAS	1.387*** (-0.208)	0.315 (-0.238)
EU	0.412*** (-0.0407)	1.205*** (-0.106)
MERCOSUR	1.257*** (-0.0851)	0.561 (-0.386)
NAFTA	0.644*** (-0.0926)	-0.735* (-0.395)
PAFTA	-0.307** (-0.147)	1.053*** (-0.216)
SADC	2.545*** (-0.148)	0.734*** (-0.153)
Importer, Exporter and Year dummies	Yes	Yes
Observations	207,368	203,528
R-squared	0.858	0.434

Note: Estimated using ppml. Variables included but not reported: gdp importer, gdp exporter, distance, landlocked, shared border, common language, common colony, colonial link. Robust standard errors (clustered by country-pairs) are in parentheses. * p<0.05, ** p<0.01, *** p<0.001

Conclusions

Food security at the worldwide level is possible when food can move freely from areas of surplus to areas of deficit. Yet, there are still asymmetries in the regional and multilateral trade agreements, especially between developed and developing countries.

Only RTAs are found to have succeeded in increasing food trade among the members. However, although on average the WTO has negative implications on food trade, it has facilitated the developing countries more than the developed countries.